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Research Article

PREVALENCE OF *AMRAZ-E GOSH* (OTOLOGICAL DISEASES) AND ASSOCIATED RISK FACTORS AMONG SECONDARY LEVEL SCHOOL CHILDREN IN THE FIELD AREA OF NIUM, BANGALORE

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ABSTRACT

Preventable otological diseases/conditions have been found to be significant health problem amongst children. The most common ear problems found among school children are impacted wax, acute and chronic suppurative otitis media, hearing impairment and foreign bodies etc. The present study was a cross sectional conducted in 546 school children of either gender upto 8th standard in age group of 5-15 years for ear diseases/conditions, in three selected schools in the field area of NIUM, Bengaluru, in one year duration. A pretested and semi structured questionnaire was designed in such a manner that more information regarding demographic profile, assessment of various otological diseases/disorders and associated risk factors in children could be collected. The present study revealed that 352 (64.47%) were found having otological conditions. Among them otological conditions were found in 121 (34.37%) and 231 (65.62%) in age group of 5-10 and 11-15 years respectively. Out of total number of enrolled students 319 (58.42%) were girls and 227 (41.58%) were boys. Among them otological conditions were found in 212 (60.23%) girls and in140 (39.77%) in boys. In the present study otological conditions were found more in females than males and more affected children were from lower socioeconomic status. The present study showed that female gender, higher age group and lower socioeconomic status were the risk factors for various otological conditions. Further it was revealed that there was strong relationship between otological conditions and school children; it was also revealed that some risk factors, like female gender, higher age group and lower socioeconomic status are directly related to otological conditions in school children.

Keywords: Prevalence; Otological conditions; Risk factors; Amraz-e Gosh; Unani Medicine.

INTRODUCTION

The human ear is tremendously complex and wonderfully designed organ meant primarily for hearing and balancing the body. Responding to frequencies in the range of 20 to 20,000 Hz, the ear, which helps human beings accomplish a very important social function of communication, is subject to a number of ailments owing to its intricate structure and majority of these ailments occur quite early in life. According to World Health Organization, 42 million people (age > 3 years) have hearing loss[1].A global incidence study reported an acute otitis media incidence rate of 10.9%.Estimates suggest that 80% of children will have at least one episode of acute otitis media (AOM) before 3 years of age[2]. The global incidence of the most severe form of otitis media, chronic suppurative otitis media (CSOM), is 4.8%. CSOM is estimated to contribute to more than half of the global burden of hearing impairment. The burden and population demographics of otitis media differ greatly between developed and developing regions. India and sub Saharan Africa (SSA) account for most deaths from complications arising from otitis media. Incidence of CSOM is higher in developing countries because of poor socio-economic standards, poor nutrition and lack of health education**.** It affects both sexes and all age groups[3].

Preventable ear diseases have been found to be an important health problem among children[4]. Nearly one third of otorhinolaryngology outdoor attendance in a hospital is comprised of the pediatric age group and young children. Ear diseases are the common cause of morbidity among children. The most common ear problems reported among school children in various studies are impacted wax, acute and chronic suppurative otitis media and hearing impairment etc[5].The diseases of external ear include diseases of pinna which may be congenital, traumatic, inflammatory or neoplastic. Similar categorization of diseases of the external auditory canal also is made. Of relevant importance are inflammatory diseases of the ear canal which are collectively termed as the otitis externa and can be either of bacterial, fungal or viral in origin. Miscellaneous conditions like impacted wax, foreign living or nonliving bodies owing to poorly developed anatomical structures in the pediatric age group are also frequently encountered. Diseases of the eustachian tube which is short, straight and wide in children predisposes them to middle ear infections. The major bulk of the disorders of the middle ear are

formed by various kinds of otitis media including ASOM, serous otitis media, recurrent otitis media and CSOM. Although interplay of various factors is responsible for occurrence of any type of otitis media, they are more than often encountered in children of the lower socio- economic strata. Complications of both acute and chronic otitis media especially the latter may be as severe as development of extra cranial conditions like acute mastoiditis, masked (latent) mastoiditis, labyrinthitis, petrositis, facial paralysis and intra cranial complications like meningitis, extradural abscess, subdural abscess, lateral sinus thrombophlebitis, brain abscess and otitic hydrocephalus[3].The diseases of inner ear are largely represented by Meniere's disease which is characterized by vertigo, sensorineural hearing loss, tinnitus and aural fullness[3].

The most common symptoms of ear diseases are hearing loss which may be temporary or permanent, tinnitus, giddiness, delayed and defective speech, mild earaches, vertigo etc. All these symptoms affect an individual's performance in various spheres of life. Consequences of hearing impairment include inability to interpret speech sounds, often producing a reduced ability to communicate, delay in language acquisition, economic and educational disadvantage, social isolation and stigmatisation[6]. Spoken language development is often delayed in children with deafness. Hearing loss and ear diseases can have a significantly adverse effect on the academic performance of the children. In developing countries, children with hearing loss and deafness rarely receive any schooling. In addition to the economic impact of hearing loss at individual level, hearing loss substantially affects socio-economic development in communities and countries[7]. Whereas hearing loss seems to influence the psychosocial and emotional aspects more than the physical aspects, vertigo has more impact on the physical aspect[8].Tinnitus can affect individuals' life, prevent their intellectual work, disturb their daily routine and have a general impact on their quality of life[9].

Regular screening of children ensures that they lead their school lives without hearing impairment and preventable ear disorders[10]. Half of all cases of hearing loss can be prevented through primary prevention. Some simple strategies for prevention include:

Immunizing children against childhood diseases, including meas les, mumps, rubella and meningitis. Pre-school, school and occupational screening for ear diseases and hearing loss is an effective tool for early identification and management of hearing loss[7]. Hearing loss due to otitis media can be prevented by good and healthy ear caring practices[11].In infants and young children with hearing loss, early identification and management can improve the linguistic and educational outcomes for the child[7].The direness of CSOM is partly attributable to its complications and the factors influencing development of its complications are age, poor socio-economic group, virulence of organisms, immune-compromised host, preformed pathways, cholesteatoma etc[3].

Risk factors associated significantly with COM/ROM include ethnicity, genetic factors, gender, day-care center attendance, breast feeding and allergy/atopy etc[12].

Though there is a general decline in the incidence of complications of CSOM, they are still frequently seen in India. The causes are poor socioeconomic conditions, lack of education and awareness about health care (middle ear discharge is still being considered merely a nuisance rather than a potentially dangerous condition), and lack of availability of trained specialists in the far-flung rural areas where transportation facilities are still inadequate[3]. In India, the overall prevalence rate is 46 and 16 persons per thousand in rural and urban population, respectively[3]. Overall prevalence of disabling hearing loss in children all over the world is 1.7%[13].WHO protocol estimated prevalence of significant auditory impairment is reported to be 6.3% in India[14].

India being the second most populous country of the world is home to more than 250 million children, forming about 35% of its total population[15].Students have the potential for changing the health scenario of the society if properly groomed and educated for healthful living. Hearing loss and preventable ear disorders are significant health problems in developing country like India and hence corrective interventions must be initiated at the earliest so that lifetime handicap can be prevented[16]. Prevention of hearing impairment or ear disorders with early diagnosis and treatment of ear diseases is a better and cost effective option compared to rehabilitation of established hearing loss and ear diseases.

In India, data regarding occurrence of ear diseases is still far from sufficient to attract attention of policy makers. Effective strategies to contain the heavy burden of ear diseases can be designed only when sufficient descriptive data is available. Despite of recognition of causation of ear diseases much needs to be done to implement the existing plans at ground level and much more needs to be added in the current health care policy. This can be brought about only by bringing in light the burden of ear disorders and their deleterious impact on economic growth and development of the country. Considering the predilection of ear ailments in extremes of life, this study was designed to collect cross sectional data on prevalence of *Amraz-e Gosh*(Otological Diseases) and associated risk factors in the school children in the field area of NIUM. 546 school children upto 8th standard were screened for ear diseases in three schools in the field area of National Institute of Unani Medicine (NIUM), Bangalore on the basis of history and otoscopic examination and associated hearing loss was assessed by tuning fork tests.

MATERIALS AND METHODS

The present study was a cross sectional, conducted in three selected schools in the field area of National Institute of Unani Medicine (NIUM), Bengaluru,546 school children up to 8th standard were screened to measure the Prevalence of *Amraz-e Gosh* (Otological Diseases) and associated risk factors among the Children of Secondary Level Schools. The duration of study was 1 year, on the basis of history and otoscopic examination and associated hearing loss was assessed by tuning fork tests in school children and prior permission was taken from the head mistress of the schools. Among the selected schools one each was government, semi- government and private. In the present study, students of both sexes were included and detailed history regarding otological problems and their associated risk factors was taken. Reliable information regarding calculation of sample size was not available; hence all students found present on the day of visit were enrolled and screened to avoid any discrepancy in sample size, the inclusion criteria was students up to class 8th and students of either sex and exclusion criteria was students above class 8th and students not willing to take part in study. starting the study, a comprehensive protocol was prepared and put for clearance from the Institutional Ethics Committee (IEC) members of NIUM, Bengaluru. After ethical clearance (IEC No.NIUM/IEC/2013-14/020/TST/05), study was started. Before conducting the study informed consent was taken from head of the schools.

Methods of collection of data

A pretested semi-structured questionnaire consisted of demographic profile, dietary habits, family type, socioeconomic history, symptomatology of otological/ear diseases etc. was prepared. Every question was easily understandable and simple. The questionnaire was based on dichotomous type of questions i.e. yes or no.

Otological examination was performed for the evaluation of the ear problems, such as hearing loss, ear pain, ear discharge, ear wax, swelling and foreign body etc. and associated symptoms like nausea, vomiting, headache and fever.

Necessary instruments like otoscope, tuning fork, aural speculum, thermometer etc. were used for evaluation.

Modified Kuppaswamy Socioeconomic Status Scale 2014 was used to assess the socio-economic class of their parents. Here monthly income of the family, education and occupation of the parents were recorded separately.

Assessment of otological problems in school children

The students were asked about the following problems with class teacher/parents or guardians e.g. hearing loss, ear discharge, ringing in the ear (tinnitus), pain in the ear, vertigo, giddiness, ear discharge, itching in ear, swelling in pre and post auricular area, foreign body sensation in the ear etc. An otoscope was used to examine the external auditory canal for cerumen, foreign bodies, abnormalities of the canal skin and status of the tympanic membrane like mobility, perforation, colour and surface etc. A bowl with water and some antiseptic or liquid soap was used to wash the speculums after use and a towel or sterile cotton to dry them.

Evaluation of ear diseases was done through history and a careful physical examination was performed with visualization and palpation of the auricle and periauricular tissues. A test for hearing was performed to know the hearing loss by using of Tuning Fork of frequency 512 Hertz. The tuning fork was activated by striking gently against rubber block then vibrating tuning fork was placed vertically in line with the meatus, about 2 cm away from the opening of external auditory canal3.The tuning fork was struck softly again and placed on the mastoid bone, then it was softly strike and was placed at midline on the student scalp or on the forehead. If the student did not hear the vibrating sound of tuning fork then they were assumed as suffering from hearing loss. After the assessment the students found with ear problems were asked to consult the E.N.T (ear, nose and throat) specialist.

To spread awareness among students, their families and teachers about the otological problems, their signs and symptoms and associated risk factors, awareness sessions using audiovisual media in different languages, were organized in the schools periodically and they were also educated about the personal hygiene, ear hygiene and preventive measures regarding the otological disorders. Lastly their relevant queries were clarified and they were motivated to adopt such measures by virtue of which they can protect the ear and can promote personal and ear hygiene.

Collected data and results were presented in the form of tables in accordance with purpose of study.

Table 1: Socio-demographic data of different otological conditions of students according to age, gender, class, family type, SES, and type of diet (n=546)

	No. of students	Otological conditions			No. of students	Otological conditions		Total (%)
		No. of students	%			No. of students	%	
Age	170(31.14)	121	34.37	**11-15 years**	376(68.86)	231	65.63	**546(100)**
5-10 years								
Gender								
Girls	319(58.42)	212	60.23	**Boys**	227(41.58)	140	39.77	**546(100)**
Class								
Up to 5th class	64(11.72)	118	21.61	**6th-8th class**	130(23.81)	234	42.86	**546(100)**
Family type	64(11.72)	36	10.23	**Nuclear**	482(88.28)	316	89.77	**546(100)**
Joint								
SES								**546(100)**
UC(I)	4(0.73)	2	0.57	**UMC(II)**	22(4.03)	15	4.26	
LMC(III)	157(28.75)	93	26.42	**ULC(IV)**	363(66.48)	242	68.75	
Type of diet								
Vegetarian	32(5.86)	18	5.11	**Mixed**	514(94.14)	334	94.89	**546(100)**

RESULTS

In the present study 546 school children of either gender up to 8th standard in age group of 5-15 years were screened for ear diseases/conditions, in three selected schools in the field area of National Institute of Unani Medicine (NIUM), Bangalore. 352 (64.47%) were found with otological conditions and 194 (35.53%) were normal. 170 (31.14%) student were in age group of 5-10 years and 376 (68.86%) were of 11-15 years. Among them otological conditions were found in 121 (34.37%) and 231 (65.62%) in age group of 5-10 and 11-15 years respectively. 319 (58.42%) were girls and 227 (41.58%) were boys. Among them otological conditions were present in 212 (60.23%) and 140 (39.77%) among girls and boys respectively. 64 (11.72%) belonged to joint family and 482 (88.28%) were from nuclear family and among them otological conditions were found in 36 (10.23%) and 316 (89.77%) in the joint and nuclear family respectively. Socio economic study showed that 4 (0.73%) were from upper class (I), 22 (4.03%) were from upper middle class (II), 157 (28.75%) were from lower middle class (III) and 363 (66.48%) were from upper lower class (IV). Among them otological conditions were found in 2 (0.57%), 15 (4.26%), 93

(26.42%) and 242 (68.75%) of upper class (I), upper middle class (II), lower middle class (III) and upper lower class (IV) respectively. 32 (5.86%) were vegetarian and 514 (94.14%) were on mixed diet. Otological problems were found in 18 (5.11%) and 334 (94.89%) who were taking vegetarian and mixed diet respectively (Table 1).

Regarding age group of 5-10 years, total no. of students screened were 170 (31.14%), out of which 121 (34.38%) have been found to have otological problems, in which hearing impairment were found in 3 (0.55%), wax in 84 (15.38%), foreign body in 6 (1.09%) and chronic suppurative otitis media (CSOM) was found in 4 (0.73%). In the age group of 11-15 years, 231 (65.63%) have otological problems, in which hearing impairment was found in 14 (2.56%), wax in 154 (28.21%), foreign body in 12 (2.20%) and chronic suppurative otitis media (CSOM) was found in 13 (2.38%). In the age group of 5-15 years, wax was found in 238 (43.59%), tinnitus was found in 22 (4.03%), ear discharge in 22 (4.03%), earache in 131 (23.99%), itching in 72 (13.19%), foreign body sensation in 16 (2.93%), Vertigo in 3 (0.55%) and headache in 37 (6.78%) either as a single disorder or in combination with other otological conditions. More over ear swelling, giddiness, vomiting, nausea and fever were not found in any student in our study. In present study chronic suppurative otitis media (CSOM) was found to be in 17 (3.11%).Hearing impairment was found in 17 (3.11%) children. Tinnitus was found in 22 (4.03%) children. Further in age group of 5-10 years it was found to be 1.09% and 2.93% in the age group of 11-15 years. Ear discharge was found in 22 (4.03%) among total enrolled children. In our study itching, foreign body sensation, vertigo and headache were found in 72 (13.19%), 16 (2.93%), 3 (0.55%) and 37 (6.76%) respectively. Out of 319 girls screened, otological problems were found in 212 (60.23%), in which hearing impairment was present in 9 (1.65%), wax was in 143 (26.19%), foreign body in 8 (1.46%) and chronic suppurative otitis media (CSOM) in 11 (2.01%), tinnitus in 10 (1.83%), ear discharge in 14 (2.56%), FBS in 10 (1.83%), earache in 83 (15.20%), itching in 46 (8.42%), vertigo in 3 (0.55%), and headache was in 24 (4.40%) children. In 227 screened school boys, 140 (39.78%) have otological problems in which hearing impairment was present in 8 (1.46%), wax in 95 (17.40%), foreign body in 10 (1.83%) and chronic suppurative otitis media (CSOM) in 6 (1.10%), tinnitus in 12 (2.20%), ear discharge in 8 (1.46%), earache in 48(8.79%), itching in 26 (4.76%), foreign body sensation in 6 (1.10%) and headache was in 13 (2.38%) children.

In our study earache was found to be more in girls 83 (15.20%) than boys 48 (8.79%).In the present study prevalence of tinnitus was less in girls 10 (1.83%), than in boys 12 (2.20%), hearing impairment was found slightly more in girls 9 (1.65%) than in boys 8 (1.46%), Prevalence of wax was found more in girls 143 (26.19%) than in boys 95 (17.40%). Ear swelling, giddiness, nausea and fever were not found in any female children and vertigo in male children (Table 2).

Table 2: Distribution of students according to gender and different otological conditions (n=546)

Otological conditions	Gender				Total (%) Boys and Girls
	Girls		Boys		
	No. of students	%	No. of students	(%)	
Hearing impairment	9	1.65	8	1.46	17(3.11)
Tinnitus	10	1.83	12	2.20	22(4.03)
Ear discharge	14	2.56	8	1.46	22(4.03)
Earache	83	15.20	48	8.79	131(23.99)
Itching	46	8.42	26	4.76	72(13.19)
Foreign body sensation	10	1.83	6	1.10	16(2.93)
Wax	143	26.19	95	17.40	238(43.59)
Foreign body	8	1.46	10	1.83	18(3.30)
CSOM	11	2.01	6	1.10	17(3.11)
Vertigo	3	0.55	0		3(0.55)
Headache	24	4.40	13	2.38	37(6.78)

Children belonging to socio-economic status of upper class (I) were normal except for earache and wax, which was present in 1 (0.18%) and 1 (0.18%) respectively. In upper middle class (II), hearing impairment was found in 1 (0.18%), tinnitus in 1 (0.18%), earache in 4 (0.73%), itching in 2 (0.37%), wax in 11 (2.01%), foreign body in 1 (0.18%) and headache in 2 (0.37%). In lower middle class (III), hearing impairment was found in 6 (1.10%), tinnitus in 8 (1.47%), ear discharge in 6 (1.10%) earache in 32 (5.86%), itching in 14 (2.56%), foreign body sensation in 6 (1.10%), wax in 70 (12.82%), foreign body in 6 (1.10%), chronic suppurative otitis media (CSOM) in 3 (0.55%), vertigo in 1 (0.18%) and headache was in 7 (1.28%). In upper lower class (IV), hearing impairment was found in 10 (1.83%), tinnitus in 13 (2.38%), ear discharge in16 (2.93%), earache in 94 (17.22%), itching in 56 (10.26%), foreign body sensation in 10 (1.83%), wax in 156 (28.57%), foreign body in 11 (2.01%), chronic suppurative otitis media (CSOM) in 14 (2.56%), vertigo in 2 (0.37%) and headache was present in 28 (5.13%) studied children. In our study the prevalence of wax in upper class was 0.18%, in middle class was 14.83% and in lower socioeconomic class was 28.75%. This showed that lower socioeconomic class children were more affected. Chronic suppurative otitis media (CSOM) was found to be more in children of lower socioeconomic status with a prevalence rate of 2.56%, in middle class prevalence was 0.55%, and no child with chronic suppurative otitis media (CSOM) was found in upper class.

Out of 352 subjects diseased conditions as a single entity; HI was found in 1 (0.28%) and tinnitus also in 1 (0.28%), earache was found in 31 (8.81%), itching in 18 (5.11%), foreign body sensation in 2 (0.57%), wax in 151 (42.90%), foreign body in 6 (1.70%) and perforated tympanic membrane with ear discharge in 4 (1.14%) students. The otological conditions found in two different combinations were EA + Wax in 29 (8.24%), I + Wax in 11 (3.13%), TS + EA in 1 (0.28%), EA + I in 8 (2.24%), TS + FBS in I (0.28%), ED + EA in 1 (0.28%), EA + HA in 10 (2.84%), Wax + FB in 3 (0.85%), I + FB in 1 (0.28%), HI + EA in 1 (0.28%), VO + Wax in 2 (0.57%), FBS + FB in 2 (0.57%), TS + I in 1 (0.28%), TS + Wax in 2 (0.57%), in HI + Wax in 1 (0.28%), HI + I in 1 (0.28%). Otological conditions found in different three combinations were; I + TM (Per) + ED in 2 (0.27%). Wax + TM (per) + ED in3 (0.85%), EA + TM (Per) + ED in 1 (0.28%), EA + Wax + FB in 1 (0.28%), EA + I + Wax in 8 (2.27%), EA + FBS + FB in 1 (0.28%), ED + EA + Wax in 2 (0.57%), EA + FBS + Wax in 1 (0.28%), TS + I + Wax in 2

(0.57%), EA + HA + Wax in 5 (1.42%), EA + I + HA in 3 (0.85%), TS + I + FBS in 1 (0.28%), TS + EA + HA in 1 (0.28%), TS + EA + I in 1 (0.28%), TS + EA + FBS in 2 (0.57%), HI + EA + HA in 1 (0.28%), HI + EA + Wax in 1 (0.28%), I + FBS + Wax in 1 (0.28%), HI + TS + I in 1 (0.28%) and FBS + Wax + FB in 1 (0.28%). Other conditions found in different combinations were TS + EA + TM (Per) + ED in 1 (0.28%), HI + FBS + TM (Per) + ED in 1 (0.28%), EA + I + HA + Wax in 5 (1.42%), TS + EA + FBS + Wax in 1 (0.28%), TS + ED + EA + HA in 1 (0.28%), TS + EA + HA + FB in 1 (0.28%), HI + EA + HA + Wax in 2 (0.57%), EA + HA + Wax + FB in 1 (0.28%), HI + TS + I + Wax in 1 (0.28%), ED + EA + I + HA in 1 (0.28%), HI + TS + EA + TM (Per) + ED in 1 (0.28%), HI + EA + HA + TM (Per) + ED in 1 (0.28%), EA + FBS + HA + Wax in 1 (0.28%), HI + TS + EA + I + Wax in 1 (0.28%), VO + EA + I + FBS + Wax in 1 (0.28%), EA + I + HA + TM (Per) + ED in 1 (0.28%), HI + EA + I + HA + TM (Per) + ED in 1 (0.28%), HI + EA + I + HA + Wax in 1 (0.28%) and HI + TS + EA + I + HA + FB + TM (Per) + ED in 1 (0.28%). (Table 3)

Table 3: Distribution of students according to the different otological conditions either single or combination

Otological conditions	Gender			%
	Girls	Boys	Total	
Hearing impairment(HI)	1	0	1	0.28
Tinnitus(TS)	1	0	1	0.28
Earache(EA)	19	12	31	8.81
Itching (I)	11	7	18	5.11
Foreign body sensation(FBS)	2	0	2	0.57
Wax	87	64	151	42.90
Foreign body(FB)	3	3	6	1.70
Tympanic Membrane Perforated (TM Per)+ED	3	1	4	1.14
EA +Wax	20	9	29	8.24
I+ Wax	9	2	11	3.12
I+ TM(Per)+ED	1	1	2	0.57
TS+EA	1	0	1	0.28
EA+ I	5	3	8	2.27
TS+FBS	1	0	1	0.28
ED+ EA	0	1	1	0.28
EA+HA	6	4	10	2.84
Wax +TM(Per)+ED	2	1	3	0.85
Wax +FB	1	2	3	0.85
I+FB	0	1	1	0.28
HI+EA	1	0	1	0.28
VO +Wax	2	0	2	0.57
FBS+FB	1	1	2	0.57
TS+I	0	1	1	0.28
TS +Wax	0	2	2	0.57
HI +Wax	1	0	1	0.28
HI+I	0	1	1	0.28
EA+TM(Per)+ED	1	0	1	0.28
EA +Wax +FB	0	1	1	0.28
EA +I +Wax	6	2	8	2.27
EA+FBS+FB	1	0	1	0.28
ED +EA +Wax	1	1	2	0.57
EA +FBS +Wax	1	0	1	0.28
TS +I +Wax	1	1	2	0.57
EA +HA +Wax	3	2	5	1.42
EA+I+HA	2	1	3	0.85
TS+I+FBS	1	0	1	0.28
TS+EA+HA	0	1	1	0.28
TS+EA+I	0	1	1	0.28
TS+EA+FBS	0	2	2	0.57
HI+EA+HA	1	0	1	0.28
HI +EA +Wax	0	1	1	0.28
I +FBS +Wax	1	0	1	0.28
TS+EA+ TM(Per)+ED	1	0	1	0.28
HI+FBS+ TM(Per)+ED	0	1	1	0.28
HI+TS+I	0	1	1	0.28
FBS +Wax +FB	0	1	1	0.28
EA +I +HA +Wax	3	2	5	1.42
TS +EA +FBS +Wax	0	1	1	0.28
TS+ED+EA+HA	1	0	1	0.28
TS+EA+HA+FB	1	0	1	0.28
HI +EA +HA +Wax	2	0	2	0.57
EA +HA +Wax +FB	0	1	1	0.284
HI+TS+EA+ TM(Per)+ED	0	1	1	0.28
HI +TS +I +Wax	0	1	1	0.28
ED+EA+I+HA	1	0	1	0.28
HI+EA+HA+ TM(Per)+ED	0	1	1	0.28

EA +FBS +HA +Wax	1	0	1	0.28
HI +TS +EA +I +Wax	1	0	1	0.28
VO +EA +I +FBS +Wax	1	0	1	0.28
EA+I+HA+ TM(Per)+ED	1	0	1	0.28
HI+EA+I+HA+ TM(Per)+ED	1	0	1	0.28
HI +EA +I +HA +Wax	0	1	1	0.28
HI+TS+EA+I+HA+FB+ TM(Per)+ED	1	0	1	0.28
Total	**212**	**140**	**352**	**100**

(EA-Earache, ED-Ear discharge, FBS-Foreign body sensation, FB-Foreign body, HA-Headache, HI-Hearing impairment, I-Itching, Per-Perforated, TS-Tinnitus, TM-Tympanic membrane, VO-Vertigo.)

Out of total children screened with otological conditions, 74 (21.02%) and 47 (13.35 %) girls and boys were having various otological conditions in age group of 5-10 years respectively. In age group of 11-15 years, 138 (39.20%) and 93 (26.42%) girls and boys were having various otological conditions respectively.

DISCUSSION

Ear diseases are the common cause of morbidity among children. The most common ear problems reported among school children in various studies are impacted wax, acute and chronic suppurative otitis media and hearing impairment etc[5].

India being the second most populous country of the world is home to more than 250 million children, forming about 35% of its total population[15]. According to World Health Organization, 42 million people (age > 3 years) have hearing loss. The major cause for hearing loss is otitis media, which is second only to common cold as a cause of infection in childhood[1].Nearly one third of otorhinolaryngology outdoor attendance in a hospital is comprised of the pediatric age group and young children[5].

Hearing loss and ear diseases can have a significantly adverse effect on the academic performance of the children[7]. Hearing loss and preventable ear disorders are significant health problems in developing country like India and hence corrective interventions must be initiated at the earliest so that lifetime handicap can be prevented.

In the present study 546 school children of either gender up to 8th standard in age group of 5-15 years were screened for ear diseases/conditions, in three selected schools in the field area of National Institute of Unani Medicine (NIUM), Bangalore, on the basis of history and otoscopic examination and associated hearing loss was assessed by tuning fork tests.

In the present study out of total students screened, 352 (64.47%) were found with otological conditions as shown in above results. Our study results were similar with the findings of the study done by Sanjay P K *et al* in which otological conditions among children were found in more than 55%[17].In another study conducted by Prakash Adhikari *et al* in school going children of Kathmandu valley, the overall otological diseases were present in 75.7% children[18] which was to a large extent similar to our study results.

Regarding age wise distribution, total number of enrolled students were 170 (31.14%) in age group of 5-10 years and 376 (68.86%) were of 11-15 years. Among them otological conditions were found in 121 (34.37%) and 231 (65.62%) in age group of 5-10 and 11-15 years respectively. Our study results are contrary to the findings of the study conducted by Burns J, Thomson N, in which it was reported that as the age increases otological conditions decreases in children[19]. The probable reason of contrary findings in present study may be that large numbers of enrolled students were from higher age group.

Out of total number of enrolled students 319 (58.42%) were girls and 227 (41.58%) were boys. Among them otological conditions were found in 212 (60.23%) and 140 (39.77%) among girls and boys respectively. Our study results were contrary to the findings of the study conducted by Yang Chen *et al* in which they found that otological conditions among boys were higher than girls[20]. The probable reason for this may be that in present study maximum enrolled students were mainly girls i.e. 58.42%.

Out of total number of included students 64 (11.72%) were from joint family and 482 (88.28%) were from nuclear family. Among them otological conditions were found in 36 (10.23%) and 316 (89.77%) in the joint and nuclear family respectively. This data is opposite to the findings of the study conducted by Adhikari P *et al* in which otological conditions were found more in joint families and overcrowding, poor hygiene and nutrition were given as the possible factors[21]. The probable reason for these opposite results of our study may be that the maximum numbers of students enrolled were from nuclear families.

In present study, data regarding socio economic study showed that 4 (0.73%) were from upper class (I), 22 (4.03%) were from upper middle class (II), 157 (28.75%) were from lower middle class (III) and 363 (66.48%) were from upper lower class (IV). Among them otological conditions were found in 2 (0.57%), 15 (4.26%), 93 (26.42%) and 242 (68.75%) of upper class (I), upper middle class (II), lower middle class (III) and upper lower class (IV) respectively. Our survey findings are consistent with the study conducted by Burns J, Thomson N, where it was clearly reported that children from lowest socioeconomic status were more likely to have otological morbidities. The factors responsible were poverty, overcrowded houses and poor nutrition[19].

From the studied children,32 (5.86%) were vegetarian and 514 (94.14%) were on mixed diet. Among them otological problems were found in 18 (5.11%) and 334 (94.89%) who were taking vegetarian and mixed diet respectively. However in a study conducted by Burns J, Thomson N children taking fruits and vegetables were found having less ear problems than those who did not eat fruits and vegetables[19].Fruits and vegetables may have anti-infective properties and strengthen the immune system.

Regarding age group of 5-10 years, total no. of students screened were 170 (31.14%), out of which 121 (34.38%) have been found to have otological problems, in which hearing impairment were found in 3 (0.55%), wax in 84 (15.38%), foreign body in 6 (1.09%) and chronic suppurative otitis media (CSOM) was found in 4 (0.73%).

In the age group of 11-15 yrs, total no. of students screened were 376 (68.86%), out of which 231 (65.63%) have otological problems, in which hearing impairment was found in 14 (2.56%), wax in 154 (28.21%), foreign body in 12 (2.20%) and

chronic suppurative otitis media (CSOM) was found in 13 (2.38%).

In the age group of 5-15 years, tinnitus was found in 22 (4.03%), ear discharge in 22 (4.03%), earache in 131 (23.99%), itching in 72 (13.19%), foreign body sensation in 16 (2.93%), Vertigo in 3 (0.55%) and headache in 37 (6.78%) either as a single disorder or in combination with other otological conditions. The ear swelling, giddiness, vomiting, nausea and fever were not found in any student in our study.

In age group of 5-15 years wax was found in 43.59% among total enrolled children. These results are commensuration with the results of the study conducted by J.A.E. Eziyi *et al* in which wax was found in 46.70% of children.[22]Further our results were in conformity with the study conducted by Naeimeh Daneshmandan *et al* in which wax was found in 49% of children below eighteen years[23].Olusanya and Adhikari *et al* reported impacted wax among school children of Nigeria, Nepal and Kathmandu Valley was as 52.60%, 62% and 60.60% respectively[22].

In present study chronic suppurative otitis media (CSOM) was found to be in 17 (3.11%). Our study results were similar to the results reported by Soekirman Soekin *et al* in which CSOM was found in 3.10% in Indonesian population[24].Further study done by Ratna Anggraeni *et al* showed that CSOM was present in 2.70% of children[25] which is consistent with our study results. In our study chronic suppurative otitis media (CSOM) was found more prevalent in age group of 11-15 as compared to 5-10 years of age. Bijan Basak *et al* reported in their study that chronic suppurative otitis media (CSOM) was more prevalent in 11-15 years of age group[26],hence our findings are consistent with their study.

In present study hearing impairment was found in 17 (3.11%) children. A study conducted by Thakur *et al* reported that hearing impairment was found in 2% among children under 15 years of age[27],which is close to our study findings. Further in a study conducted in Saudia Arabia reported prevalence of hearing loss in school children of 6-12 years of age was 4.4%[28].

Regarding tinnitus, it was found in 22 (4.03%) children. Further in age group of 5-10 years it was found to be 1.09% and 2.93% in the age group of 11-15 years. There are very few epidemiological studies on the prevalence of tinnitus amongst the children in the literature. However it is mentioned that prevalence of tinnitus increases with age[29] which was commensurate with our study findings.

Ear discharge was found in 22 (4.03%) among total enrolled children. This is almost similar to the study results conducted by L Biagio *et al* in which the prevalence was found to be 3.3% in the same age group[2].

In our study itching, foreign body sensation, vertigo and headache were found in 72 (13.19%), 16 (2.93%), 3 (0.55%) and 37 (6.76%) respectively. No convincing data were found regarding these in previous surveys. Ear swelling, giddiness, nausea, vomiting and fever were not found in any of the studied children in present study.

In our study earache was found to be more in girls 83 (15.20%) than in boys 48 (8.79%). The study conducted by Sanjay P Kishve *et al* showed earache was more in boys (19.10%) than in girls (17.30%)[17].This is opposite to present study results. The possible reason for this may be that in present study number of girls was more than boys. In the present study prevalence of chronic suppurative otitis media (CSOM) was more in girls 11 (2.01%) than in boys 6 (1.10%). The study conducted by L Biagio et al showed that chronic suppurative otitis media (CSOM) was found more in boys (6.70%) than in girls (4.90%)[2].This is also opposite to present study results and the possible reason for this may be that in present study gender and age matching was not made.

In the present study prevalence of tinnitus was less in girls 10 (1.83%), than in boys 12 (2.20%). The study conducted by G. Bartnik *et al* showed the symptoms of tinnitus were more in girls (63.60%) as compared to boys (36.40%)[29]. Thus, our results are opposite to this study. In present study hearing impairment was found slightly more in girls 9 (1.65%) than in boys 8 (1.46%) which was contrary to the study conducted by S.K. Thakur *et al* in which they reported that hearing loss was more in males than in females[27]. Regarding wax, prevalence was found more in girls 143 (26.19%) than in boys 95 (17.40%) which was similar to the study findings of G. Yamamah *et al* in which they reported that ear wax is more frequent in girls than in boys[28].

In our study the prevalence of wax in upper class was 0.18%, in middle class was 14.83% and in lower socioeconomic class was 28.75%. This showed that lower socioeconomic class children were more affected. The study conducted by J.A.E. Eziyi *et al* reported prevalence of wax as 22.70% in lower socioeconomic class[22] which is similar with findings of present study.

In present study chronic suppurative otitis media (CSOM) was found to be more in children of lower socioeconomic status with a prevalence rate of 2.56%, in middle class prevalence was 0.55%, and no child with chronic suppurative otitis media (CSOM) was found in upper class. These findings were commensuration with the study conducted by Okafor *et al*. in which it was reported that only a few cases of chronic suppurative otitis media (CSOM) were found in higher socioeconomic class[30].

Out of total children screened with otological conditions, 74 (21.02%) and 47 (13.35 %) girls and boys were having various otological conditions in age group of 5-10 years respectively. In age group of 11-15 years, 138 (39.20%) and 93 (26.42%) girls and boys were having various otological conditions respectively. Various previous epidemiological studies reported male gender, lower age group and lower socioeconomic status as associated risk factors for various otological morbidities[19, 20, 26] .However, present study showed that female gender and higher age group were the risk factors for various otological conditions. The probable reason for such controversies in results may be that maximum number of enrolled children were girls and of higher age groups. Besides, present study is school based not the population based. The characteristic of under study population determine the distribution of diseases in various aspects. Hence difference may be attributed to this. Regarding socioeconomic status, present study also confirmed it as an associated risk factor as mentioned in previous epidemiological surveys.

With the above discussion the inference may be made that otological conditions were prevalent more in females according to the present study, and more affected children were from lower socioeconomic status. With respect to the age, the present study also showed that otological conditions were more in higher age group (11-15 years) as compared to lower age group (5-10 years).

CONCLUSION

Ear and hearing problems are one of the chief health problems among children. Chronic suppurative otitis media followed by wax impaction and acute otitis media and hearing impairment are the most common ear diseases in school children. Increase in awareness about ear diseases should be one of the goals of all health care providers. Improvement of health care facilities and awareness amongst health care providers would positively help in reducing the prevalence of ear diseases in developing countries like in India. In the present study otological conditions were found more in females than in males and more affected children were from lower socioeconomic status. The present study also revealed that female gender, higher age group and lower socioeconomic status were the risk factors for various otological conditions. Further, it was revealed that there was strong relationship between otological conditions and school children. Students have the potential for changing the health scenario of the society if properly groomed and educated for healthful living. Prevention of hearing impairment or ear disorders with early diagnosis and treatment of ear diseases is a better and cost effective option compared to rehabilitation of established hearing loss and ear diseases.

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