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Factors Associated with Acute Respiratory Infections among Under-Five Children in Bangladesh

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Abstract

Acute respiratory infection (ARI) is a group of diseases and symptoms. It is a leading cause of morbidity and mortality among children 6-59 months in worldwide. The main objective of this study was to investigate the ARIs among under-five children in Bangladesh. ARIs was measured using three problems of under-five children such as (i) fever in last two weeks¸(ii) cough in last two weeks, and (iii) short and rapid breath in last two weeks. This cross sectional study conducted from BDHS-2014. We considered 6678 mothers who had at least one child aged 6-59 months¸ and mothers and their selected children did not have any serious disease. Frequency distribution, Chi-square test and multiple binary logistic regression models were applied in this study. The prevalence of fever, cough and short and rapid breath in last two weeks among under-five children in Bangladesh was 62.3%, 62.3%, 66.6% and 56.6%. Five factors, mother's education level, wealth index, father's occupation, mothers and child's BMI were significantly associated with ARIs. From the present study we found that children live in Chittagong division, Muslim children, children living in middle income family, children's from early childbearing mothers, undernourished children, children who got diarrhoea recently, children with low birth size, children whose father was unemployed had more chance to suffer from fever than their counter part. Similarly, we found that the children had more chance to suffer from cough than their counter part who had diarrhoea recently, mothers whose age less than 20 years and child's low birth size. The children with primary educated mother, children used unhygienic toilet, poor family's children and

undernourished women's children had more chance to suffer from short, rapid breath than their counter part. In this study, we observed that a remarkable number of under-five children in Bangladesh suffering from ARIs, and some modifiable factors were associated with ARIs. Government should take special care of ARIs among under-five children in Bangladesh. Government could conduct some programmes for making awareness of parents living in Bangladesh for taking care of ARIs among their children.

Keywords: Acute respiratory infection, Bangladesh, Multiple logistic regression model, Under-five children.

AMS Classification: 62J05.

1. Introduction

Acute respiratory infection (ARI) is an important cause of morbidity and mortality among children in global. But the death proportion due to ARI is mostly focused in developing areas like Africa and Southeast Asia. The World Health Organization (WHO) estimated that annually 1.9 to 2.2 million children died due to ARI, with 70% occurring in Africa and Southeast Asia (WHO, 2010). Under five children mortality levels remain high in Bangladesh, and 5% of children under age five have symptoms of ARI (NIPORT, 2014). ARI is an infection that may affect normal breathing system. It can disturb just upper respiratory system, which jumps at sinuses and ends at vocal cords. This infection is mostly risky for children, older adults, and people with immune system syndromes. It usually starts as a viral infection in the nose, trachea (windpipe), or lungs and can spread from one individual to another.

From the previous literatures mentioned, it is clearly known that several risk factors have been associated with ARI such as children age, sex, socio-economic status, over-crowding place, indoor air pollution, passive smoking, absence of ventilation, defects in immune system, lack of basic health services, lack of awareness, overuse and misuse of antibiotics. Except during the neonatal period, ARIs are the most common causes of both illness and mortality in children under five, who average three to six episodes of ARIs annually regardless of where they live or what their economic situation. However, the proportion of mild to severe disease varies between high-income and low-income countries, and because of differences in specific etiologies and risk factors, the severity of LRIs in children under-five is worse in developing countries, resulting in higher case-fatality rate.

From the public health point of view, it is important to know the risk factors of ARI among under five children in Bangladesh. Many studies have been done with under-five children ARI, but most of them done with other populations (Brown et al, 2004). To the best of our knowledge some studies also have been done with children ARI in Bangladesh, among these studies some were very old (Rahman et al., 1997; Zaman et al., 1997). Most of the related factors of ARI such as women' education level, household wealth quintile, medical facilities in Bangladesh have been improving during the last two decades (NIPORT, 2014). Some studies have been done with only urban or rural ARI of children in Bangladesh (Hadi, 2002; Piechulek et al., 2003; 2012; Chisti et al., 2013 and Chisti et al., 2015). It is needed to investigate in details on ARIs of under five children in Bangladesh considering current data covering overall Bangladesh. For this urgency and lack of sufficient research work in health studies, the present work will test the hypothesis that some modifiable factors such as parents' education, household wealth index may have important predictors for ARIs of children in Bangladesh.

The government of Bangladesh has achieved some health-related goals such as child mortality, maternal health, and HIV/AIDS and malaria under Millennium Development Goals (MDGs), and it has finished in 2015. The government of Bangladesh is working toward achieving Sustainable Development Goals (SDGs) by 2030. This study can help our Government to take vital step for making awareness among the people in Bangladesh about the factors associated with ARIs that is harmful for children. Government of Bangladesh is currently working to achieve the goal of Sustainable Development Goals (SDGs) especially for maternal and under five children mortality. We hope our findings can contribute to achieve this goal. Therefore, the main objective of this thesis was to determine the prevalence of ARIs among under-five children in Bangladesh.

2. Materials and Methods

Inclusion criterion: In this study, we considered non pregnant ever married women having at least one child aged 6-59 months living with his/her mother. Moreover, we considered children and her/his mother who did not have serious disease.

Sample selection procedure: The data was collected from March 24, 2014 to August 11, 2014. Two-stage stratified cluster sampling procedure was used by BDHS-2014 for selecting the sample from the Bangladesh survey. BDHS collected data among under-five children and the percentage who had symptoms of ARIs in the two weeks preceding the survey. The sampling technique, survey design, survey instruments, measuring system and quality control have been described elsewhere (NIPORT, 2014). Irregular data points were then identified and excluded because their existence may lead to puzzling results. Some missing values were also detected, and these cases were also excluded. After these adjustments, the data set was reduced to 6678 mothers for further analysis.

Outcome variable: The BDHS-2014 asked question to every mothers, "Was their children with symptoms of acute respiratory infection in the two weeks?" Mothers had two options; (i) Yes, (ii) No. The outcome variable of this study was classified into two classes based on the option of mothers such as (i) Yes and (ii) No. It was mentionable that for this, we consider three symptoms of ARIs in last two weeks of BDHS-2014 survey such as (i) fever (ii) cough and (iii) short, rapid breath, and each symptom was categorized into two groups; (a) fever: (i) Yes (code, 1), (ii) No (Code, 0), (b) cough: (i) Yes (code, 1), (ii) No (Code, 0), and (c) short, rapid breath: (i) Yes (code, 1), (ii) No (Code, 0).

Independent variables: Some selected socio-economic, demographic, anthropometric variables such as division, residence, parents education and occupation, type of toilet facilities, number of family member, wealth index, total children ever born, mothers' age at first birth, mothers' age group, mothers' and children's BMI, parents occupation, place of delivery, had diarrhoea recently, size of children at birth, initial breastfeeding were considered in this study as independent variables. Most of the selected independent variables were selected from previous studies and available in NIPORT-2014 (Qazi et al., 1996).

Statistical analysis: Descriptive statistics, Chi-square (χ^2) tests and binary logistic regression model were in this study. All statistical analyses were carried out using

SPSS (IBM version 20) software. A value of p less than 0.05 will be considered as statistically significant in the analysis.

3. Results

A total number of 6678 mothers having at least one children aged 6-59 months considered in this study to investigate the acute respiratory infections (AIRs) of their under five children in Bangladesh.

Prevalence and associated factors of fever in last two weeks among under-five children:

This study revealed that the prevalence of fever in last two weeks was 62.3% among under-five children in Bangladesh (Figure-1).

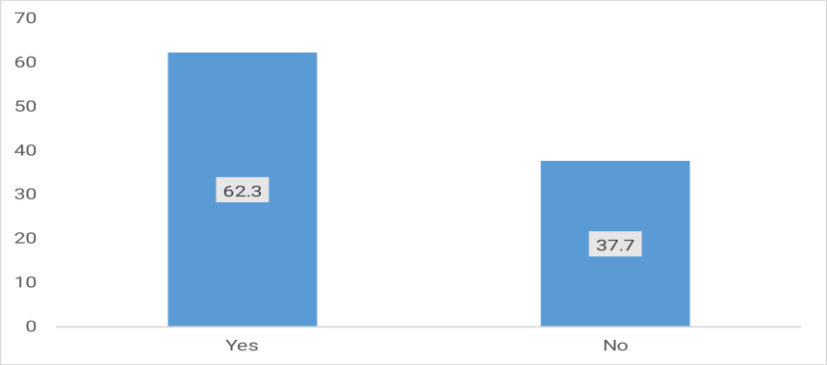

Figure 1: The prevalence of fever in last two weeks among under-five children, Bangladesh

The Chi-square test demonstrated that fever in last two weeks was significantly ($p<0.05$) associated with division, mother's education level, wealth index, religion, total children ever born, mothers age at first birth, father's occupation, mothers and child's BMI, had diarrhoea recently and received BCG.

We considered only significantly associated factors provided by Chi-square test as independent variable for logistic model. If the value of the standard error lies between 0.001-0.5, there was no evidence of multicollinearity problems among independent variables.

After controlling the effect of other factors, the logistic model showed that children live in Chittagong division were more likely to suffer by 19.3% higher in

fever than the children living in Khulna division (AOR = 0.807, CI = 0.664-0.974, $p<0.05$). It was found that Muslim children had 1.252 fold greater risk to suffer from fever than the non-muslim children in Bangladesh (AOR = 1.252, CI = 1.037-1.510, $p<0.05$). It was investigated that the children living in middle family were more likely to get fever than the children live in rich family in Bangladesh (AOR = 1.168, CI = 1.012-1.348, $p<0.05$). Early childbearing mothers had more chance by 15.8% to get children who were more likely to suffer from fever than their counterparts (AOR = 0.842, CI = 0.719-0.987, $p<0.05$). Undernourished children were more likely to suffer from fever than over nourished children in Bangladesh (AOR = 1.268, CI = 1.073-1.498, $p<0.01$). Children who got diarrhoea recently had more chance to suffer from fever than their counterpart (AOR = 2.084, CI = 1.669-2.603, $p<0.01$). The children with low birth size had more chance to suffer from fever than the normal birth size children (AOR = 1.179, CI = 1.012-1.374, $p<0.05$). The children whose father was unemployed had more chance to suffer from fever by 30.8% than the children whose father was businessman (AOR = 0.692, CI = 0.507-0.944, $p<0.05$). Children who received BCG had more chance to suffer from fever than their counterpart (AOR = 0.558, CI = 0.441-0.706, $p<0.01$).

Table 1: Effect of socioeconomic and demographic factors on ARIs (suffering from fever in last two weeks)

Variable	B	S.E.	Wald	p-value	AOR	95% CI (AOR)	
						Lower	Upper
Division							
Barisal vs Chittagong	0.02	0.09	0.07	0.791	1.02	0.85	1.23
Sylhet vs Chittagong	0.12	0.09	1.98	0.159	1.13	0.95	1.35
Dhaka vs Chittagong	-0.14	0.08	2.74	0.098	0.86	0.73	1.02
Khulna vs Chittagong	-0.21	0.09	4.71	0.030	0.80	0.66	0.97
Rajshahi vs Chittagong	-0.05	0.09	0.34	0.557	0.94	0.78	1.13
Rangpur vs Chittagong	0.01	0.09	0.03	0.860	1.01	0.84	1.22
Education level							
No education vs higher	0.05	0.12	0.18	0.666	1.05	0.82	1.35

Primary vs higher	0.13	0.11	1.31	0.251	1.13	0.91	1.42
Secondary vs higher	0.12	0.10	1.40	0.237	1.12	0.92	1.37
Religion							
Muslim vs non-Muslim	0.22	0.09	5.48	0.019	1.25	1.03	1.51
Wealth index							
Poor vs Rich	0.06	0.06	0.85	0.355	1.06	0.93	1.21
Middle vs Rich	0.15	0.07	4.48	0.034	1.16	1.01	1.34
Total child ever born							
Two vs One	-0.01	0.06	0.01	0.906	0.99	0.87	1.12
Three vs One	-0.03	0.07	0.14	0.705	0.97	0.83	1.13
Four/More vs One	0.16	0.08	3.60	0.058	1.17	0.99	1.38
Mothers age at first birth							
Normal childbearing vs early childbearing	-0.17	0.08	4.50	0.034	0.84	0.71	0.98
Mother's BMI							
Undernourished vs over nourished	0.23	0.08	7.79	0.005	1.26	1.07	1.49
Normal vs over nourished	0.13	0.07	3.69	0.055	1.14	0.99	1.31
Father's occupation							
Hard worker vs unemployed	-0.27	0.15	3.22	0.073	0.76	0.565	1.025
Service holder vs unemployed	-0.26	0.18	2.00	0.157	0.76	0.533	1.107
Businessman vs unemployed	-0.36	0.15	5.40	0.020	0.69	0.507	0.944
Had diarrhoea recently							
Yes vs No	0.73	0.11	42.01	0.001	2.08	1.669	2.603
Received BCG							
No vs Yes	-0.58	0.12	23.498	0.001	0.55	0.441	0.706
Constant	-0.67	0.21	9.592	0.002	0.51		
Size of child at birth							
Low vs Normal	0.16	0.07	4.490	0.034	1.17	1.012	1.374
Constant	-0.47	0.03	185.383	0.001	0.62		

Prevalence and associated factors of cough in last two weeks among under-five children:

This study found that the prevalence of cough in last two weeks among under-five children was 66.6% (Figure-2).

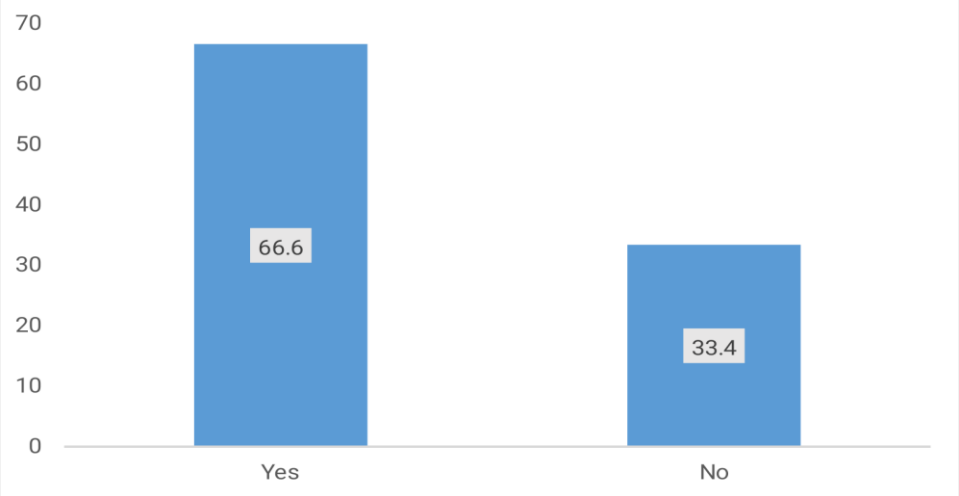

Figure 2: The prevalence of cough in two weeks among under-five children, Bangladesh

From the Chi-square test it was found that the mothers education level, wealth index, total children ever born, mothers age at first birth, mother's age, father's occupation, mothers and child's BMI, had diarrhea recently and received BCG were significantly ($p<0.05$) associated with cough among under-five children.

From table 2, we showed that the children more chance to suffer from cough who had diarrhea recently than others (AOR = 1.734, CI = 1.390-2.163, $p<0.01$). It was showed that the mothers with age group (≤20), their children had more chance to suffer from cough than 21-29 age group mothers (AOR = 0.826, CI = 0.702-0.972, $p<0.05$). It was also showed that the mothers with age group (≤20), their children had more chance to suffer from cough than (≥30) age group mothers (AOR = 0.756, CI = 0.597-0.958, $p<0.05$). The children received BCG was more likely to suffer from cough than the children not received BCG (AOR = 0.545, CI = 0.423-0.702, $p<0.01$). The children with low birth size had more chance to suffer from cough than the normal birth size children (AOR = 1.276, CI = 1.092-1.490, $p<0.05$).

Table 2: Effect of socioeconomic and demographic factors on ARIs (suffering cough in last two weeks)

Variable	B	S.E	Wald	p-value	AOR	95.0% CI(AOR)	
						Lower	Upper
Education level							
No education vs higher	0.07	0.12	0.37	0.540	1.08	0.84	1.38
Primary vs higher	0.07	0.11	0.43	0.51	1.07	0.86	1.34
Secondary vs higher	-0.02	0.10	0.03	0.843	0.98	0.80	1.19
Wealth index							
Poor vs Rich	0.01	0.06	0.02	0.870	1.01	0.88	1.15
Middle vs Rich	0.06	0.07	0.83	0.361	1.07	0.92	1.23
Total child ever born							
Two vs One	-0.05	0.07	0.45	0.499	0.95	0.82	1.10
Three vs One	0.04	0.09	0.25	0.617	1.05	0.86	1.27
Four/More vs One	0.17	0.11	2.23	0.135	1.19	0.94	1.49
Mother's BMI							
Undernourished vs over nourished	0.08	0.08	1.02	0.311	1.09	0.92	1.29
Normal vs over nourished	0.03	0.07	0.19	0.662	1.03	0.89	1.19
Father's occupation							
Hard worker vs unemployed	-0.02	0.15	0.03	0.852	0.97	0.71	1.32
Service holder vs unemployed	-0.18	0.19	0.90	0.341	0.83	0.57	1.21
Businessman vs unemployed	-0.12	0.16	0.60	0.435	0.88	0.63	1.21
Had diarrhea recently							
Yes vs No	0.55	0.11	23.84	0.001	1.73	1.39	2.16
Received BCG							
No vs Yes	-0.60	0.12	22.02	0.001	0.54	0.42	0.70
Mothers age group							
Age 21-29 vs age <=20	-0.19	0.08	5.29	0.021	0.82	0.70	0.97
Age >=30 vs age <=20	-0.27	0.12	5.34	0.021	0.75	0.59	0.95
Mothers age at first birth							
Normal childbearing vs early childbearing	-0.03	0.08	0.16	0.686	0.96	0.82	1.13
Size of child at birth							
Low vs Normal	0.24	0.07	9.39	0.002	1.27	1.09	1.49

Prevalence and associated factors of short, rapid breath among under-five children:

This study revealed that the prevalence of short, rapid breath among under-five children was 56.5% (Figure-3).

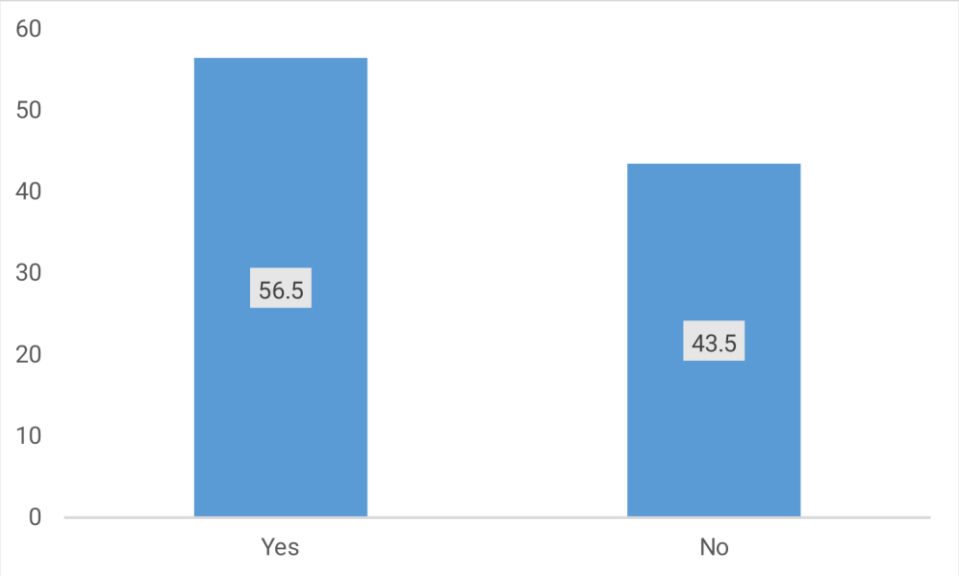

Figure 3: The prevalence of short, rapid breath among under-five children, Bangladesh

Frequency distribution and Chi-square test for association between two factors

We observed from Chi-square test that the mother's education level, type of toilet facilities, wealth index, mother's and child's BMI, father's occupation and size of children at birth were significantly ($p<0.05$) associated with short, rapid breath.

From table 3, we observed that the children with primary educated mother had more chance to suffer from short, rapid breath than higher educated mother (AOR = 1.531, CI = 1.120-2.093, $p<0.01$). The children used unhygienic toilet had more chance to suffer from short, rapid breath than the children used hygienic toilet (AOR = 0.748, CI = 0.630-0.889, $p<0.01$). The poor family's children had more chance to suffer from short, rapid breath than the children belong to rich family (AOR = 1.442, CI = 1.194-1.742, $p<0.01$). Undernourished women's children had more chance to suffer from short, rapid breath than the over-nourished women's children (AOR = 1.577, CI = 1.210-2.056, $p<0.01$). Undernourished and normal

children had more chance to suffer from short, rapid breath than the over-nourished children (AOR = 1.600, CI = 1.029-2.487, p<0.05) (AOR = 1.376, CI = 1.069-1.771, p<0.05). We observed that the normal birth size children had more chance to suffer from short, rapid breath than the low birth size children (AOR = 1.198, CI = 1.012-1.419, p<0.05).

Table 3: Effect of socioeconomic and demographic factors on ARIs (suffering short, rapid breath)

Variable	B	S.E	Wald	p-value	AOR	95.0% CI(AOR)	
						Lower	Upper
Education level							
No education vs higher	0.34	0.17	3.78	0.052	1.40	0.99	1.98
Primary vs higher	0.42	0.16	7.11	0.008	1.53	1.12	2.09
Secondary vs higher	-0.42	0.15	1.19	0.274	1.18	0.87	1.59
Type of toilet facilities							
Hygienic vs Unhygienic	-0.29	0.08	10.87	0.001	0.74	0.63	0.88
Wealth Index							
Poor vs rich	0.36	0.09	14.42	0.000	1.44	1.19	1.74
Middle vs rich	0.20	0.11	2.90	0.088	1.22	0.97	1.54
Mother's BMI							
Undernourished vs over nourished	0.45	0.13	11.34	0.001	1.57	1.21	2.05
Normal vs over nourished	0.22	0.11	3.62	0.057	1.25	0.99	1.58
Children's BMI							
Undernourished vs over nourished	0.47	0.22	4.36	0.037	1.60	1.02	2.48
Normal vs over nourished	0.31	0.12	6.13	0.013	1.37	1.06	1.77
Father's occupation							
Hard worker vs unemployed	0.39	0.26	2.17	0.140	1.47	0.88	2.48
Service holder vs unemployed	-0.20	0.32	0.38	0.536	0.81	0.43	1.54
Businessman vs unemployed	0.36	0.27	1.70	0.191	1.43	0.83	2.45
Size of child at birth							
Normal vs low	0.18	0.08	4.41	0.036	1.19	1.01	1.41

4. Discussion

In the present study a total number of 6,678 married women at their reproductive age (15-49 years) were considered as sample. The current study may help to determine the prevalence of ARIs among children aged 6-59 months in Bangladesh and also to examine the association between socioeconomic, demographic factors and ARIs among children aged 6-59 months in Bangladesh.

Prevalence of ARIs:

Suffering fever in last two weeks: In this study, we observed that 62.3% children were experienced with fever. From previous study we observed that occurrence of both fever (31.00% in 1997 vs. 36.76% in 2014) and dyspnoea (39.27% in 1997 vs. 43.27% in 2014) has increased gradually since 1997, and tended to be higher in households in the lower wealth quintiles (Sanni et al., 2019). The rate of poorer and the poorest quintiles children of families were 2.40 and 2.36 times more likely to suffer from ARIs associated to the wealthiest group (Sultana et al., 2019). Piechulek et al., (2003) calculated that the risk of dying reduced 60% and about 30% children less likely to suffer from diarrhoea. Zaman et al., (1997) investigated that most of the children (96%) had upper respiratory infections and the rate was highest among 18-23 months old children followed by 6-11 months old children.

Sufferings cough in last two weeks: In this study, we observed that 66.6% children were experienced with cough. Chisti et al., 2015 studied about the respiratory difficulty or cough and radiological pneumonia among 0-59 month's children in Bangladesh. They observed that 27% children had the symptoms and 63% did not had the symptoms of severe pneumonia. Only 2-3% of children had received diphtheria-pertussis-tetanus and BCG vaccine and after 3 months of follow-up all children aged 9-23 months were immunized against measles **(**Zaman et al., 1997). In 2003 and 2008 survey, more male (5.8%) than female (5.4%) children had acute respiratory infection among underweight and stunted children (Orimadegun et al. 2019). In our study it was observed that the maximum number of children (35.8%) whose mother was undernourished suffering from cough and the minimum number of children (30.7%) whose mother was over-nourished suffering from cough.

Suffering short, rapid breath in last two weeks: The prevalence of short, rapid breath related to the symptoms of ARIs was 56.5% experienced with short, rapid

breath. The rate of acute respiratory infection among under five children was 41.6%. They found that the history of parental smoking (57%), respiratory infection among family members (51.1%) and malnourished children (66.4%) **(**Savitha et al., (2018), India. All categories of pneumonia like pneumonia, severe pneumonia and very severe pneumonia were computed for 30.3%, 28% and 26.9% respectively from 1990-92 among under-five children (Qazi et al., (1996), Pakistan.

Effect of socio economic demographic factors on ARIs:

Effect of socio economic demographic factors on fever: The present study looking at the whole sample population, we observed that Chittagong division were more likely to suffer in fever than the children living in Khulna division. It was found that Muslim children had greater risk to suffer from fever than the non-Muslim children in Bangladesh. It was investigated that the children living in middle family were more likely to get fever than the children live in rich family. Early childbearing mothers had more chance to get children who were more likely to suffer from fever than their counterparts. Undernourished children were more likely to suffer from fever than over nourished children in Bangladesh. Children who got diarrhoea recently had more chance to suffer from fever than their counterpart. The children with low birth size had more chance to suffer from fever than the normal birth size children. The children whose father was unemployed had more chance to suffer from fever than the children whose father was businessman. Broor et al., (2001) investigated mothers upper respiratory infection, severe malnutrition, inappropriate immunization for age and history of lower respiratory tract infection in the family.

Effect of socio economic demographic factors on cough: The children more chance to suffer from cough who had diarrhoea recently. It was showed that the mothers with age group (≤20), their children had more chance to suffer from cough than 21-29 age group mothers. It was also showed that the mothers with age group (≤20), their children had more chance to suffer from cough than (≥30) age group mothers. The children received measles was less likely to suffer from cough than the children not received measles. The children with low birth size had more chance to suffer from cough than the normal birth size children. The mortality was below 2% higher risk in the intervention group (odds ratio 1.16, 95% CI: 0.61-2.21) (Brown et al., 2004).

Effect of socio economic demographic factors on short, rapid breath: From the study we observed that the children from primary educated mother had more chance to suffer from short, rapid breath than higher educated mother. The children used unhygienic toilet had more chance to suffer from short, rapid breath than the children used hygienic toilet. The poor family's children had more chance to suffer from short, rapid breath than the children belong to rich family. Undernourished women's children had more chance to suffer from short, rapid breath than the over-nourished women's children. Undernourished and normal children had more chance to suffer from short, rapid breath than the over-nourished children. We observed that the normal birth size children had more chance to suffer from short, rapid breath than the low birth size children.

Strength of the study: The main strength of this study may be it was the first time we attempted to consider all types of symptoms of ARIs among under-five children in Bangladesh to investigate the prevalence and risk factors. We considered the secondary data collected from BDHS-2014 but we used an appropriate statistical tools and techniques to determine the associations and effects of selected socio-economic, demographic, anthropometric and behavioural factors on ARIs.

Limitations of this study: This study has a number of remarkable limitations. Firstly, in this study secondary data was considered to find association and effect of selected independent variables on prevalence of ARIs. However, there were we meeting so many troubles due to some missing and abnormal data set. In this cross-sectional study, we could not be able to include many other factors which may be important for ARIs for our time limitations. Several risk factors have been declared in the literature all of which were not considered in this study.

5. Conclusions

In the present study, we investigated the ARIs among children aged 6-59 months in Bangladesh. We selected 6,678 married women at their reproductive age (15-49 years) as sample. It was found that prevalence of children suffering from fever, cough and short, rapid breath were 62.3%, 66.6% and 56.6%. We also observed that division, education level, wealth index, religion, total children ever born, mothers age at first birth, father's occupation, mothers and child's BMI, had diarrhoea recently, and received BCG were significant factor for fever. Education level, wealth index, religion, total children ever born, mothers age at first birth,

father's occupation, mothers and child's BMI, had diarrhoea recently, received BCG and age group of mothers were significant for cough and education level of mother, type of toilet facilities, wealth index, mother's BMI, father's occupation and size of children at birth were associated with short, rapid breath. The influencing factors of suffering fever and cough in last two weeks were residence, education level, religion, wealth index, total children ever born, mothers' age at first birth of child, mother's BMI, while the influencing factors of short, rapid breath was the education level of mother, type of toilet facilities, wealth index, mother's BMI, father's occupation and size of children at birth. Government, parents and other policy makers should take special care of children and decision for increasing the awareness about the effect of ARIs among under-five children in Bangladesh.

Reference

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