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The burden, social and economic consequences of Childhood Pneumonia in North Karnataka- A cross-sectional study

Dattatraya D Bant[1], Tewe U Kapfo[2]

[1]HOD and Professor, [2]Post Graduate, Department of Community Medicine, Karnataka Institute of Medical Sciences, Hubballi, Karnataka

Abstract

Background : Pneumonia is the prominent cause of childhood mortality. The disease accounts for 18 per cent deaths in children < 5 years. Pneumonia kills more children than any other illness, more than measles, malaria and AIDS combined. Caring for children with pneumonia is a daunting task in resource-poor countries where caregivers are required to pay for treatment 'out of pocket' at the point of care.

Objectives: To assess the burden, social and economic consequences of childhood pneumonia and to determine the risk factors associated with it.

Methods : A cross sectional study was conducted among the 15 children admitted in Paediatrics Department of KIMS Hubli, with clinical evidence of pneumonia infections using a pretested, semi-structured questionnaire.

Results: The incidence of childhood pneumonia was more among males (87%) and in rural population (54%). 53% were in the aged group of 1 and 5yrs. Overcrowding was present in 74%, indoor pollution in 80% and outdoor pollution in 33%. 13% had to cancelled social gatherings and 54% had other impacts on their socialisation. 53% have taken external financial help for the treatment of pneumonia.

Conclusion: Treatment of childhood pneumonia requires relatively more care and consequently more resources to manage. The high costs of treatment puts a heavy financial burden on the family that necessitate the need for preventive care interventions which could lead to a reduction in the number of disease cases and decreased socio economic burden on the families.

***Key WordS** : Pneumonia, children, economic burden, childhood mortality.*

Introduction

Pneumonia is the major cause of childhood mortality. The disease accounts for 18 per cent deaths in children less than 5 years. Pneumonia kills more children than any other illness, more than measles, malaria and AIDS combined [(3)].156 million new pneumonia cases are reported every year in the developing world. As many as 8.7 per cent of these cases are severe enough to be life-threatening and require hospitalization. India accounts for the maximum 43 million new cases followed by China (21 million cases) and Pakistan (10 million cases) [(4)]. In India, pneumonia is responsible for an estimated 410,000 deaths in children under five. Studies have shown that up to 19% of children hospitalized with pneumonia die in India. India tops in global pneumonia deaths of children less than five years of age with 3.97 lakh reported in 2010 (UNICEF) [(4)]. The third annual International Vaccine Access Centre's (IVAC) Pneumonia Progress Report 2012 said that almost 1,088

Corresponding author:
Dr. Tewe U Kapfo
Department of Community Medicine,
Karnataka Institute of Medical Sciences,
Hubballi, Karnataka
Phone (or Mobile) No.: +91-7005859240
Email: teweukapfo@gmail.com

children under 5 years of age die every day in India, an increase of 6.7 per cent from 2008 IVAC data which pegged the deaths at 3.71 lakh annually[5].

Caring for a child with pneumonia may be financially burdensome in resource-poor areas, particularly when in-hospital treatment is required for a prolonged period. This is even more relevant in situations where caregivers have to pay 'out of pocket' for patient care [2]. Estimates show that the average daily cost of in-patient care for under-5 with severe pneumonia in health facilities in developing countries is beyond the reach of average low-income earners if unsubsidised [6]. Many a times, children are discharged against medical advice, often for financial reasons, and sometimes due to burnout on the part of caregivers or a perceived lack of clinical improvements [7].

In addition to the direct medical costs, composed of expenses on medicines, investigations, consultation, and hospital stay, households of sick children incur non-medical expenses for transportation, food, child care, and lost income in the form of caregiver time and/or lost wages. The provider cost of US$83.89 and US$146.59 and household cost of $41.35 and $134.62 for inpatient treatment of severe pneumonia in secondary and tertiary level hospitals respectively was estimated in a study conducted in India [8].

Childhood clinical pneumonia is caused by a combination of exposure to risk factors related to the host, the environment and infection. Possible risk factors include malnutrition, low birth weight, non-exclusive breastfeeding (during the first 6 months of life), immunization status, indoor air pollution, overcrowding, concomitant diseases, mother's education and birth order etc. Poverty and malnutrition underlie both the high incidence and deaths of young children from pneumonia in SEAR countries. But poor access to healthcare services is largely responsible for high mortality [9]. In India, more than 40 per cent of children aged under-3 year underweight and more than half of all children under 6 months are not exclusively breastfed [10]. Keeping in view the burden of the disease, this study was conducted with objectives to assess the burden, social and economic consequences of Childhood Pneumonia and to determine the risk factors affecting the development of pneumonia.

Objectives

1. The assess the burden, social and economic consequences of Childhood Pneumonia

2. To determine the risk factors affecting the development of pneumonia.

Methodology

This was a cross sectional study conducted in the paediatrics Department of Karnataka Institute of Medical sciences, Hubli in the month of May and June 2014. Convenient sampling technique was used to collect the data and a total 15 children aged 0-14 years who were admitted with a physician's diagnosis of pneumonia, severe pneumonia or very severe pneumonia noted on their treatment records were included in the study.

Inclusion criteria: All pneumonia cases aged 0 -14 yrs whose parents gave consent to participate in the study.

Case definition: In the context of cough or difficulty in breathing, pneumonia is defined as tachypnoea (respiratory rate more than or equal to 60 breathes per minutes for children under 2 months of age , >50 breathes per min from 2 -11 months of age, or > 40 breaths per minute in children from 1-4 year of age); severe pneumonia is diagnosed if symptoms are associated with lower chest wall indrawing or sub-costal retraction, and very severe pneumonia if there is a danger sign such as central cyanosis, or severe respiratory distress ,convulsions, inability to arouse the child or if the child is unable to drink [9].

Data collection: The participants (parents of the children) were briefed about the purpose of the study and informed verbal consent was taken and data was collected by using pre-designed, pre- tested and semi-structured questionnaire. It consists of Socio-demographic details (age, gender, types of family and per capita income), specific informations (socio-cultural factors, nutritional history, developmental history, environmental factors etc.) and social and economic consequences.

Data Analysis: The data collected was entered in Microsoft Excel and later analyzed using SPSS version 20. Appropriate descriptive statistics and inferential statistics were used for analysis.

Results

Socio-demographic details

Majority of the study population (53%) were in the aged group of 1 to 5yrs.The incidence of childhood pneumonia was more among males (87%) as compared to females and in rural population (54%) as compared to the urban population. 60% were from joint family, 80% from Hindu religion and 80% from class III & IV socioeconomic status according to modified BG Prasad classification.

Table 1: Birth history and other factors influencing the disease

Variables		Number of cases	Percentage %
Birth order	1st	6	40
	2nd	6	40
	3rd	2	13.3
	>3rd	1	6.7
Gestational period during delivery	Preterm	2	13.3
	Term	13	86.7
Birth weight	Low	1	6.7
	Normal	14	93.3
Congenital anomaly	Yes	4	26.7
	No	11	73.3
Exclusive breast-feeding	Yes	14	93.3
	No	1	6.7
Immunization history	Achieved	13	86.7
	Delayed	2	13.3
Developmental milestones	Achieved	13	86.7
	Delayed	2	13.3
Nutrition	Malnourished	12	80
	Well nourished	3	20

It was observed that the incidence of pneumonia was more common in 1st (40%) and 2nd (40%) birth order. 80% of the cases were malnourished (Table 2).

Table 2: Environmental factors influencing the disease

Variables		Number of cases	Percentage %
Type of house	Kuchcha	6	40
	Semi-pucca	7	46.7
	Pucca	2	13.3
Overcrowding	Yes	11	73.3
	No	4	26.7
Separate kitchen	Yes	10	66.7
	No	5	33.3

Cont ... **Table 2: Environmental factors influencing the disease**

Fuel used	Fire wood	10	66.7
	Gas	5	33.3
Exhaust Ventilation	Present	8	53.3
	Absent	7	46.7
Moulds and damp stains on walls and floor	Yes	5	33.3
	No	10	66.7
Source of water	Borewell	4	26.7
	Corporation	11	73.3
Purification of water	Boiling	4	26.7
	Filter	1	6.7
	None	10	66.7
Indoor pollution	Yes	12	80
	No	3	20
Outdoor pollution	Yes	5	33.3
	No	10	66.7

Overcrowding was present in 74%, indoor pollution in 80%, outdoor pollution in 33% and poor housing in 87% (Table 3) and lack of cross ventilation in most of the houses.

53% have residence within 1km of health care facilities and in most of the cases (93%) it takes less than 1 hour to reach the hospital, only 7% need 1-3 hours.

Table 3: Social and economical impact of the disease

Variables		**No of cases**	**Percentage %**
Psychological impact	Anxious	10	66.7
	Depressed	4	26.7
	No	1	6.7
Impact on socialisation of child	Cancellation of social gatherings	2	13.3
	Others	8	53.3
	None	5	33.3
No. of days of absence from work	>5days	7	46.7
	1-3days	4	26.7
	None	4	26.7
Loss of pays (Rupee)	>1000	4	26.7
	100-300	1	6.7
	600-1000	6	40
	None	4	26.7
External financial help	Taken	8	53.3
	Not taken	7	46.7
Cost of management is affordable	Yes	10	66.7
	No	5	33.3

67% of the parents were anxious and 27% became depressed due to disease. 13% had to cancel social gatherings and 54% had other impacts on their socialisation. In 46% of the cases, parents had to take leave from work for more than 5 days and 27% parents for 1-3 days on account of the child's disease. Attendance of the siblings was not affected due to the sickness. 26.7% people lost an income of more than Rs.1000, 40% lost between Rs. 600 to Rs.1000 and 6.7% lost between Rs. 100-300. 53% have taken external financial help for the treatment of pneumonia. 67% responded that the cost of treatment was affordable but most of them took loans (53%) on accounts of the disease (Table 4).

There was no stigma associated with the disease and the socialization of majority of children was not affected. Time lapse between appearance of symptoms and hospitalization was more in rural areas as compared to urban areas. In 53% cases, the medical intervention was sought within 24 hours whereas in 47% cases, medical intervention was done in 1-2 days.

All females and 66.6% male of the study population were malnourished. Indoor air pollution was seen to same extent in both rural and urban areas whereas, outdoor pollution was more in rural areas (20%) as compared in urban areas (13.3%). As the birth order increased, malnourishment increased from 1st, 2nd and 3rd order births. More than half of the rural and urban residents took external financial support for medical facilities.

Discussion

In our study 93% were exclusively breastfeed for 6 months. Whereas in the study conducted by Arifeen et al, the proportion of infants who were breastfed exclusively was only 6% at enrolment, increasing to 53% at 1 month and then gradually declining to 5% at 6 months of age. Compared with exclusive breastfeeding in the first few months of life, partial or no breastfeeding was associated with a 2.23-fold higher risk of infant deaths resulting from all causes and 2.40- and 3.94-fold higher risk of deaths attributable to ARI and diarrhoea, respectively [11].

In our study, male female ratio affected by pneumonia was 6.5. in the study conducted by Hsiu-Lin Chen et al, on childhood pneumonia in Taiwan in 2001-2002, the male female ratio affected by pneumonia was 1.26 [12] and by Christa L Fischer Walker et al. is 1.3 [13].

In our study, 43% of the study population belonged to age group 0-1 years and 50% in the age group of 1-5 yrs. The study conducted by Christa L Fischer Walker et al, showed that 81% cases of pneumonia occurred before 2yrs [13].

In our study, 67% of the study population used solid fuels, whereas in the study by Zheng Xiao Hong et al. in Nanjing, China, 3.5% of the study population used solid fuels [14].

In our study, 33% had previous history of hospitalisation, 80% overcrowding and indoor pollution, 87% poor housing while in the study conducted by W.Fonseca, in Fortaleza, Brazil 5.4 % had previous history of hospitalisation, 20.3% overcrowding and 9.6% indoor pollution, 12% poor housing. Malnutrition, indoor air pollution, overcrowding, day care attendance, humidity and outdoor air pollution were etiological factors for childhood pneumonia [15]. The same was observed in our study.

In our study, 80% were undernourished and 7% were not exclusively breast fed, whereas in the study conducted by M Ghimire et al., 40% of the children were underweight and were not exclusively breast fed [9].

Conclusion

Our study concluded that social and economic factors like poor housing, low socioeconomic status play a crucial role in the development of childhood pneumonia. Treatment of childhood pneumonia requires relatively more care and consequently more resources to manage. The high costs of treatment puts a heavy financial burden on the family leading to loss of wages, loans, debts etc. that necessitate the need for preventive care interventions such as exclusive breast feeding, proper nutrition, hygienic practices, proper housing conditions, complete immunisation, control of indoor pollution, which could lead to a reduction in the number of disease cases and decreased socio economic burden on the families. This will also decrease the pressure and cost of treatment on the already overburdened public health system. Apart from the significant costs to the health care providers, families of children with pneumonia diseases incur considerable expenses during the course of treating the sick child.

Limitation

The study had a number of limitations. Firstly, the sample size was less as the study was conducted during the off-season. Secondly, the study was conducted in a single institution, so the findings might not be generalisable.Thirdly, the complications and long term sequelae were not taken into account as the duration of the study was short.

Recommendation

Improved access to preventive and management strategies is needed to reduce the burden of

Childhood pneumonia in resource limited settings. More research on childhood pneumonia is needed to better understand the burden and to develop more effective and cost effective preventive and treatment strategies.

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