ORIGINAL ARTICLE

DETERMINANTS OF ACUTE OTITIS MEDIA IN INFANTS

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ABSTRACT

Objectives: To describe the relationship of acute otitis media with mode of feeding (bottle-or breast-fed) and with different positions of infant during feeding.

Study design: Case control study

Subjects and methods: Babies aged up to 24 months (62 cases, 66 controls) were selected from the OPD of Abbasi Shaheed Hospital and the Aga Khan Hospital, Karachi. The variables considered were the gender of the infant, mother's educational level and occupation, mode of feeding and the different positions during feeding. SPSS version 11.5 was used for descriptive and inferential analysis.

Results: There was a significant association of otitis media with lying position of baby during feeding (OR 37.7, 95 % CI 13.34-106.43, p< 0.001), bottle feeding (OR 3.0, 95%CI 1.43-6.25, p = 0.003), working mother (OR 3.8, 95% CI 1.38-10.34, p = 0.007) and education of mother (OR 2.1, 95% CI 1.01-4.24, p = 0.044).

Conclusion: Babies with acute otitis media were more likely to be bottle fed and having a lying posture during the feeding than babies without having acute otitis media.

Keywords: Acute Otitis Media, Bottle feed, Breast feed, infants.

INTRODUCTION

Acute otitis media (AOM) is common in young children in fact it is the number one reason that children under one year are taken to the doctor.[1] Despite advances in treatments, the percentage of children who developed otitis media has remained quite steady over time. After first infection the affected children are at higher risk of developing repeated infections later in childhood.[1] Treatment of such infections could have implications to the economy.[2] Bland found increase incidence of otitis media in bottle-fed as compared to breast-fed infants and speculated this to be due to transfer of IgA in breast milk.[3] Haemophilus. Influenzae is the major cause of otitis media and lower respiratory tract infection in childhood. Human milk contains numerous host defense factors which may inhibit adherence of Haemophilus H. Influenzae to pharyngeal cells and its colonization. The incidence of H. influenzae in breast-fed infants and formula-fed infants was 0 and 7.0% respectively. It is suggested that the colonization of H. influenzae in the throat was inhibited by the presence of breast milk.[4]

Previous studies showed that breast feeding decreases the incidence of gastrointestinal and urinary tract infection, lower respiratory tract illnesses, otitis media and meningitis. Common reasons for which breast and bottle fed infants are brought in well baby clinics include otitis media, respiratory tract infection, viral infections and gastroentritis.[5] There is evidence that breast-feeding has decreased the rate of gastrointestinal infections as compared to exclusive or supplementary bottle feeding.[6-7] Exclusive breast feeding for four months or more prevents against both acute and recurrent otitis media.[8-10]

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The disease is more common in boys than girls. It is more common in children born with a cleft palate or other structural problems of the face or skull. Infants who were not being breast-fed had increase risk of middle ear infection.[11] Pharyngeal mucosal immunity may develope against respiratory infection in breast fed infants.[12]

The objective of this study was to describe the relationship of acute otitis media with mode of feeding (bottle-fed or breast-fed) and with different positions of infant during feeding, apart from some maternal factors.

SUBJECTS AND METHODS

It was a case control study conducted from April to September 2007 in Pediatric and Oto-rhino-laryngology (ENT) O.P.D of Abbasi Shaheed Hospital and Aga Khan Hospital, Karachi.

Inclusion criteria were infants with earache, fever, discharge, and irritability for the last six days or less, further supported by otoscopic findings of pussy discharge from middle ear, bulging and redness of tympanic membrane accompanied by ear pain. Infants with cranio-facial abnormalities, genetic disorders, immune deficiency, babies with recurrent AOM, chronic otitis media and permanent deafness were excluded.

A closed ended questionnaire was administered consisting of the variables regarding the gender of the infant, mother's educational level and occupation, type of feeding (bottle vs. breast fed) and the different positions of infant during feeding (lap, lying or sitting). Data was collected and entered by the fourth year medical college students after getting formal training by the principal investigator. SPSS version 11.5 was used for descriptive and inferential analysis. Cross tabulations were performed for selected variables for bi-variable analysis against the outcome of acute otitis media and p value of less than 0.05 was considered significant.

The variables having multiple categories were compressed to meaningful dichotomized variable and relationship of different factors were observed among cases and controls through cross tabulation using chi square test of proportion. Odds ratio was calculated for each bi-variable analysis.

RESULTS

A total of 128 babies were selected and data was entered on SPSS version 11.5. Before conducting final analysis missing information in the fields were checked and corrected. Most of the mothers were house wives (82%). Data on educational status of the mothers, proportion of different age groups and duration of breast feeding to the baby is presented in Table 1. Most babies were male (72.7%). A substantial proportion (95.3%) had updated vaccination status and only seven percent had history of similar disease in his/her sibling. The reported bottle feeding was (11%) and bottle plus breast feeding was 48.4%. Only 40.6% reported exclusive breast feeding. Regarding posture of the baby during breast feeding mothers preferred lap position (57%) followed by lying (38%) and sitting (5%).

Table 1: Baseline characteristics of the babies and their mothers selected from the pediatric outpatient department of tertiary care hospitals in Karachi. (n=128)

Characteristic	Proportions %
Age (months)	
<6	21.9%
6 to <12	40.6%
12 to <18	28.9%
18 to <24	8.6%
Duration of feeding	
<6m	26.6
6 to <12	32.8
12 to <18	25.8
18 to <24	14.8
Education of the mother	
Primary	32.8
Secondary	24.2
Higher secondary	30.5
Graduate	12.5

In the bivariate analysis there was no significant relationship of gender with acute otitis media. Education of the mother was significantly associated with otitis media and cases of otitis media were twice as likely from a mother having educational status less than higher secondary level than controls. Lying position of the baby during feeding was positively associated with acute otitis media. Babies with otitis media were 38 times more likely to be fed in lying position than babies without otitis media, (Table 2).

Table 2: Risk factors for otitis media among the children aged up to two years (n=128)

Characteristics	No Otitis media (Controls n=66) Frequency	Otitis media (Cases n=62) Frequency	Odds Ratio	95% CI	P value
Gender of the baby					
Male	48	45	1.007	0.046-2.19	0.98
Female	18	17			
Occupation of the mother					
House wife	60	45	3.8	1.38-10.34	0.007
Working women	6	17			
Education of the mother					
=Higher Secondary	34	21	2.1	1.01-4.24	0.044
<Higher Secondary	32	41			
Baby's position in relation to mother during feeding					
In the Lap	60	13	37.7	13.34-106.43	<0.001
Lying on bed/floor	6	49			
Mode of feeding					
Breast	35	17	3.0	1.43-6.25	0.003
Breast and bottle both	31	45			

DISCUSSION

The proportion of females who exclusively breast fed their babies in this study was 41% (52/128). An earlier multi center hospital based study done in Karachi found even a lower proportion of females who exclusively breast fed their babies.[13] Despite the fact that breast feeding is strongly recommended in our religion, well supported by culture and endorsed by the government this pattern of breast feeding exhibits the complex nature of the issue.

This study did not find any statistically significant relationship of gender with acute otitis media. However many other studies have reported male gender vulnerability for acute otitis media.[11] The non significant results in this study could be ascribed to small sample size and low representation of female babies in the sample.

Studies have reported a positive relationship of acute otitis media with lower educational status of the mothers. This study also found that babies with AOM belong to the mothers who had educational level less than higher secondary.[14,15] The reason might be educated women are generally in better position to promote health and prevent diseases in their babies. Education imparts a decision making status to the women that is usually required for prompt action during an episode of children illness.

This study showed a direct relationship of acute otitis media and employed mothers. however the available literature presents a divided opinion on the relationship of otitis media and employed mothers.[16,17] Lanphear and colleagues in a large study based on National Health Interview Surveys, also found that recurrent otitis media is more common among children of employed mothers.[18] One explanation of this phenomenon is that working mothers are busy or stressed in their schedules and dont find time to promptly act upon when the initial symptoms of respiratory tract infections develop. Another hypothesis is that working women may be supplementing breast feeding with bottle feed.[19,20] Besides mothers employment, day care/out of home care (except mother's employment) are considered independent predictors of recurrent otitis media.[21,22] Presumably, use of day care is more common among employed mothers and hence could serve as a proxy variable for mother's employment.

Despite small sample size, this study demonstrates positive relationship of bottle feeding with AOM. These results are supported by other international studies as well.[23] Earlier studies have established the association of breast feeding with disease development in the children through demonstrating dose response relationship of breast feeding with respiratory infections. Resler et al. elaborated that most of the infants who were fully breast fed had lower odds ratio of cough and wheeze.[24] Another birth cohort study of 2602 children concluded that breast feeding to one year may reduce the prevalence and subsequent morbidity of respiratory illness and infection in infancy. [8]

Another study describeing effect of feeding methods on respiratory illnesses, found protective effect of breast feeding on respiratory illnesses. The effect persisted even after adjustment for age of the infant, socioeconomic class, maternal age, and cigarette consumption.[25]

Kathryn revealed another favorable effect of breast feeding by concluding that in the first year of life the percentage with any otitis media was 19% lower and with prolonged episode (>10 days) was 80% lower in breast fed compared with bottle fed infant.[26] Similar results were given by Milosavljevic and Virijevic in a study where healthy infants enrolled at birth were followed for the occurrence of acute otitis media during the first year of life. Infants who were exclusively breast fed had 0.72 odds for developing acute otitis media as compared to those who were exclusively bottle fed .[25]

Chung et al recollected the current evidence through a

meta analysis on the effect of breast feeding on short and long term infant and maternal health outcome in developed countries. This review found that history of breast feeding was associated with a reduction in the risk of acute otitis media, severe lower respiratory tract infection and asthma.[9] These results indicate that the reduction in morbidity associated with breast feeding is of sufficient magnitude to be of public health significance. The favorable effects of breast feeding are so profound and universal that health organizations around the world endorse breastfeeding as an important public health concern.[27-33]

This study also revealed an association of otitis media with positional differences of babies during feeding. The anatomy of Eustachian tube in babies allow entry of milk in to middle ear when fed in supine position. This concept of positional otitis has also been stated in earlier researches of different national and international studies.[34,35]

Another study demonstrated that supine posture of the baby during feeding predisposes them to abnormal post-feeding tympanographic results compared with infants fed in the semiupright position. This is the reason for recommending feeding in lap or semi upright positions.[36]

CONCLUSION

Babies with acute otitis media were more likely to be bottle fed, had lying posture during feeding, and belonged to mothers who are less educated and employed, where as babies without acute otitis media had opposite findings.

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