



Original Article

Effect of Breastfeeding on Pneumonia: A Case-Control Study

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ABSTRACT

Pneumonia-associated mortality is the leading cause of fatalities in children under 5 years of age. Breast milk provides adequate nutrition and immunity to children against harmful bacteria, thus protecting them from infections like pneumonia. Despite several beneficial effects of breastfeeding, mothers in many countries, even industrialised countries, are incurious about breastfeeding their infants and children, leading them to severe life-threatening diseases like pneumonia. This case-control study was conducted from January 2018 to July 2018 in the Department of Paediatrics, Jalalabad Ragib-Rabeya Medical College Hospital to evaluate the effect of breastfeeding on pneumonia in 6 to 24 months old children. A total of 200 children were included in this study by purposive sampling. Study subjects were divided into two groups. A hundred children who were suffering from pneumonia were included in group I and considered as cases. Group II, which was deemed the control group, contained 100 children who showed no symptoms of pneumonia. Data was collected from the parents of children in a structured questionnaire. The data was analyzed using SPSS version 22. Children who were not under exclusive breastfeeding were more prone to develop pneumonia ($p < 0.05$). But the duration of breastfeeding had no significant effect on the development of pneumonia in our study ($p > 0.05$). Practices that promote breastfeeding are an essential way to lower the incidence of pneumonia.

Keywords: Pneumonia, Breastfeeding, Exclusive breast feeding (EBF).

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INTRODUCTION

Pneumonia, the leading cause of child mortality, was responsible for approximately 1.4 million deaths among children <5 years of age¹. In many developing countries, two to seven percent of infants are hospitalised each year with respiratory tract infections². When an infant only feeds breast milk up to six months of age, it is referred to as exclusive breastfeeding (EBF)³. Both the World Health Organization (WHO)

and the United Nations International Children's Emergency Fund (UNICEF) recommended early initiation of breastfeeding within 1 hour after birth, exclusive breastfeeding during the first six months of life, and continued breastfeeding until 24 months of age⁴. Breast milk contains all the nutrients and vitamins that are optimal up to six months of human life⁵. Poor breastfeeding practises are widespread in many countries, making children more vulnerable to gastrointestinal disorders, otitis media, and even respiratory tract infection⁶.

Diarrhoea and pneumonia are the leading causes of

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childhood morbidity and mortality worldwide⁵. The likelihood of death from diarrhoea and respiratory infections is 14 times less in children who exclusively take breast milk in the first six months of life⁵. Though there are many beneficial effects of breastfeeding, sub-optimal breastfeeding practice is still common⁷. Not only developing countries but also industrialised countries are facing problems regarding suboptimal breastfeeding⁸. The unique antimicrobial and immunological properties of breast milk provide adequate nutrition and immunity to children against harmful bacteria⁶. Human breast milk has financial, psychosocial, and developmental benefits in addition to nutrients⁹.

Ramezani et al.¹⁰ reported in a review study that breastfeeding lowers the risk of developing acute lower respiratory tract infections, particularly pneumonia, in developing countries. According to the BDHS 2014, 55 percent of children under the age of six months in Bangladesh are exclusively breastfed¹¹. Despite the efforts of different government agencies and NGO's, exclusive breastfeeding practice is still low in our country and traditional cultural barriers also exist. The study was conducted to evaluate the relationship between breast feeding and the risk of pneumonia in children aged 6 to 24 months.

MATERIALS AND METHODS

This case-control study was conducted in the Department of Paediatrics, Jalalabad Ragib-Rabeya Medical College Hospital, Sylhet from January 2018 to July 2018. By purposive sampling, a total of 200 children with an age range of 6-24 months were included. Among them, 100 were hospitalised for pneumonia and were considered cases. These children were included in group I. A child with pneumonia was defined as having a cough or difficulty breathing, fast breathing, and/or chest pain, as well as recently developed radiological pulmonary shadowing¹². A hundred children were free from pneumonia, which was considered as control. These children were included in group-II. Children in the control group were collected from the EPI centre and the paediatric outpatient department (OPD) who were suffering from other problems apart from pneumonia. Children with a history of low birth weight, congenital cardiovascular or respiratory malformations, chromosomal abnormalities, and recurrent wheeze were excluded from the study. The protocol of this study was approved by the ethical committee of Jalalabad

Ragib-Rabeya Medical College, Sylhet. The aim and purpose of the study were explained, and informed written consent was taken from the parents. A detailed history were taken and data was collected by using a structured questionnaire. The socioeconomic classification was made according to July 2016 per capita Gross National Income by World Bank calculations¹³. Data were analyzed using SPSS version 22. The mean and standard deviation were used to express numerical data, and the frequency and percentage were used to express categorical data. The Independent Student "t" test and the Chi-square (χ^2) test were done and the odds ratio was calculated. A p-value of <0.05 was considered statistically significant.

RESULTS

The result showed that the mean age of the children of cases and controls was 10.395 ± 4.037 months and 10.935 ± 4.26 months, respectively. In the case group, 57% of children were male and 43% of children were female, whereas in the control group, 45% were male and 55% were female. There was no significant difference between the age and gender of the case and control group ($p > 0.05$). Most of the children in the case group (47%) were living in the rural area in comparison to control group children (20%), which was statistically significant ($OR = 3.547$; 95% of $CI = 1.893-6.646$; $p = 0.000$). The mean age of the mother in the group-I was 26.14 ± 4.96 years, and in the group-II it was 25.72 ± 4.24 years. Regarding educational qualification, 16% of the mothers of pneumonia affected children were illiterate, which was 5% of the mothers in the control group. Contrarily, 8% of mothers in the case group and 20% of mothers in the control group had higher secondary certificate degrees or above. Children with illiterate mothers had a significantly higher risk of acquiring pneumonia, whereas those with college-educated mothers had a significantly lower risk ($p < 0.05$). Most of the mothers in the case and control groups were housewives (86% and 84%, respectively). In group-I, 37%, 56%, and 7% of the children came from low, middle, and high socioeconomic status, respectively, which was 15%, 70%, and 15%, respectively, in group-II. Children from low socioeconomic status backgrounds had a much higher risk of having pneumonia, whereas those from high socioeconomic backgrounds had a significantly lower risk ($p < 0.05$) (Table-I).

Table-I: Distribution of study population by demographic variable (N=200)

Demographic profile	Group-I Case (n=100)	Percentage	Group-II Control (n=100)	Percentage	Odds ratio (95% CI)	p-value
Age						
Months±SD	10.39±4.037 (Range: 6-24)		10.935±4.26 (Range: 6-22)			0.25
Sex						
Male	57	57	45	45	0.922	0.776
Female	43	43	55	55	(0.527-1.612)	
Residential area						
Rural	47	47	20	20	3.547	0.000
Urban	53	53	80	80	(1.893-6.646)	
Maternal age						
Years ± SD	26.14±4.96 (Range: 18-36)		25.72±4.24 (Range: 19-36)			0.521
Maternal education						
No education	16	16	5	5		
Primary	24	24	27	27		0.01
Secondary	52	52	48	48		
Higher	8	8	20	20		
Maternal occupation						
Housewives	86	86	84	84	1.170	
Service holders	14	14	16	16	(0.538-2.547)	0.692
Father's education						
No education	8	8	5	5		
Primary	25	25	26	26		
Secondary	54	54	44	44		0.137
Higher	13	13	25	25		
Socioeconomic status						
Low	37	37	15	15		
Middle	56	56	70	70		0.001
High	7	7	15	15		

N= total number of subject, n= number of subjects in each group

Exclusive breastfeeding for 6 months was present in 24% of the children in the case group and 70% in the control group, which was statistically significant (OR= 7.389; 95% of CI=3.946-13.836; p=0.000) (Table-II).

The mean duration of breastfeeding in the case group

was 9.9±4.82 months and 10.31±4.78 months in control group. The difference was statistically insignificant (p>0.05) (Table-III).

Table-II: Distribution of the patients on the basis of EBF, (N=200)

EBF	Group-I n (%)	Group-II n (%)	Odds ratio	p-value
Yes	24 (24)	70 (70)	7.389	0.000
No	76 (76)	30 (30)	(3.946-13.836)	
Total	100 (100)	100 (100)		

N= total number of subject; n= number of subjects in each group; EBF- Exclusive breastfeeding

Table-III: Distribution of the patients depending upon the duration of breastfeeding (N=200)

Groups	Duration of breastfeeding (Months±SD)	p-value
Group-I (n=100)	9.9±4.82 (Range: 2-24)	0.547
Group-II (n=100)	10.31±4.78 (Range: 0-22)	

*N= total number of subject, n= number of subjects in each group

DISCUSSION

Breastfeeding is the ideal method suited for the physiological as well as psychological needs of an infant³. Suboptimal breastfeeding was responsible for 10% of the disease burden in children under the age of five⁷. The unique anti-infective properties of breast milk provide adequate protection against pneumonia¹⁴. A study in Brazil revealed that when there was an increased prevalence of breastfeeding, it reduced the rate of hospitalisation of under 1 year of children suffering from pneumonia¹⁵.

The mean ages of both the case and control group were 10.395±4.037 months and 10.935±4.26 months, respectively, in our study. Almost similar age ranges were also observed by Chisti et al¹⁶.

In this study, 43% of males and 57% of females suffered from pneumonia. The result is not statistically significant. Stanley and Kitaw observed a total of 47310 respondents from the four countries in West Africa and found that male children had a higher distribution than females¹⁷.

In our study, children living in rural areas had a 3.5 times higher chance of developing pneumonia. Children with college-educated mothers had a lower risk of acquiring pneumonia, whereas those with illiterate mothers had a significantly higher risk. However, we were unable to find any association between the father's education and the children's

pneumonia. The association between pneumonia and maternal education was also mentioned by Boccolini et al¹⁵.

A cross-sectional study conducted by Prietsch et al.¹⁸ found a positive correlation between low socioeconomic status and pneumonia. In the current study, children from low socioeconomic status backgrounds had a much higher risk of having pneumonia, whereas those from high socioeconomic backgrounds had a significantly lower risk.

Hanieh et al.¹⁹ conducted a cohort study in Vietnam and found that EBF significantly reduces the admission of children with suspected pneumonia. In our study, we found that children who didn't get exclusive breastfeeding for 6 months had a 7 times greater risk of developing pneumonia. These results are also supported by Boccolini et al¹⁵.

Although the mean duration of breastfeeding in the case was lower than in the control group, we didn't find any significant difference. Maintenance of breastfeeding up to six months of life is crucial for the proper development of a child's immunity. Cessation of breastfeeding or non-breastfeeding during the neonatal period may increase the incidence of malnutrition, poor immunity, pneumonia, and diarrhea²⁰.

To protect against infections, human milk contains a number of antimicrobial, anti-inflammatory, immunomodulatory, and bioactive molecules. Transfer

of cytokines and other immunological agents from the mother's immune system to the baby through breast milk provides adequate protection to the baby¹⁴. These processes involve several mechanisms, including promoting mucosal maturation, balancing the gut microbiota, developing mature neonatal immune systems, interfering with antigen attachment to epithelial cells, and limiting exposure to germs from foreign dietary antigen^{21,22}.

CONCLUSION

From this study, we can conclude that exclusive breastfeeding for 6 months may reduce the occurrence of pneumonia in children aged 6-24 months. These results confirm the necessity to focus breastfeeding promotion efforts on mothers of very young infants.

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