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LEADING ARTICLE

TYMPANOMETRY IN SCHOOL CHILDREN

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Abstract: *Tympanometry along with general otorhinolaryngological examination of 245 children was performed, In 213 children successfully tympanometry could be performed, B type of response was maximally (16.18%) in the age group of 5-6 years. Overall 63.8% had A type response, B type 9.86%, C_1 17.8% C_2 8.45% in cases of middle ear effusian, Parental smoking familial involvement were the factors to be considered.*

Key words: *Tympanometry, School health survey, Otitis media.*

The importance of tympanometry is well established and several studies have shown its importance over audiometry in children which is not reliable below 5 years of age[1]. Otitis media with middle ear effusion (MEE) is a prominent complication of upper respiratory tract infection, usually of viral origin. Viral infection promotes production of inflammatory mediators, reduced ciliary clearence, altered bacterial adherence leading to Eustachian tube dysfunction which causes negative middle ear pressure and middle ear effusion (OME)[2].

Otitis media is one of the most common illnesses encountered in early childhood and it accounts to almost 3.5 % of total patients attending outdoors[3]. Otitis media, which is a multifactorial disease, involves microbiological organisms, environmental risk factors and host characteristics. The principal bacteriological organisms in acute otitis media (AOM) are Haemophilus influenzae (42.8%) Streptococcus pneumonae (35.7%) and Streptococcus pyogenus (7.14%), Moraxella catarrhalis (21.42%)[4].

Voluminous literature on the etiopathogenesis of otitis media contains mainly microbiological aspect and not much literature is available on contributing factors and epidemiological aspects of acute otitis media in children in terms of social and feeding patterns[5] hence this study was undertaken to study the middle ear status of school children of suburban community of Muzaffarnagar area.

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MATERIALS & METHODS

A total of 245 children of Saraswati Shishu Mandir were examined in the year 2001. All children were examined by the author and his team from Indian Institute of Ear Diseases Muzaffarnagar, apart from general examination , otoscopy, acoustic reflex, pneumatic otoscopy, tunning fork test and tympanometry were performed in all cases. Pure tone audiometry was done above the age of five years where tympanometry was suggestive of OME or hearing loss. In selected cases Eustachian tube function was also performed, Siemens SD30 impedancemeter was used

Tympanograms were classified in four categories:

1. Type A: compliance>0.2 ml. and P> - 100 mm. H_2O:
2. Type B: compliance< 0.2 ml. and P< - 400 mm. H_2O:
3. Type C_1: compliance >0.2 ml. and - 100 mm. H_2O > P > - 200 mm. H_2O:

4. Type C_2: compliance >0.2 ml. and - 200 mm. H_2O > P > - 400 mm. H_2O.

A prforma of contributing factors was circulated to parents and its results are shows in table IV.

Age & Sex Distribution of School Children

AgeGroup	Total no.	Male		Female	
		No.	%	No.	%
5 - 6 Years	41	24	58.5	17	41.5
6 - 8 Years	62	35	56.4	27	43.5
8 - 10 Years	69	38	55	31	44.9
10 - 12 Years	73	41	56.2	32	43.8
Total	245	138	56.3	107	43.7

Table I

RESULTS

Out of total 245 children tympanometry could be successfully done in 213 children, rest of the children were having either pain in ear, perforation of tympanic membrane, wax or congenital abnormalities as shown in table II.

Sign & Symptoms

	Total	Male	Female
Pain in Ear	4	2	2
Impairment of hearing	3	2	1
Discharge	9	5	4
Cerumen	14	6	8
congenital abnormalities	2	2	-
Otomycosis	3	3	-
other illnesses	42	23	19

Table II

The male female ratio was 1.29/ 1 and children were catagorized in four groups as shows in table I.

Out of 426 tympanograms a total of 63.8% had 'A' type response, which was highest in 10-12 years group (78.46%), B type response was highest (16.18%) in 5-6 years group and in total 9.86% C_1 type response was almost insignificant of age variation while C_2 type of impedance was drastically reduced in upper age group of children.

The incidence of parental smoking of father was 35 (14.29%) and mother was 8 (3.27%). There were three cases of digital sucking and seven cases of nail biting, twelve children reported allergy to milk or various food products.

Parental smoking		
Father	35	14.29%
Mother	8	3.27%
Dairy Product	15	6.12%
Digital sucking	3	1.22%
Nail biting	7	2.86%
Sensitivity to food product	12	4.9%
Familial incidence		
Father	4	1.63%
Mother	3	1.22%
Grand parents	2	.81%
Brothers & Sisters	31	12.65%
Parity of mother		
Single	78	31.84%
Two	108	44.08%
Multiple	59	24.08%
Socioeconomic status		
Father: Graduate	79	32.24%
Metric	93	37.96%
Can read only	56	22.86%
Illiterate	17	6.94%
Mother: Graduate	38	15.51%
Metric	108	44.08%
Can read only	67	27.35%
Illiterate	32	13.06%
Pets in home	3	1.22%
Pets in campus	2	.81%

The familial incidence was more common 12.65% in siblings than mother, father or grand parents.

DISCUSSION

Higher incedence of B type (16.18%) of response in the lower age group may be due to shorter Eustachian tube which is less angled in children too. Sly and colleagues reported a very high incidence of 20.7%, type B 25%,

Type & Percentage of Tympanograms

	Examined	A		B		C_1		C_2		Could not examined
		No.	%	No.	%	No.	%	No.	%	
All ears No. 490	426	272	63.8	42	9.86	76	17.8	36	8.45	64
Age Group 5-6 Years	68	35	51.47	11	16.18	13	19.12	9	13.24	14
6-8 Years	102	57	55.88	15	14.71	19	18.63	11	10.78	22
8-10 Years	126	78	61.9	14	11.11	21	16.67	13	10.32	13
10-12 Years	130	102	78.46	2	1.54	23	17.69	3	2.31	16

Table III

type C in their study[6]. Stophanic et al also reported a high incidence of 21.8% of type 'B' response and 17.2% type C1 and C2 response a low incidence has been reported by a Chinese study from Hongkong[8] and 6.5% in a study from Greece. With increase in age incidence of B type & C type response reduced in our study. Similar observation has been made by Birch and Elbrond reported the prevalence of A, C1, C2, and B curves to be 30%, 10%, 15% and 40% in 3 year olds and 60%, 25%, 10% and 3% in 6 year olds[10] and many others[11, 12].

There was no sign of acute illness like pain, viral or upper respiratory tract infection in majority, 7 of the patients having abnormal pressures or compliance[13]. No significant relation could be found out in educational status and abnormal response while others have reported a higher incidence in poor education group.Deka (2001)has found 12% of children with OME in his school servey in Delhi[14].

Conclusion

Tympanometry is a very useful diagnostic tool for early diagnosis hence should be a part of school health programme to avoid complication like adhesive otitis media and cholesteatoma or permanent tympanic membrane perforation leading to hearing loss and delayed linguitstic development and poor personality development.

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