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Original Research Article

A STUDY OF COMMON MORBIDITIES AMONG THE 0–5-YEAR CHILDREN WITH SPECIAL REFERENCE TO ACUTE RESPIRATORY TRACT INFECTION

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Abstract

Background: Children under five years represent a critical group in terms of health and development. Despite substantial global efforts to reduce child morbidity and mortality, developing countries like India continue to face challenges, with acute respiratory infections (ARI) being one of the most prevalent and serious health issues in this age group. This study examines common morbidities among children aged 0-5 years, focusing on ARI and the factors influencing its incidence. **Materials and Methods:** A community-based, cross-sectional study was conducted in the Boko Bongaon Block, Kamrup (Rural) District, Assam. A sample size of 441 children was calculated based on ARI prevalence (18.5%) with 20% relative error. Participants were selected using simple random sampling from 21 villages. Data were collected through household visits using pretested questionnaires and clinical examination tools. Statistical analysis was performed using Epi Info 7, with significance set at $p < 0.05$. **Result:** Among the 441 children studied, morbidity was present in 63.04%. ARI accounted for 16.78% of the total morbidities, with the highest prevalence (29.81%) in the 0-1 year age group. Significant associations were observed between ARI incidence and factors such as overcrowding (23.44% vs. 5.95%, $p < 0.05$), poor ventilation (20.12% vs. 6.48%, $p < 0.05$), incomplete immunization (62.75% vs. 3.85%, $p < 0.05$), and lack of exclusive breastfeeding (31.40% vs. 6.56%, $p < 0.05$). Socioeconomic status also influenced ARI prevalence, with the lower-middle class reporting the highest incidence (32.43%). **Conclusion:** Acute respiratory infections remain a major health concern among children under five in rural Assam, exacerbated by poor living conditions, inadequate healthcare, and low immunization rates. Targeted interventions focusing on improving housing conditions, increasing immunization coverage, and promoting exclusive breastfeeding are essential to reducing ARI incidence in this vulnerable population.

INTRODUCTION

Gaston Bachelard aptly noted, “Even a minor event in a child’s life is an event of their world, and thus a world event” (1962).[1] Children are the Inheritors of our past and the foundation of our future. They form the backbone of any nation, and their health is of paramount concern. In India, children under the age of five account for approximately 15% of the total population. The early years of life represent a critical period characterized by rapid growth and development, warranting continuous monitoring. During this phase, around 40% of physical growth and 80% of cognitive development takes place.[2] Yet, despite their importance, children are often overlooked in resource distribution, particularly in developing countries.[2]

The World Health Organization (WHO) defines morbidity as any deviation from a state of physiological well-being.[3] According to WHO classification, India falls under the South-East Asia Region D (SEAR-D), a high-mortality region. While child mortality in this region has declined modestly over the past four decades, children under five still represent about 15% of India’s population.[2,4] The critical years of rapid development make children highly susceptible to adverse influences, which can

have long-term implications for their future growth and health.[4]

Common childhood ailments in this age group include acute respiratory infections (ARI), diarrheal diseases, malnutrition, and anemia. Globally, in 2013, approximately 38% of under-five deaths were attributed to infectious diseases, with undernutrition contributing to more than half of these deaths.[5] In India, leading causes of under-five mortality include pneumonia, diarrhea, and prematurity.[5,6]

Acute respiratory infections are among the most prevalent illnesses in children in developing countries, contributing significantly to the overall disease burden.[7] In India, ARI accounts for up to 50% of pediatric outpatient consultations and 30% of hospital admissions.[8] Risk factors such as inadequate housing, overcrowding, indoor air pollution, and limited access to healthcare are closely associated with the high incidence of ARI.[8,9]

To mitigate this burden, national programs like the Reproductive and Child Health Program, Phase II (RCH-II), have prioritized the prevention and management of childhood pneumonia. Effective strategies include rapid identification, timely treatment, and preventive interventions.[10] However, challenges in the national implementation of such programs persist, necessitating ongoing evaluation and adjustment.[10]

MATERIALS AND METHODS

Study Design: A community-based, cross-sectional study.

Study Area: Boko Bongaon Block, Kamrup (Rural) District, Assam.

Sample Size and Sampling Design: Based on a 2012-2013 prevalence rate of ARI (18.5%) among children aged 0-5 years, with a 20% relative error and a 95% confidence interval, the required sample size was calculated to be 441 using the formula:

$N = 4pq/L^2$,

Where P = 18.5%, q = 100 – P, and L = 20% of prevalence (relative error).

Fifteen percent (21 villages) of the 140 revenue villages were selected using simple random sampling. In each village, 21 children meeting the inclusion criteria were sampled through house-to-house visits.

Study Population: Children under five years and their mothers. If the mother was absent or deceased, another adult responsible for the child was the respondent.

Inclusion Criteria

- Permanent residents of the study area.
- The youngest child (aged 0-5 years) in households with multiple children.

Exclusion Criteria

- Terminally ill children.
- Non-residents.
- Children who were not the youngest in households with multiple children.

Study Period: One year.

Data Collection Tools

- Pretested questionnaire
- Measuring tape
- Weighing machine
- Stethoscope
- Thermometer
- Growth chart
- Hemoglobin estimation (Haemocheck/Sahli's method)

Ethics Clearance: Approval was obtained from the Institutional Ethics Committee (IEC), Gauhati Medical College.

Data Analysis: Data will be analyzed using Epi Info 7. Statistical tests such as the chi-square test, along with mean, standard deviation, and proportions, will be employed. A p-value of < 0.05 will be considered statistically significant.

Review of Literature

Acute Respiratory Infections (ARI):

Acute respiratory infections (ARI) in children are categorized into upper respiratory infections (URI) and lower respiratory infections (ALRI). URI is commonly characterized by a fever exceeding 37.8°C, accompanied by cough or nasal discharge, while ALRI is identified by symptoms such as cough, rapid breathing (more than 50 breaths per minute), and, in severe cases, chest indrawing (1). ALRI may arise directly or evolve as a complication of URI.

Classification of ARI Severity:

- **Mild ARI:** Cough or cold without pneumonia.
- **Moderate ARI:** Rapid breathing but no chest indrawing.
- **Severe ARI:** Chest indrawing or other severe symptoms such as convulsions, severe malnutrition, or nasal flaring (2).

Indian Context: In India, ARI and pneumonia are often used interchangeably in research, though community and hospital-based studies suggest that around 10% of ARI cases progress to pneumonia. However, this may not fully capture the national burden (3). Data from the National Family Health Survey (NFHS) reveal ARI prevalence in children under five ranging from 6.5% to 19% across different periods (3). A study conducted in Udupi documented an annual ARI incidence of 6.42 episodes per child, with 8.7% of cases progressing to pneumonia (4).

Morbidity and Mortality: Globally, ARI—particularly pneumonia—is a major cause of mortality among children under five, accounting for approximately 20% of childhood deaths, with pneumonia being a significant contributor (5). In India, pneumonia is responsible for over 400,000 child deaths annually and accounts for 13-16% of pediatric hospital admissions (6). The Million Death Study identified 369,000 deaths due to pneumonia in children aged 1-59 months, with a mortality rate of 13.5 per 1,000 live births (7).

Global ARI Impact: Pneumonia remains the leading cause of mortality in children under five globally, responsible for 18% of all deaths in this age group,

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particularly in regions such as Sub-Saharan Africa and South Asia (5). According to UNICEF's 2012 report, countries like India, Nigeria, and the Democratic Republic of the Congo contribute to nearly half of the global under-five mortality (5).

Challenges in Estimating the Burden: Estimating the true burden of ARI is challenging due to variations in definitions, the spectrum of disease severity, and potential misclassification. In developing countries, children experience an average of five ARI episodes per year, which contribute to 30-50% of pediatric outpatient visits and 20-30% of hospital admissions (6). Recent community studies suggest that ARI accounts for up to 70% of childhood morbidities in children under five (8).

Etiology and Current Interventions for ARI: The etiology of ARI has evolved over time, with new pathogens contributing to the rising incidence of respiratory infections. Hospital-based studies highlight the role of emerging pathogens and the resurgence of diseases like pertussis, leading to revisions in immunization strategies (6). As a result, several countries now recommend booster doses of acellular pertussis vaccines to counteract this re-emergence (6).

Objectives:

1. To find out the common morbidities of the children in the age group of 0-5yrs.
2. To determine the factors influencing ARI in 0-5 years

RESULTS

Table 1: Distribution of children according to morbidity status.

Morbidity	Number of children	Percent
Present	278	63.04
Absent	163	36.96
Total	441	100

Comments: Morbidity was present in majority (63.04%) of the children

Table 2: Distribution of children according to their age and morbidity pattern

Morbidity	Age (in month)					Total (n=441)
	0-12 (n=104)	13-24 (n=112)	25-36 (n=95)	37-48 (n=72)	49-60 (n=58)	
ARI	31 (11.53)	19 (20.53)	11 (17.89)	6 (11.11)	7 (24.13)	74 (16.78)
Fever	23	28	18	22	12	103(23.36)
Diarrhoea	12	10	8	7	5	42(9.52)
Skin disease	15	17	14	9	11	66(14.97)
Anaemia	11	19	23	16	4	73(16.55)
Malnutrition	23	27	21	18	16	105(23.81)
Pain abdomen	19	12	17	8	3	59(13.38)
Jaundice	7	3	4	2	0	16(3.63)
Others (worm infestation, soft tissue injury)	2	11	9	14	-	36(8.16)

*Frequencies and percentages are mutually exclusive of each other

Comments: ARI was present in 24.13% cases in age group of 49-60 months, followed by in the age group of 13-24 months (20.53 %).

Table 3: Distribution of ARI cases in relation to age of children

Age in years	ARI		Total
	Present	Absent	
0-1	31(29.81)	73(70.19)	104
1-2	19(16.96)	93(83.04)	112
2-3	11(11.58)	84(88.42)	95
3-4	6(8.33)	66(91.67)	72
4-5	7(12.07)	51(87.93)	58
Total	74(16.78)	367(83.22)	441

X2=19.083, df=4, p=<0.05; *figure in parenthesis indicate row wise percentage.

Comments: The ARI prevalence was highest (29.81%) in the age group of 0-1 years. Lowest number of cases (8.33%) were found in the age group of 3-4 years. There was a statistically significant difference in the prevalence of ARI between the different age groups.

Table 4: Distribution of ARI cases in relation to socio economic status

Socio economic status	ARI				Total
	Present		Absent		
	Number	Percent	Number	Percent	
Upper class	7(17.07)	9.46	34(82.93)	9.26	41
Upper middle	9(15.79)	12.61	48(84.21)	13.08	57
Middle class	12(15.58)	16.21	65(84.42)	17.71	77

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Lower middle class	24(15.58%)	32.43	130(84.42)	35.42	154
Lower class	22(19.64%)	29.73	90(80.36)	24.52	112
Total	74	100	367	100	441

X2=0.9364, df=4, p value=<0.05; *figures in parenthesis indicate row wise percentage

Comments: Out of total 74 ARI cases 32.43% were found in lower middle-class family. Out of total 112 children ARI was found in 19.64% of lower-class family. This difference is found to be statistically significant.

Table 5: Distribution of ARI cases in relation to ventilation of houses

Ventilation	ARI				Total
	Present		Absent		
	No	Percent	No	Percent	
Satisfactory	7 (6.48)	9.46	101(93.52)	27.52	108
Unsatisfactory	67(20.12)	90.54	266(79.88)	72.48	333
Total	74(16.78)	100	367(83.22)	100	441

X2=9.908, df=1, p=<0.05; *figures in parenthesis indicate row wise percentage.

Comments: Houses where ventilation was satisfactory, were having a smaller number of children (6.48%) with ARI than in unsatisfactory condition where 20.12% cases of ARI were there. This difference was found to be statistically significant.

Table 6: Distribution of ARI cases in relation to overcrowding

Overcrowding	ARI				Total
	Present		Absent		
	Number	Percent	Number	Percent	
Present	64(23.44)	86.49	209(76.56)	56.95	273
Absent	10(5.95)	13.51	158(94.05)	43.05	168
Total	74(16.78)	100	367(83.22)	100	441

X2=22.784, df=1, p=<0.05; *figure in parenthesis indicate row wise percentage.

Comments: Out of 74 ARI cases,23.44% cases were found in children, living under overcrowded condition while only 5.95% cases occurred where overcrowding was absent and the difference was significant statistically.

Table 7: Distribution of children above 6months of age(n=380) showing relation between ARI and exclusive breast feeding

Exclusive breast feeding	ARI				Total
	Present		Absent		
Done	17(6.56)	30.91	242(93.44)	74.46	259
Not done	38(31.4)	69.09	83(68.6)	25.54	121
Total	55	100	325	100	380

X2=41.112, df=1, p value=<0.05; figure in parenthesis indicate row wise percentage
Significant.

Comments: There was statistically significant association between the presence of ARI and pattern of exclusive breast feeding. Out of total 259 children who were exclusively breastfed ARI was found in 6.56% cases. Out of 55 ARI cases 30.91% cases were exclusively breastfed.

Table 8: Distribution of ARI cases in relation to immunization status of children above 1 year of age

Immunization status	ARI				Total
	Present		Absent		
Fully immunized	11(3.85)	25.58	275(96.15)	93.54	286
Partially immunized	32(62.75)	74.42	19(37.25)	6.46	51
Total	43	100	294	100	337

X2=134.89, df=1, p value=<0.05; figure in parenthesis indicate row wise percentage

Comments: There was statistically significant association between the presence of ARI and immunization status of children above 1 year of age. Out of total 286 children who were fully immunized, ARI was found in 3.85% cases. Out of 43 ARI cases, 25.58% cases were fully immunized.

Table 9: Distribution of children according to Nutritional status and presence of ARI

Nutritional Status	ARI				Total
	Present		Absent		
	No	Percent	No	Percent	
Normal	21(6.12)	28.38	322(93.88)	87.74	343
Undernourished	53(54.08)	71.62	45(45.92)	12.26	98
Total	74	100	367	100	441

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X2=125.55, df=1, p value = <0.05; figure in parenthesis indicate row wise percentage
Comments: There was significant association between the presence of ARI and nutrition status of children. There were a total 105 malnourished under five children, out of them 98 were undernourished and rest 7 were over nourished.

DISCUSSION

The present study indicates that 63% of the children surveyed had some form of morbidity. Among these,

4% were malnourished, 23% had fever, and 17% were suffering from Acute Respiratory Infections (ARI), while the remainder experienced conditions such as diarrhea, skin diseases, abdominal pain, jaundice, and injuries.[11,12]

A similar trend was observed in the study conducted by Kaushik Ishore et al. (2015), where morbidity was recorded in 74 out of 192 children. The major causes of morbidity in their study were diarrhea (26%), ARI (24.5%), and fever (16.7%). Furthermore, 64.4% of the children in their study were found to be underweight. The present study's findings are in alignment with this, highlighting a comparable burden of illness among children.[13, 14]

In the study by Vijay L. Grover et al. (2004), more than half (53.7%) of the children were found to be suffering from some form of illness, with ARI being the most common (16.01%), followed by diarrhea (10.2%). Chronic morbidity in their study was primarily driven by diarrhea and malnutrition. Although the present study's findings partially align with Grover's study, the proportions vary slightly, possibly due to different geographical or temporal factors.[15]

The current study also shows a statistically significant relationship between ARI and socioeconomic status. Specifically, ARI was more prevalent among children from lower middle-class families (32.43%) and lower-class families (19.64%), which highlights a significant socioeconomic gradient in disease prevalence. This finding is supported by Goel K et al. (2012), who found that ARI prevalence was higher in lower social classes (Class III - 20.94%, Class IV - 32.9%, Class V - 35.89%). The statistical significance ($\chi 2=13.72$, $p<0.001$) in their study corroborates the present study's conclusions. Conversely, the study by Ahishek A et al. (2014) reported a higher ARI prevalence in upper-class families (Class I - 44.4%), but these findings are not comparable to the present study due to differences in study settings and population characteristics.[16,17]

Furthermore, this study revealed a statistically significant association between ARI and overcrowding. Children living in overcrowded conditions had a significantly higher incidence of ARI (23.44%) compared to those living in non-overcrowded environments (5.95%). This finding is consistent with Samya V et al. (2015), who also observed a significant association between overcrowding and ARI. However, Zha AK et al. (2014) did not find a statistically significant association in their study, indicating that environmental and contextual factors may influence the relationship between overcrowding and ARI.[18]

Undernourished children in the present study experienced significantly higher episodes of ARI (72%) compared to those with normal nutritional status (28%). This finding aligns with Pore PD et al. (2010), who also found a statistically significant association between ARI and the nutritional status of children, further emphasizing the critical role of nutrition in determining children's susceptibility to infections.[19]

Another notable finding in this study is the relationship between housing conditions and ARI. Children living in well-ventilated homes had fewer episodes of ARI (9%) compared to those living in ill-ventilated homes (91%). This association was statistically significant, reinforcing the importance of adequate ventilation in preventing respiratory infections. Prajapati B et al. (2011) and Goel K et al. (2012) similarly found that ARI was more prevalent in children living in poorly ventilated homes, with Goel K et al. reporting a prevalence of 74.35% in such environments. These consistent findings across studies underscore the importance of improving housing conditions as a public health measure.[20]

Exclusive breastfeeding was another significant protective factor identified in this study. Children who were exclusively breastfed had a lower likelihood of developing ARI. Of the 259 children exclusively breastfed, only 6.56% developed ARI, compared to 30.91% of those who were not exclusively breastfed. This finding aligns with established research, including a study by Prajapati B et al., which demonstrated that exclusive breastfeeding for the first six months of life significantly reduces the risk of infant mortality, neonatal sepsis, ARI, and diarrhea. The protective effects of exclusive breastfeeding, as observed in this study, are consistent with global public health recommendations.

In conclusion, the present study's findings are consistent with the results of previous research in terms of morbidity patterns, the influence of socioeconomic factors, the role of nutrition and overcrowding, and the protective effect of breastfeeding. These findings highlight the multifactorial nature of ARI and other childhood morbidities and underscore the importance of addressing these determinants through targeted public health interventions.

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CONCLUSION

1.In the present study morbidities were found out in 63% of under five children.

The present study found out that the most common morbidities were Malnutrition (24%), fever (23%), ARI (17%), Anemia (16%) followed by Skin diseases (15%), Pain in abdomen (13%) and Diarrhea (9%).

The most commonly affected age group in Acute respiratory infection was 0-12 months.

2.The Acute Respiratory infections were determined by socio-demographic factors like age, sex, religion, type of family, literacy status of mother, occupation of mother and socio-economic status. Of which age, sex, literacy status of mother, occupation of mother and socio-economic status showed statistically significant association.

Similarly, The Acute Respiratory infections were determined by environmental factors like type of house, ventilation, overcrowding, type of kitchen, type of fuel used in kitchen, parental smoking habits, colostrums giving practices, exclusive breast-feeding practices, immunization status, measles vaccination status, nutritional status and hand washing practices of mothers. Of which type of fuel used in the kitchen and housing condition did not show statistically significant association.

3.The present study showed that majority of mothers (41.89%) preferred treatment from govt. hospital during their children's illness. About 32.43% mothers preferred home remedies. About 6.76% of mothers did not seek any treatment. The present study also showed that out of 24 (32%) mothers giving home remedies it was observed that during the ARI episodes,70.83% mothers gave hot fomentation,62.5% mothers offered warm water to their children, Tulsi was given by 50% mothers while 33.33% preferred honey. 96 of 441 (22%) women were practicing hand washing.

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