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Breastfeeding and infant acute otitis media: A comprehensive analytical study

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Abstract

Significance of the study acute otitis media (AOM) is an infection of the middle ear usually caused by a complication of viral infection in the upper respiratory tract¹. The interaction of virus and bacteria plays an important role in the development of AOM and in the latter case can be treated with antibiotics^{1,2}. Due to limited space in the middle ear and relatively poor drainage through the Eustachian tube, especially in young children, AOM is often accompanied by significant pain and other characteristics including fever, acute loss of hearing and general lethargy.

The factors currently identified as associated with a reduced risk of AOM include breastfeeding, avoidance of *in utero* and childhood passive tobacco smoke exposure, and avoidance of indoor air pollution^{3, 11-13}. Evidence from the literature supports a reduction in AOM risk from breastfeeding. However, there has been no recent comprehensive analytical review, particularly addressing issues related to the effect of duration and exclusivity of breastfeeding on the risk of AOM. Therefore, we aimed to study the relation between Breastfeeding and acute otitis media.

Keywords: Breastfeeding, AOM, Newcastle–ottawa scale, WHO

Introduction

Acute otitis media (AOM), an infection of the middle ear, is commonly caused by a complication of viral infections in the upper respiratory tract. Otitis media is generally a childhood disease, but occurs in adults also. In children it resolves with age as there are changes in anatomy with growth. The interaction of virus and microbes play an important role in the development of AOM and in the latter case can be treated with antibiotics. Due to limited space in the middle ear and relatively poor drainage through the Eustachian tube, especially in young children, AOM is often accompanied by significant pain and other characteristics including fever, acute loss of hearing and general lethargy. It results in continuous middle ear effusion with short-term hearing loss. Until the condition is resolved, it has effects on balance, hearing, and speech and language development; resulting in poor school performance.

A review of epidemiologic studies points that the introduction of infant formula in the first 6 months of life is associated with increased incidence of acute otitis media in early-childhood. Recent research raises the question of how long this increased risk persists, and whether lack of breastfeeding has any association with diagnosis of otitis media with effusion. Possible risk factors include younger age, male sex, Eustachian tube anatomy in infants, parental or sibling history of OM, low socioeconomic status, reduced duration of breastfeeding, overcrowding, daycare attendance, recurrent upper respiratory infections, snoring, pacifier use, position of feeding, allergic rhinitis, parental smoking, parental education level, and passive smoking^[10-13]. Infants and young children are at highest risk of developing AOM, with peak prevalence between 6 and 36 months of age. This pattern of incidence may be attributed to the structural and functional immaturity of the ET and an immature immune system. The Eustachian tube in the infant is shorter, wider, and more horizontal than in the adult, which makes it prone for harbouring infections. AOM is characterized by rapid onset of signs and symptoms of inflammation in the middle ear, which is accompanied by effusion. Signs of inflammation include bulging or fullness of the tympanic membrane (TM), erythema of the TM, and acute perforation of the TM with otorrhea.

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Materials and Methods

Infants with history of ear discharge (otorrhoea) visiting to the outpatient department of Mahatma Gandhi medical college and hospital, Department of Otolaryngology, Sitapura, Jaipur, within the period of 1 year from February 2021 to January 2022 were included in this study. The study got approval from the Institutional Ethics Committee. A purposive sampling method was followed by inviting all infants. 150 infants satisfying the inclusion criteria were included in the study. Infants who are not breastfed and those with cleft lip, cleft palate, craniofacial abnormalities and other co-morbidities were excluded from the study. Detailed history with regard to otorrhoea, frequency of occurrence of otorrhoea (no. of episodes), position of the infant while breast feeding (supine or upright), burping after feeding and the mother's knowledge regarding breast feeding was recorded.

Results

A total of 150 breast fed infants were included in the study. Out of 150 infants, there 78(52%) were male and 72(48%) female. Prevalence was more among males than females. Among 150 cases 115 (76.66%) were presented with 1st episode of otitis media while 27 (18%) cases presented with 2nd episode and 8 (5.33%) cases with 3rd episode of otitis media. Frequency of otitis media was higher with increase in age. The association between age group and number of episodes of ASOM was statistically significant. Out of 150 aural swabs sent for culture and sensitivity, 93 positive cultures were obtained, 57 cultures showed no microbiological growth. Of the 93 positive cultures, Haemophilus influenza 43 (46.23%) was the commonest microorganism isolated, followed by group b Streptococci 17 (18.27%), streptococcus pneumoniae 8 (8.6%), staphylococcus aureus 6 (8%), Pseudomonas 6 (3.79%), klebsiella species 4 (3.79%), E. coli 4 (2.53%), MRSA 3 (2.53%) and Proteus 2 (1.26%). (Figure 1).

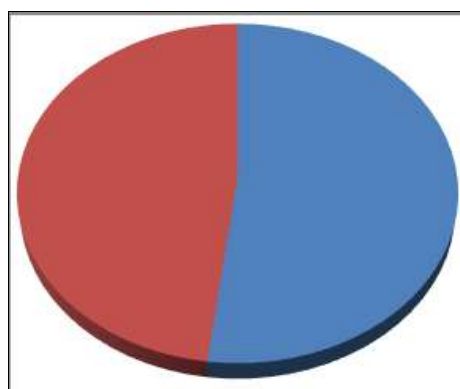


Fig 1: Gender wise distribution of infants

Table 1: Age wise distribution of the cases was from 1 month to 12 months

Age group (months)	1 st episode	2 nd episode	3 rd episode	Total
1-3	24	4	0	28
4-6	23	10	0	33
7-9	40	5	3	48
10-12	28	8	5	41
Total	115	27	8	150

Commonest age group with ASOM was between 10-12 months with total of 41 cases.

Table 2: Position of breast feeding as risk factor:

Age group (months)	Supine	upright	Total
1-3	12	16	28
4-6	16	17	33
7-9	28	20	48
10-12	32	9	41
Total	88	62	150

Conclusion

In addition to the biochemical components in human milk, there are also physiological mechanisms explaining the association between breastfeeding and reduced risk of AOM. Strong negative pressure is generated by breastfeeding, in contrast to bottle-feeding. Suck, swallow and breathing patterns are also different from bottle-feeding infants. In bottle-feeding children, pooling of formula is more likely. The low beneficial biological components in formula coupled with pooling of milk create an increased risk of pathogen colonisation in the eustachian tube leading to an increased risk of AOM.

Our analysis showed that longer duration of breastfeeding was protective for AOM during the Infant life. Longer duration of breastfeeding has also been found to be protective for many childhood diseases including acute childhood infections, childhood diabetes, respiratory and atopic diseases, and obesity.

Future Recommendations

- Future studies should address the role of these breastmilk components in the colonisation of the middle ear by AOM pathogens and the response of the infant's immune system.
- Researchers are also advised to record breastfeeding in a uniform manner using validated questions and definitions, to avoid exposure misclassifications.

Conflict of Interest

Not available

Financial Support

Not available

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