Original article

A study of risk factors of acute respiratory tract infection (ARI) of under five age group in uban and rural communities of Ahmedabad district, Gujarat

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ABSTRACT:
BACKGROUND: Acute respiratory tract infection is a major cause of morbidity and mortality in developing and also developed countries. About 13 million children under 5 years of age die every year in the world; 95% of them in developing countries and one third of total deaths due to ARI.
OBJECTIVE: To study some of the risk factors which are responsible for occurrence of ARI in under five age groups living in urban and rural areas of Ahmedabad district.
MATERIALS AND METHODS: A cross sectional study covering 500 under five children in urban (five zone) and rural (five PHC of sanand taluka) area of Ahmedabad district from September 2008 to March 2009.
RESULTS: A significant association was found between ARI and low birth weight, timely initiation of breast feeding, prelactal feeding, timely given complementary feeding and immunization status. No significant association was found between ARI and duration of breast feeding. Occurrence of ARI was found to be 22%. It was more in low birth weight babies (<2.5 kg) (36.18%).Occurrence of ARI was lower in urban area (17.2%) as compared to rural area (26.8%) . In rural area, it is more because of lack of basic health services, lack of awareness etc,
KEYWORDS: cross sectional study, random sampling method, chi square test and Epi info for analysis

INTRODUCTION:

Acute respiratory tract infection is a major cause of morbidity and mortality in developing and also developed countries. About 13 Million children under 5 years of age die every year in the world, 95% of them in developing countries, one third of total deaths are due to ARI. In the developing countries, out of ten, seven deaths in under 5 years of age group are due to ARI. NFHS -3 revealed that two weeks before the survey 6% of children under age 5 had symptoms of an ARI (cough, short and rapid breathing that was chest related and not due to blocked running nose), out of these children 69% were taken to a health facility or health provider for treatment . Average adult has 2-4 episodes per year and a child has 6-8 episodes per year. It is estimated that at least 300 million episodes of ARI occur in India every year, out of which about 30 to 60 millions are moderate to severe ARI. While every 6th child in the world is Indian, every 4th child who dies, comes from India.ARI is responsible for about 30-50 % visits to health facilities and for about 20-40 % admissions to hospital[1]. The DALYs lost due to ARI in South East Asia Region are about 3, 30, 26,000.

In spite of increasing public health importance, management and control of ARI remains a neglected entity in most of the national RCH-2 activities including recently introduced Integrated Management of Neonatal and Childhood Illness (IMNCI) programme. Thus ARI is the leading cause of mortality and morbidity in India especially in under fives.

Various factors are quoted as risk factors for ARI like low birth weight, timely initiation of breast feeding, prelactal feeding, timely given complementary feeding and immunization status.

OBJECTIVES

To study some of the risk factors responsible for occurrence of ARI in under five age groups living in urban and rural areas of Ahmedabad district.

MATERIALS AND METHODS

A cross sectional study was carried out in 500 under 5 children in urban area (five zone) and rural area (five PHC of Sanand taluka) of Ahmedabad district from September 2008 to March 2009. Out of 500 studied children, 250 children for Urban and 250 children for rural areas of Ahmedabad District were studied. For sampling in urban area, Ahmedabad city was chosen for studying urban population. There are 6 zones in Ahmedabad city. By simple Random Technique 5 zones were chosen for the city. Each zone has 7-9 wards. To choose sample from

urban area, simple random technique was applied for each 5 zone. One ward was selected by simple random technique (chit method) for each 5 zone.

Through simple random technique one area of each ward was selected and study was carried out and started from no 1 house till 50 children were found. For sampling in rural area, one Taluka (Sanand) from the total ten Talukas was selected by simple random technique. Five Primary Health Centres of Sanand Taluka were selected by simple random technique. 5 villages of each PHC were selected by simple random technique. Through simple random technique, one area of each village was selected and house to house survey was carried out starting from house no 1 till 50 children were found. Predesigned, pretested questionnaire was used for data collection. The questionnaire included information regarding birth history, birth weight, feeding history, birth order and history of immunization etc. History of episodes of ARI during last one month was enquired for calculating the occurrence of ARI amongst children.

Some definitions used in the study-

Gradation of ARI[2]: According to WHO criteria:

a. Mild ARI: Presence of cough or cold (No pneumonia)

b. Moderate ARI: Past breathing without chest indrawing.

c.Severe ARI : Presence of chest indrawing (severe pneumonia) and signs of very severe disease like convulsions, abnormally sleepy, severe malnutrition, wheezing, grunting, nasal flaring etc.

Immunization: The children were divided into 3 categories fully immunized, partially immunized not immunized.

a.Fully Immunized – A child who had received all vaccines according to National Immunization Schedule as per his/her age at the time of interview.

b.Not Fully Immunized - A child who had not received any or all vaccines according to National Immunization Schedule as per his/her age at the time of interview.

Data was analyzed by Epi-info 2002 package. Chi square test was applied for statistical significance.

RESULTS

Out of 500 children, 110 ARI cases were found during study. About one third (33.2%) were below 1 year of age 55.2% were between one to four yrs and 11.6% were in 4-5 yrs of age group. No major difference was found between rural and urban area. Sex wise distribution was almost equal (48% boys, 52% girls). Boys were more in urban area (54%), girls were more in rural area (58%). About 56.3% were males and 43.7% were females. More ARI cases were seen in 4-5 years of age group (47.3%) and in this age group 45.3% were males and 50.0% were females. Overall occurrence of ARI was found to be 22.0%. According to diagnosis, severe ARI cases were more noted in rural area (4.2%) as compared to urban area (2.4%).

Nearly 25.0% of mothers did not know the weight of their children. Children having low birth weight (<2.5 kg) were 39.8%. Low birth weight baby was more in rural area (42.4%) as compared to urban area (37.2%). Birth weight and occurrence of ARI has been found to be correlated. Severity of ARI was very high in low birth weight baby (36.1%) as compared to normal birth weight baby (17.3%).This difference was statistically significant ($x^2 = 21.32$, $p < 0.001$)

TABLE I: DISTRIBUTION OF CHILDREN ACCORDING TO INITIATION OF BREAST FEEDING AND URBAN-RURAL COMPARISON

Initiation of breast feeding	Urban		Rural		Total	
	No	%	No	%	No	%
Immed-iate	171	68.4	75	30.0	243	49.2
1st day	43	17.2	50	20.0	93	18.6
2nd day	25	10.0	40	16.0	65	13.0
3rd day	4	1.6	56	22.4	60	12.0
After 3rd day	7	2.8	29	11.6	36	7.2
Total	250	100	250	100	500	100

According to birth order of children, more than one third (39.8%) were of 2nd birth order, 28.6% were of 1st birth order and 31.6% were in the 3rd or above birth order. Positive correlation was found between birth order and occurrence of ARI. It was lowest among children who were in1st birth order (14.6%), while it as highest in 5th birth order (78.5%). This difference was statistically highly significant.
($x^2 = 36.15$, $p < 0.001$)

TABLE II: DISTRIBUTION OF CHILDREN ACCORDING TO INITIATION OF BREAST FEEDING

Initiation of breast feeding	Severity of ARI								Children with No ARI		Total	
	Mild		Moderate		Severe		Total					
	No	%	No	%	No	%	No	%	No	%	No	%
Immediate	36	14.8	1	0.4	1	0.4	38	15.4	208	84.5	243	100.0
1st day	18	19.3	2	2.1	0	0.0	20	21.5	73	78.5	93	100.0
2nd day	16	24.6	3	4.6	1	1.5	20	30.7	45	69.3	65	100.0
3rd day	17	28.3	2	3.3	1	1.6	20	33.3	40	66.6	60	100.0
After 3rd day	9	25.0	3	8.3	0	0.0	12	33.3	24	66.6	36	100.0
Total	96	19.2	11	2.2	3	0.6	110	22.0	390	78.0	500	100.0

(x^2 =16.27, p <0.001)

TABLE III: DISTRIBUTION OF CHILDREN ACCORDING TO IMMUNIZATION STATUS

Immunization status	Severity of ARI								Children with No ARI		Total	
	Mild		Moderate		Severe		Total					
	No	%	No	%	No	%	No	%	No	%	No	%
Fully immunized	18	8.2	2	0.9	0	0.0	20	9.1	189	90.8	219	100.0
Partially immunized	33	24.0	4	2.3	1	0.7	38	27.7	99	72.2	137	100.0
Not immunized	45	29.2	5	3.2	2	1.2	52	33.7	102	64.2	154	100.0
Total	96	19.2	11	2.2	3	0.6	110	22.0	390	78.0	500	100.0

(x^2 = 33.87, p<0.001)

About half (49.2%) of mothers started breast feeding immediate ly or within 1st hour. Mothers who delayed breast feeding by 1st day, 2nd day, and 3rd day or later was 18.6%, 13% and 19.2% respectively (Table-1). 68.4% of urban mothers as compared to 30% in rural mothers started breast feeding immediately. Delayed breast feeding was highest in rural areas (34% on 3rd day or later). Significant correlation was found between timely initiation of breast feeding and decreased occurrence of ARI. Occurrence of ARI was lowest in mothers who initiated breast feeding immediately (15.4%) or within one hour (21.5%) as compared to initiated breast feeding on 3rd day or beyond it (33.3%). This difference was statistically significant (x^2 =16.27, p <0.001) (Table-2). Occurrence of ARI was more in those children who started prelactal feeding (29.3%) as compared to (16.3%) who did not start prelactal sfeeding. This difference was statistically highly significant (x^2 = 12.19, p <0.001).

According to duration of breast feeding, out of total mothers, 71% mothers continued breast feeding for more than 6 months after delivery. No difference was observed in urban (35.6%) and rural area (34.4%). 28.1% of mothers continued breast feeding up to 6 months. Only 1.4% of mothers discontinued breast feeding before 3 months after delivery. 33.2% of children excluded below less than one year of age. Occurrence of ARI was higher in children of mothers who continued breast feeding up to 3 months (40.0%) as compared to breast feeding up to 6 months, 9 months and 12 months i.e 29.7%, 27.2% and 30.4% respectively. This difference was not statistically significant.

About 40.8% of children started complementary feeding at 6 months of age, 28.6% of children started after 6 months. 13.0% of children didn't start complementary feeding.

Starting of complementary feeding around 6 months or after it was slightly more in urban area(75.2%) as compared to rural areas (63.6%).Observations reveal that timely initiation of complementary feeding protect against ARI. It was least in children who were initiated complementary feeding at age of 4 months (21.3%) and 6 months (13.7%), as compare to delayed start complementary feeding 6 months or after it (30.7%). This difference was statistically highly significant (x^2 =14.78, p <0.001). Occurrence of ARI was more in urban area (46.1%) as compare to rural area (19.6%) when complementary feeding started at age of 6 months or after. This difference was also statistically highly significant (x^2 = 8.1, p <0.05).

According to immunized status, 43.8% were fully immunized, 33.8% were not immunized and 22.4% were partially immunized children. Fully immunized children were higher in urban area (77.1%) as compare to rural area (22.8%).Direct correlation between immunization status of children and occurrence of ARI. It was least in children who were fully immunized (9.1%) as compared to unimmunized children (33.7%). This difference was statistically significant (x^2= 33.87, p<0.001) (Table-3). 63.6% children had taken vitamin A. Vitamin A coverage was more in urban (84.0%) area as compared to rural (43.2%) area. Occurrence of ARI was more in those children who are not taking vitamin A prophylaxis (24.1%) as compare to taking vitamin A prophylaxis (20.7%). This difference was not statistically significant (x^2 = 0.79, p>0.05).

DISCUSSION

Out of 500 studied children, 110 children were having ARI infection during the study. Overall occurrence of ARI was found to be 22.0%. Birth weight and occurrence of ARI has been found to be correlated. Significant association was found between ARI and birth weight (p <0.001). Severity of ARI was very high in low birth weight baby (36.1%) as compare to normal birth weight baby (17.3%). Similar observations where noted by Nilanjan kumar Mitra,[3] Sudha Yadav[4] and Fonseca W[5] in their study.

There was a positive correlation between birth order and occurrence of ARI as per birth order of child increases, occurrence of ARI also increases. Occurrence of ARI was lowest among children who were in 1st birth order (14.6%) and highest in 5th birth order (78.5%). Our finding are similar to the study done by Sudha Yadav[4] and S.singhi[6].

There is positive correlation between timely initiation of breast feeding and decreased occurence of ARI. Occurrence of ARI was lowest in mothers who initiated breast feeding immediately (15.4%) or within one hour (21.5%) as compared to initiation of breast feeding on 3rd day or beyond it (33.3%). Our findings are comparable with the studies done by Sudha Yadav[4] and Nafstad P[7].

A significant association was found between ARI and prelactal feeding. Occurrence of ARI was more in those children who started prelactal feeding (29.3%) as compare to (16.3%) not started prelactal feeding. Similar finding was observed in study carried out by Biswas A[8], Deb SK[9] and M.R.Savitha[10].

Timely complementary feeding has impact on nutritional status of children which in turn affects occurrence of ARI and other communicable disease during childhood. A significant association was found between ARI and complementary feeding. Occurrence was least in children who were initiated to complementary feeding at the age of 4 months (21.3%) and 6 months (13.7%), as compared to delayed start complementary feeding 6 months or after it (30.7%). Our findings are comparable with the study done by M.R.Savitha[10].

The child when fully immunized is protected against various respiratory infections like diphtheria, pertussis and also complications of measles. As these children are not fully immunized they are at risk of development of these infections. A significant association was found between ARI and Immunization. It was least in children who were fully immunized (9.1%) as compare to unimmunized children (33.7%). Our finding are compare with the study done by Deb SK[9], M.R.Savitha[10] and Fonseca W[5], Nilanjan kumar Mitra[3], S.singhi[6].

The present study found low birth weight, delay in initiation of breast feeding, prelactal feeding, delay in giving complementary feeding and immunization status as significant risk factors for Acute Respiratory Infections (ARI) in under fives. The study strongly favours the importance of basic health promotional measures like proper infant feeding practices, proper nutrition of the child in prevention and control of ARI. Health education can change health care seeking behavior and attitude of parents and other family members to take care of the children suffering with ARI in the home itself for preventing

pneumonia death. Strengthening of RCH-2 or IMNCI programme, raising female literacy level will go a long way in prevention of morbidity amongst children. Reorientation of health workers in peripheral area i.e Anganwadi, Subcentres and PHCs regarding identification, management and timely referral cases of ARI and strong supervision, monitoring and evaluation of RCH services specifically ARI component will help bring down the morbidity and mortality in children of under five in cases of ARI.

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**Health is not, in the minds of most people, a unitary concept.
It is multi-dimensional, and it is quite possible to have 'good' health in one respect, but 'bad' in another.
Blaxter, Mildred (1990), Health and lifestyles. London (Routledge), 35**

**The main health hazard in the world today is people who don't love themselves.
Friedman, Kinky (1993), When the cat's away.
New York (Wings Books), 531**