A Study Of Epidemiological Factors Related To Acute Respiratory Infection (ARI) In Under Five Children Attending The Immunization Clinic Of Calcutta National Medical College And Hospital

S Chatterjee

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Abstract

Infection of the respiratory tract are among the most common of human ailments. They are a substantial cause of increased morbidity and mortality rates in young children in less developed countries like India.

The WHO World Health Report 1999(Making a Difference-Report of Director General, WHO) indicates that incidence rate of Acute Respiratory Infection (ARI) in developing countries like those in the Indian subcontinent is comparable to developed countries. But cause specific mortality due to ARI is 10-50 times higher in developing countries than developed countries. Every year ARI in young children is responsible for an estimated 4.1 million deaths worldwide. In India ARI constitute a major public health problem and is the most important contributory to mortality and morbidity in under 5 accounting for (15-34)% of all childhood deaths(according to the WHO bulletin, Health Situation in South East Asia Region 1994-1997, Regional office for SEAR, New Delhi, 1999). India accounted for 28% of the mortality and 30% of Disability Adjusted Life Years (DALYs) lost due to ARIs as stated in the WHO World Health Report, 1995, Bridging The Gaps.

In relative values, ARI mortality is highest in the postneonatal period. ARI, mainly pneumonia, accounts for about 18% of underlying causes of death in developing countries. Pneumonia and other ARI are frequent complications of measles and pertussis. ARI is also commonly found after other infections and in association with severe malnutrition. Virtually no data are available in developing countries to provide final estimates of the role of ARI in mortality of children aged under 5 years. However, the WHO figure of 1 out of 3 deaths due to--or associated with--ARI may be close to the real range of the ARI-proportional mortality in children of developing countries.[1]

Incidence of pneumonia in developing countries like India range between (20-30)%. This is due to high prevalence of malnutrition, low birth weight, and indoor air pollution in developing countries.

ARI is an important cause of morbidity and mortality in children under 5 years of age who suffer about 5 episodes of ARI per year, thus averaging 238 million attacks consequently.

Thus I conducted my study with the objective of -
a) estimating the attack rate of ARI among under 5 children attending the Immunisation Clinic of Calcutta National Medical College and Hospital.
b) To find out socio-economic, environmental and cultural factors related to Children suffering from ARI.

Study Design: Cross sectional, observational, clinic based study.

Study Setting: Immunization clinic under aegis of the Department of Community Medicine, Calcutta National Medical College and Hospital.

Study Population: Under-5 children attending the Immunisation Clinic(exclusion criteria-children below 6 months).

Study Duration: 6 months (01/07/2005-31/12/2005).

Sampling: a) Sampling size determination-Since the incidence of ARI in a developing country like India is approximately 20%, the required sample size using the formula -4pq/lXl works out to be 1600 where p= prevalence rate ie, 0.2, q= 1-p ie, 0.8 and l= maximum allowable rate =10% of p. Since the study period was short, I collected the data of 264 children attending the Immunisation Clinic ie, 16.5% of the total sample size.

Method of Sampling: All the children under 5 years of age attending the Clinic were listed in the OPD register from which every alternate child was chosen by simple random sampling.

Tools and technique: The basic tools of the study were A pre-designed questionnaire. The Immunisation Card of the children. The techniques employed included- An interview of the person accompanying the child, preferably the mother . Viewing of the health records of the child.

Terms and definitions: 'Absence of separate kitchen' implies that cooking is done in living space. 'Absence of smoke outlet' means the lack of chimney exhaust or ventilator in the house. Socio-economic status of the family was assessed using the Inflation Rate Adjusted Modified Kuppuswamy Scale used in India for the purpose.

Limitations of the study: 1) As it was a hospital based study, the original ARI status in the urban community could not be assessed. 2) As the duration of study was short, many of the factors that may have influence on ARI could not be considered. 3) As it was a cross-sectional study, during its short span seasonal variation in incidence of ARI could not be considered. 4) The type of ARI and its severity ie, pneumonia or not could not be ascertained as the informants(mostly mothers of the children) were not aware of the clinical signs important to mark pneumonia and 'no pneumonia'. 5) Statistical tests of significance were not conducted on the data collected and so the associations shown in the study are only apparent associations. 6) As data was collected about the attacks of ARI during the last 6 months, which is an extensive period of time, the chance of recall bias was present in the study.

Figure 1

Table 1: Age and Gender distribution of study population according to ARI status

Age group in months	Male Total	Male Cases of ARI in last 6 months	Male Attack rate (%)	Female Total	Female Cases of ARI in last 6 months	Female Attack rate (%)	Grand total Total	Grand total Cases of ARI in last 6 months	Grand total Attack rate (%)
6 to 11	77	75	97.4	45	43	95.5	122	118	96.7
12 to 23	62	60	96.7	40	38	95	102	98	96
24 to 59	30	28	93.3	10	9	90	40	37	92.3
Total	169	163	96.4	95	90	94.7	264	253	95.8

Interpretation: From Table I it is evident that within the study population, age specific attack rate of ARI decreased with increasing age of the child in both sexes and the worst sufferers were in the age group 6-11 months in both sexes, but considering all the age groups, sex specific attack rates were more in males than in females.

Figure 2

Table 2: Distribution of study population according to religion and their ARI status.

Religion	Total no. of children	No. of children attacked by ARI in last 6 months	Attack rate (%)
Hindu	114	109	95.60%
Muslim	144	139	96.50%
Christian	6	5	83.30%

Interpretation: From Table II it was seen that attack rate of ARI was maximum among Muslim children, followed by Hindus and much lower attack rate among Christian children.

Figure 3

Table 3: Distribution of study population according to no. of family members and ARI Status

No. of family members	Total no. of children	No. of children attacked by ARI in last 6 months	Attack rate (%)
<= 3	60	54	90
4 to 5	99	93	94
6 to 7	61	59	96.7
>7	48	47	98

Interpretation: From Table III it is evident that apparently there is a gradual increase in attack rate of ARI with increase in the no. of family members. Combined with the constraints of the living area, it translates into a fact that gradually increasing overcrowding predisposes to ARI.

Figure 4

Table 4: Distribution of study population according mother's education status and their children's ARI status

Education status of mother	Total no. of children	No. of children attacked by ARI in last 6 months	Attack rate (%)
Illiterate	105	103	98
Primary	64	63	96.8
Middle school	40	38	95
High school	30	28	93.3
Intermediate	18	16	88.8
Graduate	7	6	85
Total	264	253	95.8

Interpretation: From table IV it is evident that attack rate of ARI in children of illiterate mothers was the highest and it decreased gradually with increasing educational status of the mother.

Figure 5

Table 5: Distribution of study population according to socio-economic status in relation to ARI

Socio-economic status	Total no.of children	Cases of ARI in last 6 months	Attack rate (%)
Upper	1	0	0
Upper middle	48	45	93.8
Lower middle	80	76	95
Upper lower	132	129	97.7
Lower	3	3	100

Interpretation: From Table V we observe that lower the socio-economic status, higher was the attack rate of ARI.

Figure 6

Table 6: Distribution of study population according to type of fuel used and ARI status

Type of fuel used	Total no. of children	No. of cases of ARI in last 6 months	Attack rate
Coal oven	91	90	99
Kerosene stove	131	126	96
LPG/Heater	36	34	94
Electric oven	6	3	50
Total	263	253	95.8

Interpretation: Attack rate of ARI was least with electric oven and highest with coal oven.

Figure 7

Table 7: Distribution of study population according to some relevant socio-economic status and their ARI rates

Factor	Total no. of children	Cases of ARI in last 6 months	Attack rate (%)
Indoor smoking			
Present	165	162	98
Absent	99	91	91
Separate kitchen			
Present	105	96	91
Absent	159	157	98

Interpretation: Indoor smoking caused more ARI as did absence of separate kitchens.

Figure 8

Table 8: Distribution of study population according to child rearing factors and their and their ARI status

Child rearing factor	Total no. of children	Cases of ARI in the last 6 months	Attack rate (%)
Exclusive breast feeding			
Present	109	101	93
Absent	155	152	98
Immunization			
Complete	148	141	95
Partial	16	112	97
Age of weaning(months)			
4 to 6	139	134	96.4
7 to 12	111	106	95.4
>12	14	13	93

Interpretation: Absence of exclusive breast feeding, complete immunization, and weaning at younger age predisposed to greater attack rates of ARI

SUMMARY

A cross-sectional observational study was undertaken among the under-5 children attending the immunization clinic at Calcutta National Medical College and Hospital with the objective of estimating the attack rates of ARI in those children. The study also attempted to seek out the relation of different socio-economic, environmental and cultural factors on occurrence of ARI . Data was collected from 264 children and analyzed as

1) Age specific attack rates of ARI decreased with increasing age of the children. Among all age groups, sex specific attack rates were more in males.

2) Crowding with increasing number of family members tended to predispose to ARI.

3) Increased educational status of the mother appeared protective.

4) Lower socioeconomic status appeared conducive to ARI.

5) Increased smoke from cooking or smoking made attacks of ARI more common.

6) Child rearing factors like exclusive breast feeding and complete immunization apparently protected from ARI attacks.

7) Among followers of different religious practices, Muslims had highest no. of attack rates among their children.

What this paper adds: Apparent associations of ARI in the Under 5 children in an Urban setting of India, and introduces a line of thought as regards how to circumvent them.

Health policy implications: Existing health policy shortcomings and ways to improve the shortcomings.

References

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Author Information

Saurav Chatterjee, MBBS,ECFMG certified
Calcutta National Medical College and Hospital