Original Article

Risk Factors of Pneumonia in Children– A Community Survey

M I Bari [1], A B Siddiqui [2], T Alam [3], A Hossain [4]

Abstract

Pneumonia was the leading common cause of death in young children in Bangladesh. 351 patients of Pneumonia below five years of age were selected as per WHO guidelines. Out of 351 patients, one patient died due to very severe pneumonia that had history of low birth weight and malnutrition. The following factors were taken into consideration such as age, sex, low birth weight, feeding pattern, malnutrition, housing, paternal education, ventilation of living room and smoking habits of parents. It was found that below 2 months of age, severe pneumonia showed 50% and there was male preponderance in all age group and also 41.6% of male children had recurrent attack of pneumonia. Low birth weight and lack of breast feeding patient had suffered more frequently of Pneumonia. In this study, it was statistically proved that malnutrition (p=.00028), inadequate paternal education (p=.00007), bad ventilated living room (p=.00037) and also smoking habits of parents (p=.04054) had significant important risk factors of recurrent attack of Pneumonia in children.

Introduction

Acute respiratory infection (ARI) that leads to pneumonia was one of the commonest causes of death of children in developing countries. Approximately 15 million children under 5 years of age die in the world annually, of which 4-5 million deaths were caused by ARI.[1,2]. The magnitude of the problem could be acknowledged from the fact that about 20% of infant born in developing countries failed to reach their fifth birth days and that one fourth to one third of the child morbidity was attributable to pneumonia alone as an underlying cause[3]. Pneumonia was the most common cause of morbidity and mortality during infancy and childhood in devoloping countries[4] .Under five mortality rate (USMR) in Bangladesh was 122/1000 and it was claimed that 25-30 children/thousand/year die from ARI only[5]. Almost all ARI death in young children were due to pneumonia.

Incidence of pneumonia under 5 years old in urban area of the United States between 30-40 per 1000 children, whereas in developing countries it was 70-100 per 1000 children[6]. In rural area of Bangladesh a child under 5 years old experienced 2-3 episodes of pneumonia[7]. Bangladesh overall morbidity due to pneumonia was approximately 27.6 lacks and mortality was 13.37%[8]. There were about 7-9 episodes of ARI per child per year among under five kids in our country[9].

There were some risk factors predisposed to ARI in children.Colley *et al.* commented that in the first year of life exposure to cigarette smoke due to parental smoking doubled the risk for the infant of an attack of respiratory infections [10]. Other risk factors like malnutrition. Vit-A deficiency , Low birth weight (LBW), overcrowding, bad housing, low socio economic condition, lack of immunization, outdoor and indoor air pollution

[1] Professor, Department of Paediatrics, Rajshahi Medical College, Rajshahi.

[2] Professor, Department of Paediatrics, Rajshahi Medical College, Rajshahi.

[3] Associate Professor, Department of Ophthalmology, Rajshahi Medical College, Rajshahi.

[4] Associate Professor, Department of Paediatrics, Rajshahi Medical College, Rajshahi.

impacted children more to got pneumonia frequently [11-14].

So, this study was undertaken to find out the risk factors for acute & recurrent attacks of pneumonia in the community & addressing all problems would definitely reduce the morbidity and mortality of pneumonia in Bangladesh.

Patients and Method

This retrospective and longitudinal study was carried out on September 97 to August 98 at Horogram union of Paba Thana. Which was 15 kilometer away from Rajshahi Medical College, Rajshahi. There were 16 village in this union and average number of under five population in each village was 124 (Census report of Paba thana Health complex 1991)[15]

Three data collectors were selected in this study and they were 2 weeks training before collecting information in 6 separate villages. Since the natural course of pneumonia was 5-7 days. they attended each home at every alternate day and samples were collected in simple way. Getting primary information from the data collecter, research fellow would attend these patients on a the next day and confirmed the validity of diagnosis and also helped in medical care and advice.

351 patients of pneumonia below five years of age were selected of 6 villages at Horogram union during 12 month study period. The history was taken in detail and presented questionnaire were filled up. The following factors were encountered age, sex, housing,smoking habits of parents, feeding patttern and nutritional status etc.Patient having two or more attacks of pneumonia in a study period were termed recurrent pneumonia At the end, data were processed and analyzed by computer using SPSS win. program.

Results: Part-A

Pneumonia was highest in more than 2 months of age. Fig. I showed age distribution of the children by pneumonia where 60% of pneumonia above 1 year of age and only 7% below 2 months of age.

Attack of pneumonia and sex showing in Table-1, where there was male preponderance in all age

group and 41.6% of male had recurrent attack of pneumonia. There was a statistically significant association between sex and recurrent-attack of pneumonia (P=0,15).

Table-2 showed attack of pneumonia and in relation to birth weight where low birth weight babies had more recurrent of pneumonia than normal birth weight babies.

Table-3 reflected attack of pneumonia and it's relation to feeding pattern in children where the children having no breast feeding suffered more than that of others. Recurrent attack of pneumonia and nutritional status on the basis of mid-arm circumference where severe and moderate malnutrition suffered more recurrent pneumonia which was 44.4% and 94.7% respectively showed in table-4. The association of recurrent attack of pneumonia of the children's and their nutritional status was statistically highly significant (P=. 00028).

Attack of pneumonia and paternal educations shows in table-5 and those father having primary school or less education their children suffered more pneumonia 86.3% and it was statistically highly significant (p=.00007).

Attack of pneumonia and recurrence in relation to ventilation in living room showed in Table-6. Those children having bad ventilation living room suffered 40.8% where as good ventilation living room only 19.0%. It was statistically significant (p=. 00037). Attack of pneumonia and number of smoker in the family reflected their children got more pneumonia than no/one smoker. There was a statistically significant association between smoking and recurrent attack of pneumonia (p=.04054).

Results: Part-B

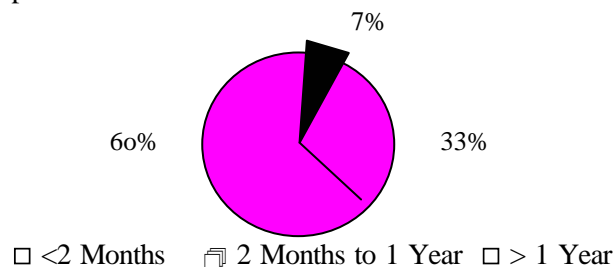**Fig. 1** Age distribution of the children affected by pneumonia.

□ <2 Months   ▤ 2 Months to 1 Year □ > 1 Year

Table-1: Attack of pneumonia and sex

Attack of pneumonia	Sex		Total
	Male N(%)	Female N(%)	
Once	111(58.4)	114(70.4)	225(64.1)
More than one	79(41.6)	47(29.2)	126(35.9)
Total	190(100.0)	161(100.0)	351(100.0)

Chi Square = 5.81   DF=1   P=.01593

Table-2: Attack of pneumonia and low birth Weight

Attack of pneumonia	Birth Weight		Total
	Low birth N(%)	Normal birth Weight N(%)	
Once	111(58.4)	114(70.4)	225(64.1)
More than one	79(41.6)	47(29.2)	126(35.9)
Total	190(100.0)	161(100.0)	351(100.0)

Chi Square = 2.05741   DF = 1   P = .15147

Table-3: Attack of pneumonia and feeding pattern.

Attack of pneumonia	Birth Weight			Total
	Best feeding N(%)	Partial Best feeding N(%)	No breast feeding N(%)	
Once	158(68.1)	63(56.8)	4(50.0)	225(54.1)
More than one	74(31.9)	48(43.2)	4(50.0)	126(35.9)
Total	232(100.0)	111(100.0)	8(100.0)	351(100.0)
	(66.1)	(31.6)	(2.3)	(100.0)

Chi Square = 4.90821   DF = 2   P = .08594

Table-4: Attack of pneumonia and nutritional status on the basic of mid arm circumference (MAC)

Attack of pneumonia	Nutritional status on MAC				Total
	Normal N(%)	Mild Malnutrition N(%)	Moderate Malnutrition N(%)	Server Malnutrition N(%)	
Once	8(88.9)	98(77.2)	94(55.3)	25(55.6)	225(64.1)
More than one	1(11.2)	29(22.8)	76(44.7)	20(44.4)	126(35.9)
Total	9(100.0)	127(100.0)	170(100.0)	45(100.0)	351(100.0)
	(2.6)	(36.2)	(48.4)	(12.8)	(100.0)

Chi Square = 18.98099   DF = 3   P = .00028

Table-5: Attack of pneumonia and Paternal education.

Attack of pneumonia	Paternal educational		Total N%
	Upto Primary School N%	2ndary School above N%	
Once	182(60.1)	43(89.6)	
More than one	121(39.9)	5(10.4)	126(35.9)
Total	303(100.0)	161(100.0)	351(100.0)
	(86.3)	(13.7)	(100.0)

Chi Square = 15.68888   DF = 1   P = .00007

Table-6: Attack of pneumonia and Ventilation of living room

Attack of pneumonia	Ventilation of living room		
	Bad	Good	Total
	N%	N%	N%
Once	161(59.2)	64(81.0)	225(64.1)
More than one	111(40.8)	15(19.0)	126(35.9)
Total	272(100.0)	79(100.0)	351(100.0)
	(77.5)	(22.5)	(100.0)

Chi Square = 12.66831   DF = 1   P = .00037

Table-7: Attack of pneumonia and number of smoker in the family

Attack of pneumonia	Ventilation of living room		
	One	Two of more	Total
	N%	N%	N%
Once	161(59.2)	64(81.0)	225(64.1)
More than one	10(22.2)	116(37.9)	351(100.0)
			(100.0)
Total	45(100.0)	306(100.0)	351(100.0)
	(12.8)	(87.2)	(100.0)

Chi Square = 4.19496   DF = 1   P = .04054

Discussion

Pneumonia was studied in many developed and developing countries. In the present study it was found that the incidence of pneumonia was gradually increasing in more than 2 months of age. The cause of increasing incidence of ARI in this age group, a lack of antibody against common viral and bacterial pathogens resulted in an increase incidence of respiratory tract infection that peaks at one 1 years age[16].

The incidence or severity of ARI based on sex varies very little but male children have more recurrent attack than female. This study have some similarities with other studies[17].

Low birth weight babies had significantly higher incidenceof pneumonia particularly in the first year or two months of life[18].

In this study it was statistically proved that low birth weight babies have had more recurrence of pneumonia and was an important factor predisposed of pneumonia.

In this present study, patient who had no breast feeding at all suffered 100% and partial breast feeding had 43.2% recurrent attack of pneumonia.

This study co-related well with the Talukdar study which reflected a child who was exclusively breast feed had 25 times and 4 times less chance of death from diarrhea and pneumonia respectively than a child who was bottle feed[19]. Besides, breast milk contains antibody to influenza, parainfluneaz, haemophilus, pertusis and cornebacterium diphtheria may protect pneumonia in children who was breast feed[20]. Poor paternal as well as maternal education upto primary level suffed more pneumonia than those had secondary level or above. This study co-related well with other studies[19-20].

Children living in kacha (poor) house or poor ventilated living room and having low socioeconomic condition suffered from pneumonia significantly higher than in pucca and good ventilated living room or above average economic condition families. Parental smoking had got a definite affect on the exposure to cigarette smoke as parental smoking doubled the risk for an infant of an attack of pneumonia. So, parental smoking was one of the most important factor which predisposed to pneumonia in children.

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All correspondence to:
Md. Iqbal Bari,
Professor.
Department of Paediatrics
Rajshahi Medical College
Rajshahi.