ISSN : (2347-498X)

Journal of Comprehensive Health

Official Publication of The Indian Association of Preventive and Social Medicine, West Bengal Chapter

Original Article

Year: 2017 | Volume:5 | Issue-1

Prevalence of Acute Respiratory Infection (ARI) and Its Different Correlates among Under-five Children of a Slum of Kolkata

Prasanta Raykarmakar1, Abhishek Paul2

1Associate Professor, 2Post-Graduate Trainee, Department of Community Medicine, R.G.Kar. Medical College, Kolkata, West Bengal.

Corresponding author:

Dr Abhishek Paul
C/O Mira Paul, Abinash Sarani, Chandmaridanga,
P.O; P.S; and District- Bankura, State- West Bengal,
Pin code- 722101.
e-mail- drabhishekpaul@gmail.com, M- 9433981603

Abstract:

Background: ARI is a major cause of morbidity and mortality of the most vulnerable age group; the under-fives. Previous studies had already identified different risk factors of ARI in slums; however, the findings are hard to generalize as there is diversity among slum populations. Moreover Kolkata (M Corp.) has second highest proportion (29.6%) of slum households among million plus cities in India which necessitates studying the ARI morbidity among under-fives of slums of Kolkata. **Objective:** To find out the prevalence of ARI and its different correlates among under-fives of a slum of Kolkata. **Methods:** A cross-sectional study was conducted in the month of May, 2015 among under-fives of the Bagbazar slum area of Kolkata. Total enumeration of under-five children residing in the selected slum was done and sample size came to 68. Data were collected by house to house visit. Chi-square test was applied for statistical significance. **Results:** Prevalence of ARI was 66.2% among the under-five children studied. Prevalence was higher for males

Address for correspondence:

The Editor/ Managing Editor,

Journal of Comprehensive Health

Dept of Community medicine

NRS Medical College,

138, AJC Bose Road, Kolkata-700014

(74.4%). Highest prevalence (100%) was noted among infants. Ventilation, over-crowding, type of family, parenteral smoking, type of cooking fuel used, location of kitchen and presence of symptoms of ARI among mothers were found to be significantly associated with ARI among under-fives ($p < 0.05$). **Conclusion:** The present study showed a very high prevalence of ARI among under-five children of Bagbazar slum area and also identified many correlates of such a high prevalence

Key words: *Acute respiratory infection (ARI), Housing environment, Slum, Under-five children.*

Introduction:

Acute respiratory infection (ARI) is a major cause of morbidity and mortality among the under-five children who constitute the most important and vulnerable age group in terms of survival, growth, and development, in developing as well as developed countries. [1-4] ARI is responsible for an estimated 0.94 million deaths of under five children annually worldwide.[5] On an average, children below five years of age suffer about five episodes of ARI per child per year and it is responsible for about 30-50% visits to health facilities.[4,6] Also in India, ARI is a major public health problem[1-3, 7] as 24% of the total deaths among under five children were due to ARIs in 2010.[6]

According to National family health survey *(NFHS -3)* 2005-06, two weeks before the survey six percent of under-five children had symptoms of an ARI, and a child suffers from six to eight episodes of ARI per year. [8] According to District Level Household and Facility Survey *(DLHS-4)* 2012-13, the prevalence of ARI among under-fives in rural and urban areas of West Bengal in last two weeks of the survey were 10.6% and 10.4% respectively. [9]

ARIs are inflammation of respiratory tract anywhere from nose to alveoli, with a wide range of combination of signs and symptoms. ARIs are often classified by clinical syndromes depending upon the site of involvement and is referred to as ARI of upper (AURI) and lower (ALRI) respiratory tract. The upper respiratory tract infection includes common cold, pharyngitis and otitis media. The lower respiratory tract includes epiglottitis, laryngitis laryngotracheitis, bronchitis, bronchiolitis and pneumonia. [4]

Many risk factors for these infections have been identified which include not only the climatic conditions but also the poverty, poor nutrition, poor housing

conditions, indoor air pollution such as parental smoking, absence of ventilation, overcrowding etc. [10,11]

Numerous studies had already been done regarding prevalence and risk factors of ARI in slums in different parts of India; however, due to diversity of, slum population, their housing, and living conditions and different health related challenges in different parts of the country, the findings are hard to generalize. Moreover such studies are still important and relevant when these are done in unreached and previously not studied areas so as to provide useful information and data regarding this particular disease burden and help preventive programs becomes more successful in all parts of the country. Interestingly the state share of slum population to total slum population of India for West Bengal had increased from 8.9% in 2001 *(census 2001)* to 9.8% in 2011 *(census 2011).* [12] Also Kolkata (M Corp.) has second highest proportion (29.6%) of slum households among million plus cities in India [Highest (41.3%) - Greater Mumbai (M Corp.)]. [12] With this background the present study was being conducted to find out the prevalence of ARI and its different correlates among under-fives of a slum of Kolkata.

Materials and Methods:

Study design and settings: A population based descriptive cross-sectional study was conducted in the month of May 2015 among under-five children of the *Bagbazar slum* area of Kolkata, West Bengal, which is the urban field practice area of R.G.Kar.Medical College, Kolkata.

Study population: Under-fives residing permanently in the above mentioned slum area.

Inclusion / Exclusion criteria: Children with diagnosed chronic respiratory disease and whose mother/ caregiver/respondent refused to give consent and children who were not present at their home during the entire study period were excluded from the study.

Sample size and sampling technique: Total enumeration (census survey method) of under-five children residing in the selected slum area was done and after applying inclusion /exclusion criteria, the actual number of study subjects came to *68.*

Study tools: A pre-designed pre-tested semi-structured questionnaire was used for data collection which included information regarding details of their socio-demographic and socio-economic

characteristics, ARI morbidity, housing condition, and type of cooking fuel. Anthropometric and clinical examination of the under-fives was done using weighing scale (Bathroom Scale) and stethoscope.

Methods of data collection and study variables: After obtaining approval from Institutional Ethical Committee, data were collected by house to house visit with help and company of health staffs of urban training center. The respondents were the caregivers of the children. So, all the caregivers were explained the purpose of the study. They were ensured of confidentiality and anonymity and were interviewed in the local language. Written informed consents were obtained from respective respondents prior to the study.

Operational definitions: Cough or cold with or without fever, discharge from nose, inability to drink, stopped feeding, fast breathing with or without chest in drawing, convulsions, abnormal sleep or excessive drowsiness, wheezing, grunting, nasal flaring and turning blue, were the symptoms used to enquire about presence of ARI. A new episode of ARI meant occurring in an individual who had been free of symptoms for at least 48 hours and also all infections of less than 30 days duration except those of the middle ear where the duration of acute episode is less than 14 days. [13] History of episode/s of ARI during last two weeks was enquired for calculating the prevalence of ARI. [8, 9]

Educational status of the mothers was recorded as one has completed classes of schooling. Occupational status of the fathers was recorded and classified according to International Standard Classification of Occupations, 2012 by International Labour Organization. [14] Socioeconomic status (SES) was determined on the basis of Modified B.G.Prasad's classification revised according to All India Consumer Price Index for Industrial Workers of May 2015 [AICPI(IW) of May 2015 was *258*].[15, 16] The nutritional status of the children was graded on the basis of expected weight for age, by plotting in growth chart as classified by World Health Organization (WHO). The weight of the children was measured with a standardized weighing scale (Bathroom Scale) with minimal clothes and bare foot. For child who was unable to stand, the weight of the child with their respective caregiver was taken and then the weight of caregiver was deducted to get the weight to nearest 500g.

Statistical analysis: The collected data were entered into MS-Excel 10 spread sheets and analyses were done using SPSS version 16 (SPSS 16.0 for Windows, release 16.0.0.Chicago: SPSS Inc.)

software. Chi-square test was applied for statistical significance.

Results:

Among the total 68 under-five children studied 57.4% (39 out of 68) were male and rest (42.6%, 29 out of 68) were female. All the children belonged to Hindu religion and 73.5% (50 out of 68) belonged to General caste and rest 26.5% (18 out of 68) belonged to Schedule caste. Majority (70.6%, 48 out of 68) of them belonged to joint family and rest (29.4%, 20 out of 68) was from nuclear family. 22.1% (15 out of 68) children had had a birth weight of less than 2.5 kilograms.

Table I - Distribution of different socio-demographic variables with presence of ARI among the study children. (N=68)

SOCIO DEMOGRAPHIC VARIABLES		ARI present No (%)	ARI absent No (%)	Total No (%)	Chi-square value (χ^2),*df*, *p*-value.
SEX	Male	29 (74.4)	10 (25.6)	39 (100.0)	2.735, 1, p = 0.098
	Female	16 (55.2)	13 (44.8)	29 (100.0)	
AGE GROUPS (IN MONTHS)#	0- 12	11 (100.0)	0 (0.0)	11 (100.0)	
	13-24	8 (61.5)	5 (38.5)	13 (100.0)	
	25-36	7 (63.6)	4 (36.4)	11 (100.0)	
	37-48	8 (50.0)	8 (50.0)	16 (100.0)	
	49-60	11 (64.7)	6 (35.3)	17 (100.0)	
CASTE	GENERAL	34 (68.0)	16 (32.0)	50 (100.0)	0.281, 1, p = 0.596
	SCHEDULE CASTE (SC)	11 (61.1)	7 (38.9)	18 (100.0)	
TYPE OF FAMILY	Nuclear	14 (51.9)	13 (48.1)	27 (100.0)	4.105, 1, ***p = 0.042***
	Joint	31 (75.6)	10 (24.4)	41 (100.0)	
SOCIO-ECONOMIC STATUS (according to modified B.G.Prasad scale)$	CLASS II	2 (28.6)	5 (71.4)	7 (100.0)	0.176, 1 p = 0.675
	CLASS III	18 (81.8)	4 (18.2)	22 (100.0)	
	CLASS IV	22 (61.1)	14 (38.9)	36 (100.0)	
	CLASS V	3 (100.0)	0 (0.0)	3 (100.0)	
MOTHER'S LITERACY STATUS#	Illiterate	4 (100.0)	0 (0.0)	4 (100.0)	
	Up to primary	5 (62.5)	3 (37.5)	8 (100.0)	
	Middle school	24 (66.7)	12 (33.3)	36 100.0)	
	Secondary	7 (53.8)	6 (46.2)	13 (100.0)	
	Higher secondary and above	5 (62.5)	2 (37.5)	7 (100.0)	

FATHER'S OCCUPATIONAL STATUS[# $$]	Clerical support workers	0 (0.0)	2 (100.0)	2 (100.0)
	Service and sales workers	12 (66.7)	6 (33.3)	18 (100.0)
	Skilled agricultural, forestry and fishery workers	2 (100.0)	0 (0.0)	2 (100.0)
	Craft and related trades workers	9 (56.3)	7 (43.7)	16 (100.0)
	Plant and machine operators and assemblers	16 (84.2)	3 (15.8)	19 (100.0)
	Elementary occupations	4 (44.4)	5 (55.6)	9(100.0)
	Unemployed	1 (100.0)	0 (0.0)	1 (100.0)

[#] Chi-square test was not done for these variables.

[$] Class II and III, and class IV and V were clubbed together before chi-square test was done.

[$$] Father of one study child had already died when the study was conducted.

All the children were found to be completely immunized according to their age as evident from their immunization cards. Overall prevalence of ARI was *66.2%* (45 out of 68) among all the under-five children studied. Association between presence of symptoms of ARI among under-fives and different socio-demographic and other variables are given below in Table I and Table II.

Table II - Distribution of birth weight, nutritional status, ARI sypmtoms in mothers, and housing characteristics according to presence of ARI among the study children. (N=68)

VARIABLES		ARI present No (%)	ARI absent No (%)	Total No (%)	Chi-square* value (χ^2),*df*, *p*-value.
BIRTH WEIGHT (in grams)	<2500	11 (73.3)	4 (26.7)	15 (100.0)	0.440, 1, p = 0.507
	≥2500	35 (64.2)	9 (35.8)	53 (100.0)	
NUTRITIONAL STATUS (according to WHO growth chart)	Normal	31 (60.8)	20 (39.2)	51 (100.0)	2.650, 1, p = 0.104
	Underweight	9 (81.8)	2 (18.2)	11 (100.0)	
	Severely Underweight	5 (83.8)	1 (16.7)	6 (100.0)	
SYMPTOMS OF ARI IN	Present	25 (80.6)	6 (19.4)	31 (100.0)	5.329, 1, ***p = 0.020***
	Absent	20 (54.5)	17 (45.5)	37 (100.0)	

MOTHER					
TYPE OF HOUSE	Kachha-pakka	40 (66.7)	20 (33.3)	60 (100.0)	0.055, 1, p = 0.815
	Pakka	5 (62.5)	3 (37.5)	8 (100.0)	
VENTILATION	Adequate	5 (38.5)	8 (61.5)	13 (100.0)	5.516, 1, ***p = 0.018***
	Inadequate	40 (72.7)	15 (27.3)	55 (100.0)	
LIGHTING	Adequate	13 (54.2)	11 (45.8)	24 (100.0)	2.390, 1, p = 0.122
	Inadequate	32 (72.8)	12 (27.2)	44 (100.0)	
OVER-CROWDING	Present	36 (80.0)	9 (20.0)	45 (100.0)	11.358, 1, ***p = 0.0007***
	Absent	9 (39.1)	14 (60.9)	23 (100.0)	
PARENTAL SMOKING	Present	29 (76.3)	9 (23.4)	38 (100.0)	3.956, 1, ***p = 0.046***
	Absent	16 (53.3)	14 (46.7)	30 (100.0)	
TYPE OF COOKING FUEL	Non LPG	29 (82.9)	6 (17.1)	35 (100.0)	8.965, 1, ***p = 0.002***
	LPG	16 (48.5)	17 (51.5)	33 (100.0)	
KITCHEN	Within living room	28 (87.5)	4 (12.5)	32 (100.0)	12.279, 1, ***p = 0.0004***
	Outside living room	17 (47.2)	19 (52.8)	36 (100.0)	
TOTAL		**45 (66.2)**	**23 (33.8)**	**68(100.0)**	

Discussion:

The present study reported a high prevalence (66.2%) of ARI among under-five children. A study done by *Gupta et al* [11] among under-fives of slums of Bankura district, West Bengal, showed prevalence of ARI as 44.73%. Although in this present study the prevalence of ARI was higher for male children (74.4%) in comparison to their female (55.2%) counterpart, the difference was not found to be statistically significant. Highest prevalence (100%) of ARI was noted among infants (age less than 12 months); a similar finding was reported by Gupta et al [11]. As in this study all the study children were completely immunized according to their age the influence of immunization status on occurrence of ARI could not be observed, though a hospital based prospective study conducted by *Das et al* [17] in Kolkata found that no/partial immunization was a significant risk factor for ARI. *Goel et al* [11] in their study on prevalence of ARI in under-five children of Meerut district observed that the prevalence of ARI amongst children who had no malnutrition was lowest (16.0%), while it was more in Grade-I to IV malnutrition and this difference was statistically significant. *Gupta et al* [10] reported that association of nutritional status with presence of symptoms ARI was not found to statistically significant. The present study also did not observe a

statistically significant association between nutritional status and occurrence of ARI. It rather observed that overcrowding, inadequate ventilation, and use non-LPG fuel were significantly associated with presence of ARI. *Prajapat et al* [3] , in a study on prevalence of ARI in under five children in urban and rural communities of Ahmedabad district, and *Goel et al* [11] in their respective studies reported a similar finding though the only difference was that the non-LPG fuel use was not found to be significantly associated. Similar thing happened with the history of parental smoking.

Conclusion: The present study had showed a very high prevalence of ARI among under-five children of Bagbazar slum area. Ventilation, over-crowding, type of family, parental smoking, type of cooking fuel used, location of kitchen and presence of symptoms of ARI among mothers were found to be significantly associated with ARI among under-fives. Other variables, like age groups, socio-economic status, type of house, immunization status and nutritional status of children were not found to be playing statistically significant role in occurrence of ARI among under-fives.

Implications: Improvement of the housing standards and housing environment of slums by slum rehabilitation processes/ projects, and universal supply or more coverage of clean cooking fuel like LPG to households may help in reducing the disease burden.

Source of support: Nil

Conflict of interest: Declared none.

References:

1. Madhi S, Klugman K. NCBI Bookshelf. Washington (DC): World Bank; 2006. 32 p.
2. Islam F, Sarma R, Debroy A, Kar S, Pal R. Profiling acute respiratory tract infections in children from Assam, India. Journal of global infectious diseases. 2013; 5(1):8.
3. Prajapati B, Talsania N, Sonaliya K. A study on prevalence of acute respiratory tract infections (ARI) in under-five children in urban and rural communities of Ahmedabad District, Gujarat. National Journal of Community Medicine. 2011; 2(2):255-9.
4. Park K. Textbook of preventive and social medicine. 23rd ed.

Jabalpur: M/s Banarsidas Bhanot; 2015. 936 p.

5. WHO. Estimated incidence, prevalence and TB mortality Geneva: WHO; 2004 [30.12.15]. Available from: http://www. who. int/mediacentre/factsheets/fs104/en . [last accessed on 2015 Nov11]

6. World Health Organization. Causes of child mortality, by country, 2000–2010. Global Health Observatory (GHO) 2014; Geneva:WHO. 2014. Available from: http://www.who.int/gho/child_health/mortality/mortality_causes_text/en/. [last accessed on 2015 Mar 11]

7. Lal S. Epidemiology of Communicable Diseases and Related National Health Programmes. Textbook of Community Medicine.(3rdedn), M. s CBS Publishers & Distributons; 2011.

8. Sciences IIfP. India National Family Health Survey (NFHS-3), 2005-06: International Institute for Population Sciences; 2007. Available from: http:// www.rchiips.org/nfhs/NFHS3%20 Data/.../India_volume_I_corrected_ 17oct08.p [last accessed on 2015 Sep 9].

9. Household DL. Facility Survey (DLHS-3), 2007–08. IIPS/MoHFW. 2010; 4. Available from: http:// www.rchiips.org/pdf/dlhs4/report/ WB.pdf [last accessed on 2015 Aug19].

10. Gupta A, Sarker G, Pal R. Risk correlates of acute respiratory infections in children under five years of age in slums of Bankura, West Bengal. Indian Journal of Child Health. 2014; 1(1):1-6.

11. Goel K, Ahmad S, Agarwal G,Goel P, Kumar V. A Cross Sectional Study on Prevalence of Acute Respiratory Infections(ARI) in Under-Five Children of Meerut District, India. J Community Med Health Educ 2:176. doi:10.4172/2161-0711.1000176.

12. Registrar General and Census Commissioner. Primary Census Abstract for Slum. Census of India 2011. New Delhi: Office of the Registrar General & Census Commissioner; 2013 Sep 30.

13. World Health Organization. ARI in children: case management in

small hospitals in developing countries. A manual for doctors and other senior health workers Programme for the Control of ARI Geneva: WHO. 1990.

14. International Labour Organization. International Standard Classification of Occupations. 2012; I: 433. Available from: http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_172572. pdf . [last accessed on 2015 Apr 10]
15. Rashmi M. Bg Prasad's Socio-Economic Status Scale–Revision For 2015. Scientific Journal for Theory and Practice of Socio-economic Development 2015; 3(6).
16. Real-time update for the Prasad's Social Classification (or the BG Prasad scale) Available from: http://prasadscaleupdate.weebly.com/ [last accessed on 2015 Aug 10]
17. Das PK, Saha JB, Basu K, Lahiri S, Sarkar GN. Some clinic-epidemiological aspect of bronchiolitis among infants and young children- A hospital based study. Indian J Public Health 2003; 47:66-71.