

Risk Factors of Acute Respiratory Infections in Children under Five Years Attending the Fishtail Hospital, Pokhara, Nepal

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ABSTRACT

Introduction: Acute Respiratory Infection (ARI) is one of the leading causes of morbidity and mortality in under five-year children. Risk factors include age, sex, socio-economic status, indoor air pollution, passive smoking, lack of basic health services, and lack of awareness. In this study, we aimed to determine the associated risk factors of ARI in children under five-years of age.

Methods: We carried out a hospital-based descriptive cross-sectional study in the peak period of November 2017 to February 2018. The study was conducted in Fishtail Hospital and Research Center (FHRC), Pokhara, Nepal. Non probability, purposive sampling technique was used and a structural interview was taken for data collection. The tool comprised of two main parts. Part I- questions related to socio-demographic variables of mother and baby. Part II- questions related to risk factors of ARI. The collected data was analyzed using Statistical Package for Social Science (SPSS) software, version 16. The Chi Square statistic is used for testing relationships between categorical variables.

Results: In total of 302 children visited to FHRC with the symptoms of ARI, only 188 (63%) were diagnosed as ARI. The most common symptoms were fever (42.2%), cough (35.7%), running nose (34.1%), difficulty in breathing (28.5%) and chest in drawing (11.6%). The age of children with ARI ranged from one to sixty month with the mean age of 21.46 ± 13.52 . Among 188 children, 51% were males whereas 49% were females. There were no statistically differences of children weight at birth among ARI. Our results revealed environmental and social factors associated with ARI.

Conclusions: The risk factors significantly associated with ARI were malnutrition, exposure to wood smoke and mosquito coil and contact with person having ARI. Reducing these conditions may reduce the morbidity and mortality associated with ARI in children.

Keywords

Acute Respiratory Infection, Pneumonia, Risk factor

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INTRODUCTION

Acute Respiratory Infection (ARI) is an acute infection of any part of the respiratory tract infection and related structures including paranasal sinuses, middle ear and pleural cavity.¹ ARI is one of the leading causes of

morbidity and mortality in under five-year children. It kills more children than any other illness more than AIDS, malaria and measles combined accounting for 19% of all under-five deaths.² It is estimated that Bangladesh, India, Indonesia and Nepal together account for 40% of the

global ARI mortality. About 90% of the ARI deaths is due to pneumonia which is usually bacterial in origin.³ ARI is one of the commonest causes of under-five childhood morbidity and mortality in Nepal. In fiscal year 2071/72 B.S (2014/15 AD) a total of 2,208,221 ARI cases have been reported. The total new cases of ARI were 783/1000 among which 155/1000 deaths were reported.⁴ A hospital based survey conducted by Shrestha YB⁵ in Kanti Children Hospital, Kathmandu showed that (40.01%) of hospital admissions were due to ARI. Among them pneumonia comprised (58.84%), upper respiratory infections (13.2%) and bronchitis and bronchiolitis (5.96%). Among ARI cases, 85% patients were under five and only 15% were above five years.

Despite the burden of acute respiratory infection on morbidity and mortality in under five year children, there is limited data on risk factors of ARI to evaluate the problem, especially in the region of western part of Nepal. Several risk factors have been associated with ARI which includes age, sex, socio-economic status, indoor air pollution, passive smoking, immune system defects, lack of basic health services, lack of awareness and overuse and misuse of antibiotics.^{6,7} However, most of these risk factors are preventable⁸, but not been documented in many regions of Nepal. This study therefore aimed to determine the associated risk factors among children under five-years of age with ARI.

METHODS

Study design and setting

This was a hospital-based descriptive cross-sectional analytic study carried out in the peak period of the dry season from November 2017 to February 2018. The study was conducted in Fishtail Hospital and Research Center, Gairapatan-4, Pokhara, Nepal. Pokhara, the capital city of the Gandaki state is situated in the Western region of Nepal. Fishtail Hospital is one of the leading private hospital having 100 beds with multisectoral facilities. Its main catchment area includes Kaski, Syanja, Parbat, Tanahun, Baglung and Lamjung districts. The participants in this study included all the mothers having under five-year children attending Pediatric OPD with their child having symptoms of ARI. Pediatrician diagnosed cases meeting Integrated Management of Childhood Illness (IMCI) criteria were confirmed as cases of ARI.

Sampling

Non probability, purposive sampling technique was used

for this study. Interview were taken to those mothers whose babies are under five years old and were willing to participate in the study. Mothers who were not willing to participate or not providing complete information were excluded in the study.

Research Instrumentation

A structured interview schedule was used for data collection. The instrument was based on objectives as well as review of literature in order to collect information in depth. The consultation with concerned expert from nursing peers, colleagues and with pediatric consultants was done for required information. The tool consisted of two main parts. Part I- questions related to socio-demographic variables of mother and baby. Part II- question related to risk factors of ARI. The content validity of the instrument was established by performing intense study in the related area, seeking the opinion of experts, and peers. Pretesting of the instrument was done in 10% of total population of under five-year age children in Pediatric OPD of FHRC. Revision and necessary modification such as using simple words, sequential arrangements of questions etc. were done on the basis of pretest. The instrument was translated into Nepali version.

Data Collection and analysis

After obtaining the confirmation letter from the concerned authorities of Tribhuvan university, Institute of Medicine (TU, IOM) Pokhara Campus, the proposal was forwarded and got approved from The Ministry of Social Development, Research Department, Gandaki, province. The purpose and objectives of the study were explained to the respondent and verbal consent was obtained.

The data was analyzed on the basis of research objectives. The collected data was checked and organized for accuracy and completeness. Data edited, coded and analyzed on basis of research study using Statistical Package for Social Science (SPSS) software, version 16. Data was analyzed using descriptive statistics (mean, frequency, percentage, standard deviation) and inferential statistics (Chi-square test).

RESULTS

A total of 361 children visited to the FHRC during the study period were selected for the study. Among them

24 children were under one month of age and 27 parents did not give consent whereas eight questionnaires had incomplete information. In total of 302 children visited to FHRC with the symptoms of ARI are participated in the study. The most common symptoms are fever (42.2%), cough (35.7%), running nose (34.1%), difficulty in breathing (28.5%) and chest in drawing were 11.6%. After Pediatrician consultation, among 302 children, only 188 children were diagnosed having ARI. So, the prevalence of ARI under five-year children in FHRC was 62.3% (188/302). Integrated Management of Childhood Illness (IMCI) classifies ARI into mild, moderate and severe pneumonia.⁹ Using IMCI guidelines, a total of 48.9% (92/188) were having mild ARI (no pneumonia), 34.6% (65/188) moderate and 16.5% (31/188) were severe ARI (Severe pneumonia) (Fig 1).

The age of participated children with ARI ranges from one to sixty month with the mean age of 21.46 ±13.52. Out of the 188 children, 96 (51%) were males whereas 92 (49%) were females. The highest percentage of ARI, 31.4%, was among 1 to 12 months children, followed by 26.6% among 13 to 24 months and the least 9% was among 49 to 60-months children. The children belong to the different ethnicity, with highest percentage was from Brahmin (28.7%) followed by Janajati (27.2%), Chhetri (25.0%), and Dalit (19.1%). Most of the children are by birth Hindu (89.8) and few belong to other religion family, Buddhist (2.1%), Christian (4.5) and Muslim (3.7%). Mother's age, education, occupation, along with types of family and economical status, were presented at Table 1.

The findings of the study revealed maximum number of the mothers belonged to more than 25 years which accounts (54.2%) of total mothers. Majority of (64.9%) mothers were housewife compare to service holder mothers of children (35.1%). Most of the mothers are literate (86.2%). The highest number, 28.7% of the mothers were from Brahmin ethnic group, Janajati (27.2%) and Chhetri (25.0%) followed by Dalit (19.1%). Majority (89.8%) of mothers of under five-year children belonged to Hindu religion. The greater number (77.1%) of mothers had adequate economic status. Regarding their living style only 47.9% mothers were from joint family.

Clinical factors associated with ARI were presented at Table 2. Most of the children were normal weight at birth (81.4%) and 13.8 % children were of low weight birth and 4.8% were overweight at birth (Data not shown). There were no statistically differences of children weight at birth among ARI and non ARI children group. Similarly,

colostrum given at birth, breast feeding and immunization status has not elucidated any statistically differences among ARI and non ARI children group. However, the nutritional status has influences in ARI.

Our results revealed environmental and social factors associated with ARI. Exposed to wood smoke had high chances to get ARI (p=0.001). Whereas passive smoker had no significantly chances to get ARI. In this study, we did not find statistically significant for the chances of ARI of the factors like mother's education, knowledge on ARI and day care attendance. However, we found factors like mosquito coil use in the house, caregiver's cooking method, history of contact with ARI person, had high chances to ARI (Table 3).

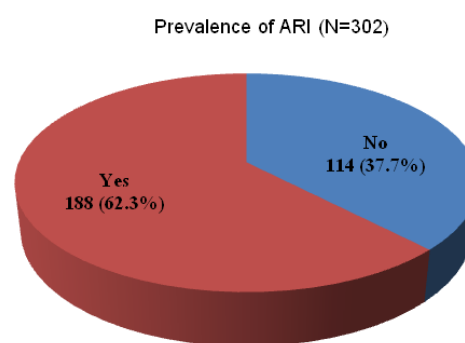


Fig 1A: Prevalence of ARI in FHRC

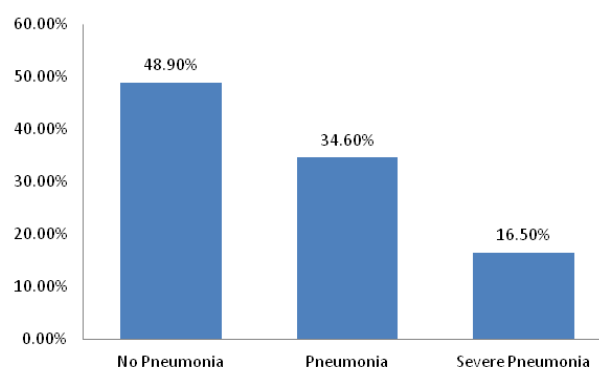


Fig 1B: Proportion of ARI using IMCI definition in children less than five years

Table 1: Socio-demographic characteristics of respondents

Variables	Frequency (N=188)	Percentage (%)
Gender of children		
Males	96	51.0%
Females	92	49.0%
Children age in months		
1-12 months	59	31.4%
13-24 months	50	26.6%
25-36 months	37	19.7%
37-48 months	25	13.3%
49-60 months	17	9.0%
Mother age		
More than 25	102	54.2%
Less than 25	86	45.7%
Mother education		
Literate	164	86.2%
Illiterate	24	12.8%
Mother occupation		
Housewife	122	64.9%
Service holder	66	35.1%
Economic Status		
Adequate	145	77.1%
Inadequate	43	22.9%
Types of Family		
Nuclear	98	52.1%
Joint	90	47.9%
Ethnicity		
Brahmin	54	28.7%
Chettri	47	25.0%
Janajati	51	27.2%
Dalit	36	19.1%
Religion		
Hindu	169	89.8%
Buddhist	4	2.1%
Christian	8	4.5%
Muslim	7	3.7%

Table 2: Clinical factors associated with ARI

Factors	Total (N=302)	ARI (N=188)	p value
Weight at Birth			
Normal	248	153 (61.7%)	0.19
Low birth weight (<2.5 kg)	43	26 (60.4%)	
Over weight (>4 kg)	11	9 (81.8%)	
Colostrum given at birth			
Yes	268	169 (89.9%)	0.26
No	34	19 (10.1%)	
Breast feeding			
Mixed	221	119 (53.8%)	0.15
Exclusive	82	69 (84.1%)	
Nutritional status			
Normal	286	177 (61.8%)	0.003
Malnourished	16	11 (68.7%)	
Immunization status			
Up to date Vaccination	294	183 (62.2%)	0.29
No/Incomplete vaccination	8	5 (62.5%)	

Table 3: Environmental and social factors associated with ARI

Factors	Total (N=302)	ARI (N=188)	p value
Exposure to wood smoke			
Not exposed	272	165 (60.6%)	0.001
Exposed	30	23 (76.6%)	
Cigarette smoke			
No	285	177 (62.1%)	0.11
Yes	17	11 (64.7%)	
Mosquito Coil use in the house			
Mixed	198	106 (53.5%)	0.02
Exclusive	104	82 (78.8%)	
Caregivers' Cooking Methods			
Gas	272	165 (60.6%)	0.005
Kerosene stove	17	13 (76.45)	
Firewood	13	10 (76.9%)	
Day Care Attendance			
No	258	160 (62.0%)	0.38
Yes	44	28 (63.6%)	
History of contact*			
No	202	101 (50.0%)	0.001
Yes	100	87 (79.8%)	
Mother's level of education			
Literature	262	164 (62.5%)	0.12
Illiterate	40	24 (60%)	
Mother knowledge on ARI			
Adequate	167	102 (61.1%)	0.09
Inadequate	135	86 (63.7%)	

* Contact with someone who has a cough

DISCUSSION

Acute respiratory tract infection (ARI) is regarded as one of the major public health problems and constitutes a major cause of morbidity and mortality among under-five children in the developing countries.¹⁰ The prevalence of ARI in this study was 62.3% which is similar to the report by Sikolia et al¹¹ in Kenya with the prevalence rate of 69.7%. A community based study conducted in India by Goel et al found the prevalence of ARI to be 52%, lower compared to our study.¹² The prevalence of ARI was high in this study is most likely because of the care givers had poor knowledge of ARI, low socioeconomic status and higher level of exposure to risk factors. Using IMCI guidelines, our data revealed 34.6% moderate ARI (Pneumonia) This is higher than the proportion of pneumonia (17.2%) in the other study.¹³ This is because the diagnostic criteria of pneumonia according to Integrated Management of Childhood Illnesses (IMCI) guidelines are highly sensitive.¹⁴ Our study revealed that the highest prevalence of ARI was among those below two years of age. Among above two years age, the prevalence decrease is similar to

a community based study in Australia as there is inverse relationship between the age and prevalence of ARI.¹⁵ The findings of the study revealed maximum number of the mothers belonged to more than 25 years (54.2%) with majority of housewife. Most of the mothers are literate (86.2%) with good economic status. This analysis was done to assess the knowledge of mothers on ARI. The mother's demographic data, economical status and knowledge of ARI may influences the cause of ARI in their children.³⁻⁵ In this study, we identify some related risk factors in children under five year attending FHRC. Nutritional status has shown a risk factor for the cause of ARI. This finding is consistent with a study conducted in Nigeria by Ujunwa et al⁶ and in india by Rahman et al¹⁶ where malnutrition was a significant risk factor associated with ARI

Of the environmental and social risk factors identified in our study, exposure to wood smoke, mosquito coil use in the house and history of contact were found to be significant. WHO reported that children exposed to cooking fuels, mosquito coil, increase the risk of developing pneumonia.^{13,17} The community has to be educated on the dangers of wood smoke because it is the main source of cooking fuel in the local communities. Contact with someone who had symptoms of respiratory disease significantly increases the risk of a child to develop ARI. ARIs are communicable diseases transmitted by droplets from infected persons. This is an association that has been found in other studies.¹³ So, the children should be kept away from people affected with respiratory infection, to prevent them from getting infected. Passive cigarette smoking in this study was not found to be a significant risk factor of ARI, which is in contrast to some other study, where passive smoking is a risk for ARI.¹³ This contrast report may be due to the level of exposure to passive smoking. Reducing those risk factors may reduce the cases of ARI in children

Limitations of the study

This study is a hospital-based study and not all of children with ARIs go to the hospital for medical care so the proportion may not be a true reflection of the community. Therefore, a longitudinal study would better illustrate the effects of the potential risk factors.

CONCLUSION

The proportion of acute respiratory infections in the

Fishtail Hospital and Research Center (FHRC), Pokhara, Nepal was 62.3%. The risk factors significantly associated with ARI were malnutrition, exposure to wood smoke, mosquito coil use in house and contact with person having ARI. Reducing these conditions will reduce the morbidity and mortality associated with ARI in children.

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