

CONTRIBUTING FACTORS IN OTITIS MEDIA

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. Otitis media, which is a multifactorial disease, involves microbiological organisms, environmental risk factors and host characteristics. The principle bacteriological organisms in acute otitis media (AOM) are *Haemophilus influenzae* (42.8%), *Streptococcus pneumoniae* (35.71%) and *Streptococcus pyogenes* (7.14%), *Moraxella catarrhalis* (21.42%)¹ and in chronic otitis media (COM) *Betahaemolytic streptococci* (26%), *Pseudomonas aeruginosa* (16%), *Esch. coli* (10.6%) and *Streptococcus aureus* (30.7%)².

The incidence of COM has increased in recent years despite vast improvement in socioeconomic status, living condition, personal hygiene maternal education and better health care. The acute/chronic otitis media may result in large perforation of tympanic membrane or gross adhesive changes leading to ossicular necrosis and irreversible hearing loss, mostly conductive. The recurrent otitis media with deafness may also lead to delayed development of speech and language^{3,4,5,6}.

Voluminous literature on the etiopathogenesis of otitis media contains mainly microbiological aspects and not much literature is available on contributing factors and epidemiological investigation of acute or chronic otitis media in children in terms of social and feeding patterns⁸, hence a retrospective study was undertaken from 1992 to 1998 of the record available at Indian Institute of Ear Diseases, Railway Road, Muzaffarnagar.

MATERIALS & METHODS

A retrospective study of 1492 children attending out patient department of Indian Institute of Ear Diseases, Railway Road, Muzaffarnagar from 1992 to 1998 with ear problem were the subject of study. An attempt was made to find out the etiological factor in otitis

media. A detailed history was taken in terms of feeding and other habits, such as digital sucking, bottle feeding, position of head during feed, dietary intake especially dairy products like milk, chocolate and sweets, parental smoking and any history of familial involvement. A detailed clinical examination including pneumatic otoscopy, tympanometry, BERA and if possible pure tone audiometry apart from general examination was carried out in every child.

RESULTS

Out of 1492 children of ear diseases attending OPD, 728 patients were suffering from AOM and rest 764 were of chronic otitis media (COM). The age wise incidence is shown in table I.

The incidence of digital sucking was observed in 1.51% in AOM and 1.71% of COM and most of the cases were resistant to antibiotics or had an early recurrence.

The faulty feeding position was the most frequent etiological factor of otitis media and was observed in 23.7% of AOM and 4.84% in COM but in the first two years incidence was 93.08% of AOM and 78.05% of COM.

The incidence of pacifier was less common and was observed only in 5.91% of cases of acute otitis media and 1.57% of chronic otitis media and was more frequent in upper socioeconomic group. In this study, in AOM group, 3.02% cases both partners were smoking while father alone was smoking in 14.84% cases. In COM incidence was quite high, both partners were smoking in 8.02% cases & father alone in 44.9% cases. The incidence of dairy products and other sweets was significant in 6.32% of cases of AOM only.

DISCUSSION

Various etiological factors mainly bottle feeding, faulty postional feeding and smoking were evaluated

as the potential factors.

Age group	Total No.	Males	Females	%
0-1 yrs.	71	39	32	9.77
1-2 yrs.	247	130	117	34.00
2-3 yrs.	221	123	98	30.44
3-5 yrs.	110	65	45	15.15
5-8 yrs.	45	19	26	6.20
8-12 yrs.	32	19	13	4.41
Total	726	396	331	100.00

The most important etiological factor was feeding in lying down and that too in lateral position (mostly left) and was almost always in all infants during night feeds. The bottle-feed was given mostly in lying down supine position with a pillow under the head. Though the incidence of otitis media is less in breast fed children but in our series, incidence was more due to faulty position of feeding termed as positional otitis media^{7,8,9,10,11} and radiographic studies showed the movement of milk up and down the eustachian tube and in the middle ear. The direct contact with cows milk might induce some kind of immunological event in the mucous membrane of tympanic cavity⁷. The human milk has been attributed to have protective factors as it provide immunity and a number of defensive factors are present in breast milk, including (a) lysozyme, (b) lactoperoxidase, (c) lactoferrin (which sequesters iron needed by pathogens), (d) immunoglobulins, especially IgA and complement, (e) antistaphylococcal factor and (f) neutrophils. In addition, breast milk promotes intestinal growth of *Lactobacillus bifidus*, which maintains a low intestinal pH and thereby inhibits growth of potentially harmful bacteria and 51% reduction in the percentage of infants with recurrent otitis media who are exclusively breast fed for more than six months^{12,13}. It is likely that secretory IgA and prostaglandin in human milk reduce the incidence of otitis media by affecting the ability of pathogens to attach or to cause an inflammatory response.

Children with an affecting sibling had 1.6 to 4.2 fold increase in RAOM than children without an affecting sibling⁶. Mr. Daly et al examined in his clinic 900 children having COME & COMIS, which revealed a self or parent reported history of RAOM/COME for 23% parents, 48% of siblings & 62% offsprings. This study suggests susceptibility of a genetic hypothesis in

Otitis media¹⁴, which need further work.

The incidence of pacifiers was not common in our study in comparison to western studies. The incidence of pacifiers was associated more with AOM. Sucking of pacifiers increases the discharge of saliva, which increases the drops outlet and spread viral infections followed by viral otitis media. It also affects by allowing the colonization at mucous membrane of nasopharynx and by increasing the carriage of ear pathogens, which is more common in recurrent otitis media^{15,16}. The radiographic evidence with thin contrast media shows that with increased intranasal pressure, the contrast refluxes into the middle ear cavity and remain there for upto ten minutes even in healthy children¹⁷ and sucking a pacifiers during a respiratory infections increases the reflux of nasopharyngeal secretions into the middle ear cavity.

Though the pacifiers is less harmful than digital sucking which is usually more prolong in duration and was associated more with COM leading to irreversible hearing loss and dentofacial abnormalities including recurrent respiratory infection. The incidence of pacifier was rare after the age of four years.

Age group	Total No.	Males	Females	%
0-1 yrs.	35	19	16	4.58
1-2 yrs.	47	29	18	6.15
2-3 yrs.	38	21	17	4.97
3-5 yrs.	126	73	53	14.49
5-8 yrs.	223	121	102	29.19
8-12 yrs.	295	162	133	38.61
Total	764	425	339	100.00

In our study no clinical correlation could be observed in association to pets (animals) but somehow (dogs, cats, birds etc) at home were more common in AOM patients and majority were of upper socioeconomic group and pets (animals) in campus were common in COM. They were of rural back ground as farmers are keeping domestic animals which includes cows, bulls, buffaloes even horses etc. While Tamio et al have reported an incidence of 20% in the home in AOM¹⁸.

On comparing the education and socioeconomic status AOM was more common in upper educated group, which might be due to better medical care and an early hospital attendance. The chronic otitis media

	Acute Otitis Media		Chronic Otitis Media	
	No.	%	No.	%
Bottle-feeding	212	29.12	14	1.83
Breast-feeding	54	7.42	23	3.01
Parental smoking				
Father	108	14.84	343	44.9
Mother	24	3.30	65	8.51
Dairy products	46	6.32	14	1.83
Pacifiers	43	5.91	12	1.57
Digital sucking	11	1.51	13	1.70
Nail biting	3	0.41		
Positional feeding	173	23.76	37	4.84
Sensitivity to cows milk & F. Products	3	0.41		
Familial incidence				
Father	12	1.65	3	0.39
Mother	9	1.24	2	0.26
Grand parents	5	0.69	1	0.13
Brothers & sisters	86	11.81	32	4.19
Parity of mother				
Single	216	29.67	56	7.33
Two	319	43.82	321	42.02
Multiple	193	26.51	387	50.65
Socioeconomic status				
Father				
Graduate	104	14.29	63	8.25
Metric	216	29.67	302	39.53
Can read only	298	40.93	298	39.01
Illiterate	110	1.51	101	13.22
Mother				
Graduate	75	10.30	14	1.83
Metric	216	29.67	81	10.6
Can read only	298	40.93	452	59.16
Illiterate	139	19.09	217	28.40
Pets in home	14	1.92	2	0.26
Pets in campus	4	0.55	143	18.72

is supposed to be a disease of poor and was observed mostly in illiterate and educationally poor. The maternal education might be a factor in preventing the ear diseases⁴. The familial incidence of otitis media has been observed in 15.39% of AOM and 4.97% cases of COM. In a study by Rockley et al, parents of children undergoing surgical treatment for COME were five times more likely to have tympanic membrane abnormalities consistent with an OM history than control parents¹⁹.

The parental smoking has not been of much significance in our study while others have reported specific increase of otitis media²⁰. The incidence of smoking inside home was associated more in upper socio-economic group.

CONCLUSION

The author feels that breast feeding should be given for complete one year and bottle feeding should be, if supplement is required and that too never in lying down position. Child should never be slept in prone position. Though the incidence of pacifier is less common in northern India, it should be discouraged after the age of one year.

The incidence of otitis media and deafness could be prevented by maternal education specifically of contributing factors and early management modalities of ear involvement. Public health efforts should be made to promote breast feeding. Proper feeding position, avoiding pacifiers and digital sucking, dairy products

should be discouraged and rather abandoned as they lead to biochemical changes in the pathogenesis of recurrent otitis media²¹. Smoking should be discouraged and no smoking around the children. Harsh climate, crowded housing, poor sanitary conditions and lack of personal hygiene should be adequately dealt²². The maternity home should be directed to report the cases

of birth asphyxia, neonatal jaundice, bacterial meningitis, congenital or perinatal infections, defects of head and neck, family history of deafness and low birth-weights for an early investigation (BERA) to check deafness and its management.

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