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Original Article

Risk Factors, Clinical Presentation and Parental Perception on Use of Antimicrobial Therapy for ARTI in Under 5 Children

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Gulshan Akhtar[1], Afroza Khanam[2], Mohammad Abdur Rahman[3], Quazi Rakibul Islam[4], Nurun Nahar Chowdhury[5], Kazi Yesmin[6]

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ABSTRACT:

Background: *Acute respiratory tract infections (ARTIs) are one of the leading causes of morbidity and mortality, the most vulnerable are under 5 group. Though self-limited and mostly viral in origin unnecessary use of antibiotics for this illness has led to development of antimicrobial resistance.* ***Methodology:*** *This cross sectional study was conducted among 200 children aged 6 to 59 months, with symptoms of ARTI attending Pediatric OPD during 1-year study period. Data regarding sociodemographic variables of study population and respondent parent, symptoms and parental knowledge and attitude on use of antibiotic for their child's current problem were collected.* ***Results:*** *In our current study we found, ARTIs, were prevalent in younger children (6 to 59 months' group) with male predominance (62%). 82.5% children were exclusively breast fed, 90% maintained standard EPI vaccination schedule, 87.5% received vitamin A in last 6 months. Prevalence of ARTI was lower among these majority group. 48.2% respondent mother completed secondary education and monthly family income was >25,000 to 50,000 BDT in majority group (49.5%). Only 37.5% study population could afford to live in well ventilated house. Child's age, sex and housing standard was significantly associated with development of ARTI in our study. Fever was the commonest (88%) symptom followed by runny nose (80%), cough (67.5%), wheeze (43%), dyspnea (19%), ear ache &/discharge (17.5%), sore throat (14%), chest in drawing (10%) and headache, facial pain/tenderness in (7.5%). 55% respondent parent didn't know the etiology of pediatric ARTIs, 77% had no idea that antibiotic misuse may lead to antimicrobial resistance and 60% were unware of side effect of the drug. 32.5% parent took medicine without valid prescription from pediatrician.* ***Conclusion:*** *The potential risk factors of ARTI in children are preventable and modifiable. Promotion of exclusive breast feeding, vaccination, vitamin A supplementation, optimum nutrition and basic hygiene practices*

1. *Associate Professor, Department of Pediatrics. Green Life Medical College, Dhaka.*
2. *Associate Professor, Department of Otolaryngology. Green Life Medical College, Dhaka.*
3. *Assistant Professor. Department of Cardiology, Shaheed Sahrowardy Medical College, Dhaka.*
4. *Professor & Head of Department of Pediatrics, Green Life Medical College, Dhaka.*
5. *Professor & Head of Department of Psychiatry, Green Life Medical College, Dhaka.*
6. *Associate Professor. Department of Microbiology, Green Life Medical College, Dhaka.*

reduces chance of infection. Identification of the modifiable risk factors and appropriate interventions will enable to reduce the burden of this illness. Besides, provision of knowledge to general population regarding necessity of antibiotics in this illness will help to minimize misuse of this drug.

Keywords: *Risk Factors, Clinical Presentation, Parental Perception, Antimicrobial Therapy, ARTI*

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INTRODUCTION:

Child mortality is an important public health issue throughout the world since it is commonly used as one of the important measures of well-being and development of a country.[1] The child mortality rate, also under-five mortality rate, refers to the probability of dying between birth and exactly five years of age expressed per 1,000 live births.[3] It encompasses neonatal and infant mortality (the probability of death in the first year of life).[4] Reduction of child mortality is reflected in several of the United Nations' Sustainable Development Goals. Target 3.2 is "by 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce under-5 mortality to at least as low as 25 per 1,000 live births." (United Nations, 2015).[2]

In 2019 an estimated 5.2 million children under 5 years died mostly from preventable and treatable causes. Children aged 1 to 11 months accounted for 1.5 million of these deaths while children aged 1 to 4 years accounted for 1.3 million deaths. Newborns accounted for the remaining 2.4 million deaths. An additional 500,000 older children (5 to 9 years) died in 2019. Leading causes of death in children under-5 years are preterm birth complications, birth asphyxia/trauma, pneumonia, congenital anomalies, diarrhea and malaria, all of which can be prevented or treated with access to simple, affordable interventions including immunization, adequate nutrition, safe water and food and quality care by a trained health provider when needed.[3]

The global under-five mortality rate declined by 59 per cent, from 93 deaths per 1,000 live births in 1990 to 38 in 2019. Despite this considerable progress, improving child survival remains a matter of urgent concern. In 2019 alone, roughly 14,000 under-five deaths occurred every day, an intolerably high number of largely preventable child deaths.[4]

Over the last 50 years, under-5 MR of Bangladesh was declining at a moderating rate to shrink from 244.68 deaths per thousand live births in 1971 to 28.95 deaths per thousand live births in 2020.[5] In 2019, the U5MR in Bangladesh was approximately 30.8 per 1000 live births. This was a decrease from 2010, in which the U5MR in BD amounted to just over 49 per 1000 live births.[6]

Various previous studies conducted in Bangladesh showed that, factors related to U5 MR are poor maternal education level, lack of antenatal care, gestational age and birth weight, inappropriate breast feeding practice, child's nutritional status, source of drinking water, household asset index, health seeking behavior and more.[1] Majority of these factors can be approached by overall improvement in health sector including, essential newborn care, infant and young child feeding practice, immunization programme, vitamin A supplementation and deworming, provision of safe drinking water, proper swage system. Due to

successful implementation of these programmes there has been a significant reduction in NMR, IMR and U5MR in BD.

ARI constitute both acute upper respiratory tract (URTI) and acute lower respiratory tract infection (LRTI). URTI usually present in forms form rhinitis, common cold, sinusitis, otitis, nasopharyngitis, pharyngitis, tonsillitis, epiglottitis, while bronchiolitis and pneumonia are the 2 most common forms of LRTI in children. Most of these RTI in pediatric age groups are viral followed by bacterial and other microbes. Children from developing countries experience 3-8 episodes of URTI annually.[7] In 2011, LRTI were estimated to be responsible for 1.3 million deaths globally in children < 5 years old.[8] In Bangladesh, ARIs are the most frequent cause of health consultation and hospitalization for children <5 years.[9] Bangladesh demographic and health survey reported that 5.8% under 5 children experienced ARI.[10]

Despite significant reduction in under 5 mortalities, there are still some areas in BD where easily accessible and appropriate health care facilities are not available. Majority of under 5 mortalities are related to infectious diseases which can be easily prevented by proper immunization, maintain personal hygiene, proper sanitation and sewage facilities and healthy drinking water supply. These facilities are not available in many rural areas including some urban slum settings resulting in high prevalence of pediatric infectious and contagious diseases. The current study was conducted at center of capital city Dhaka, where combination of upper, middle and poor class people reside. There are many tertiary care centers in this area. Despite of improved and easy access to health care facilities we observed a group of parents had the attitude of seeking care from traditional healers, from medicine shop holders, general practitioners or use of self-medication. ARI in children is mostly viral and self-limiting. Symptomatic and supportive treatment are sufficient to cure the sick child and doesn't require antibiotics in majority cases. But due to lack of knowledge regarding accurate diagnosis and case management of children with ARI, these children are often treated with antimicrobial agents though not required. Indiscriminate and wide spread use of such drugs ultimately predispose to development of drug resistance.

The aim of our current study was to see the prevalence of ARTI among under 5 children, common mode of presentation and observe parental knowledge and attitude on use of antibiotics in management of their sick child with ARTI.

METHOD AND MATERIALS:

Conceptualization of the Study: The objective of our current study was to observe the prevalence of ARTI in under 5 children in our study area, mode of presentation of ARTI and parental perception on antibiotic use for ARTI in their children. We observed sociodemographic factors of study population and respondent parent (child's age, sex, breast feeding status, immunization status, and vitamin A prophylaxis status, personal or family history of atopy, maternal education level, maternal occupation, monthly family income and housing). Other variables included child's symptoms at presentation and maternal perception (knowledge and attitude) on antibiotic use for their child's current ARTI. These variables were chosen for the analysis based on their demonstrated link as risk factors for ARTI in pediatric age group.

Data collection: A systematic questionnaire was used to obtain data from the study population. The questionnaire used in our study consisted of the different variables related to development of ARTI

in children. 200 respondent parent (mother) accompanying the child were interviewed during the study. To preserve consistency, the questionnaire was written in English, then translated into Bangla, the local language, and then back to English. Data on sociodemographic variables of both study population and respondent mother were collected using a structured self-administered questionnaire. Categorical variable included respondent parent's education level, occupation, monthly income and housing. Knowledge about cause of pediatric ARTIs, necessity of antibiotics, side effects of the drugs self- medication were all dependent variables. The study followed conventional data collection techniques and was approved by the Bangladesh Ministry of Health and Family Welfare's National Research Ethics Committee (NREC). Before enrolling in the study, all participants signed a written informed consent form.

Study place and period: The current cross sectional study was conducted at OPD setting of a tertiary care hospital (Medical College Hospital) located at the center of capital city Dhaka. The patients included in this study came from surrounding areas which was inhabited by upper, middle and lower class families. Some of these areas are urban slum with unsafe drinking water supply, defective sewage, poor sanitation and overcrowding. As a result of which communicable diseases like respiratory tract and gastrointestinal tract infections are very frequent among population residing in these areas particularly affecting pediatric age groups. The study was conducted during 1-year period from January 2021 to December 2021.

Study population: 200 children with symptoms of ARTI attending Pediatric OPD during the study period were enrolled in the study.

Inclusion and Exclusion criteria: mothers who opted to participate in the study and children aged 6 months to 59 months presenting with following 1/more symptoms were included in the study (fever/runny nose/cough/wheeze/dyspnea/ear ache & or discharge/sore throat/headache/facial pain or tenderness). Mothers unable to perceive questions and children with any severe classification (according to IMCI), or those who were admitted due to severe classification and either parents unwilling to participate in the study were excluded.

Laboratory investigations

Some children among the study population required need for investigations which included chest x ray, x ray nasopharynx (lateral view), x ray PNS (OM view), Complete Blood Count. These were not included in our study.

Sample size: This cross-sectional study was conducted among total of 200 participants.

Data analysis: Clean coded data was input into Microsoft Excel and exported to SPSS version 22 for further analysis. The descriptive statistical analysis was described using sentences, graphs, tables, frequencies, percentages, mean and standard deviation. The frequencies of the variables were used in a descriptive analysis and the 95% confidence intervals (CIs) were produced. The statistical analysis was omitted from questionnaires that were incomplete. The chi-square test was used during bivariate analysis for identifying variables associated with prevalence of ARI.

Ethical consideration:

The proposal of the study was approved by the Ethical Committee of Green Life Medical College. Informed consent was obtained from the accompanying caregiver of the child. Confidentiality of the data derived from the sample were maintained.

RESULTS:

The current study was conducted among 200 children with features of ARTI. Age of study population were categorized into 6 months to 36 months and 37 months to 59 months. Majority (59.50%) belonged to 6 to 36 months' group followed by 40.50% among the latter group. 62% children were male and 38% were female child. (Figure 1, 2)

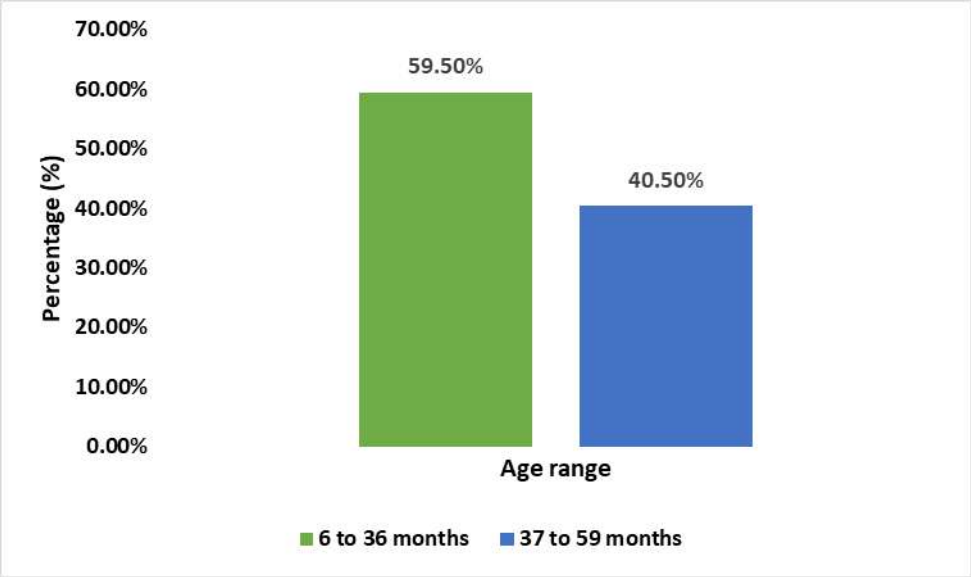

Figure 1: Age distribution of study population (n=200)

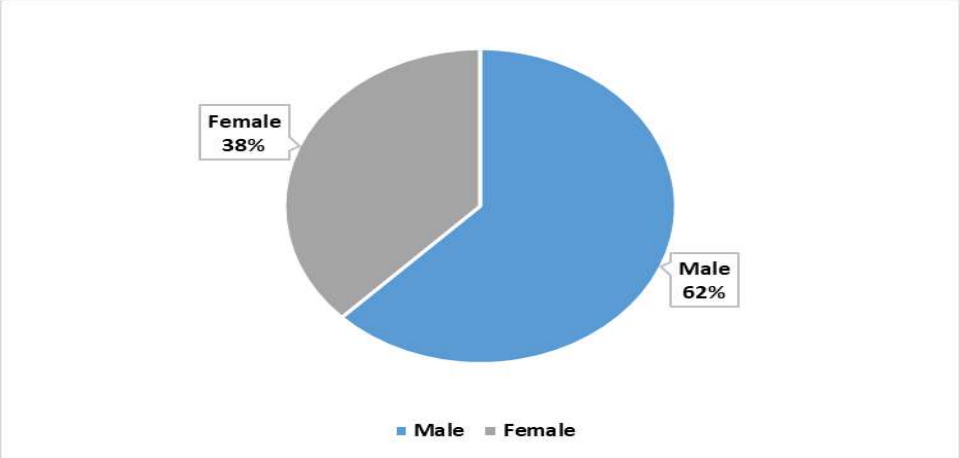

Figure 2: Gender distribution of study population (n=200)

Table I: Sociodemographic characteristics of study population & respondent parent (n=200)

Variables	Frequency (n)	Percentage (%)
Breast feeding status		
Exclusively breast fed	165	82.5
Not exclusively breast fed	35	17.5
Immunization status		
Ongoing/Completed as per EPI schedule	180	90
Not completed as per EPI schedule	20	10

Vitamin A status (in last 6 months)		
As per national vitamin A prophylaxis programme	175	87.5
Not following the programme	25	12.5
Personal/Family history of atopy		
Present	35	17.5
Absent	165	82.5
Maternal education		
No education	24	12
Primary	55	27.5
Secondary	97	48.5
Graduate	24	12
Maternal occupation		
Housewife	140	70
Occupant (in various jobs)	60	30
Monthly family income (BDT)		
<10,000	24	12
10,000 – 25,000	57	28.5
>25,000 – 50,000	99	49.5
>50,000	20	10
Housing		
Spacious & well ventilated room	75	37.5
Overcrowded & not well ventilated	125	62.5

Table I shows sociodemographic variables of study population and respondent parents. 82.5% children were exclusively breast fed and 17.5% children were on mixed feeding during 1st 6 months of their age. Majority (90%) children were immunized/ongoing immunization as per EPI schedule, only 10% didn't follow the EPI programme. 87.5% children received vitamin A during the last 6 months' period and 12.5% didn't take the vitamin A dose. Personal/family history of atopy were found among only 17.5% children with history of passive exposure to smoking among 15%. Majority (48.5%) of respondent mother completed secondary level of education followed by 27.5% completed primary and 12% were graduates. Additional 12% mothers were uneducated. 70% mothers were housewife followed by 30% occupied in various jobs. 49.5% children belonged to middle class family (>25,000 – 50,000 BDT). 62.5% population resided in overcrowded and poor ventilated house.

Table II: Common symptoms of study population (n=200)

Variables	Frequency	Percentage (%)
Fever	176	88
Runny nose	160	80
Cough	135	67.5
Wheeze	86	43
Dyspnea	38	19
Ear ache &/discharge	35	17.5
Sore throat	28	14

Chest in drawing	20	10
Headache, Facial pain &/tenderness	15	7.5

Fever was the commonest (88%) presenting symptom of children with ARTI followed by runny nose (80%), cough (67.5%), wheeze (43%), dyspnea (19%), ear ache &/discharge (17.5%), sore throat (14%), chest in drawing (10%) and headache, facial pain/tenderness in (7.5%). (Table II)

Table III: Parental knowledge on antibiotic use in ARTI in children

Variables	Yes	No	Uncertain
	n %	n %	n %
Does the respondent parent have the knowledge that most of ARTI in children are viral & does not require antibiotics?	70 35	110 55	20 10
Does respondent parent has the knowledge that indiscriminate use of antibiotic leads to drug resistance?	35 17.5	135 67	30 15
Does the respondent parent believe that antibiotics reduces the duration of illness?	110 55	70 35	20 10
Does the respondent parent know about the side effects of antibiotics?	65 32.5	120 60	15 7.5

About half (55%) respondent parent disagreed that they had no idea that most ARTI in children are of viral origin and doesn't require antimicrobial treatment. 35% respondent agreed and 10% were uncertain regarding cause of ARTI in children. Only 17.5% respondent parent had the knowledge that indiscriminate use of antibiotic leads to dug resistance and 15% were uncertain. Majority (55%)of the mother had the belief that antibiotic reduces the duration of illness and 60% mothers had no knowledge regarding side effects of antibiotics (Table III).

Table IV: Parental attitude on antibiotic use in ARTI in children

Variables	Yes		No	
	n	%	n	%
(a) Which was the most common/serious symptom of the child according to the parent that they demanded for antibiotic?				
Fever	165	82.5	35	17.5
Cough	85	42.5	115	57.5
Sore throat	30	15	170	85
Ear pain &/discharge	25	12.5	175	87.5
Dyspnea	130	65	70	35
(b) Does the respondent parent feel or demand that they should be provided with appropriate knowledge regarding need of antibiotic use in common respiratory illness	130	65	70	35
(c) When actually antibiotic was required for child's current problem as per decided by the pediatrician, did the respondent parent refuse to take it?	30	15	170	85
(d) Does the respondent parent use antibiotic for RTI in their children without valid prescription from pediatrician?	65	32.5	135	67.5

When parents were asked for possible treatment options, they chose antibiotics as a possible therapy most of the time. In addition, when parents were asked for the most common symptoms leading to use of antibiotics, fever (82.5%) was the most common symptoms for which parents used antibiotics, 65% for dyspnea, 42.5% for cough 15% and 12.5% for sore throat and ear pain respectively. 65% parent feel or demand that they should be provided with appropriate knowledge regarding need of antibiotic use in common respiratory illness. Majority of the parents did not refuse to give antibiotics when it actually was required for child's current problem as per decided by the pediatrician, only 15% refused to give antibiotics despite pediatrician recommendation. 32.5% parents admitted that they give antibiotic to their children for common respiratory illness without a valid prescription from pediatrician. The explanation for this behavior was these parents had the perception that physicians would advise for unnecessary tests which would increase their expenses or they thought that the

symptoms were not serious enough to consult with child specialist (Table IV).

TABLE V: Identified risk factor for ARI in children

Characteristics	Case	Acute respiratory infection (ARI)	
		Yes (%)	No (%)
AGE			
6 to 36 months	119	76 (64)	43 (36)
37 to 59 months	81	22 (27)	59 (73)
SEX			
Male	125	83 (66)	42 (34)
Female	75	19 (25)	56 (75)
BREAST FEEDING STATUS			
Exclusively breast fed	165	32 (19)	133 (81)
Not exclusively breast fed	35	20 (57)	15 (43)
IMMUNIZATION STATUS			
Ongoing/completed vaccination as per EPI schedule	180	34 (19)	146 (81)
Not vaccinated as per EPI	20	14 (70)	6 (30)
VITAMIN A STATUS			
As per national vitamin A supplementation programme	175	36 (21)	139 (79)
Not as per national vitamin A supplementation programme	25	17 (68)	8 (32)
FAMILY/PERSONAL HISTORY OF ATOPY			
Present	35	22 (63)	13 (37)
Absent	165	40 (24)	125 (76)
MONTHLY FAMILY INCOME (BDT)			
<10,000	24	16 (67)	8 (33)
10,000 - 25,000	57	37 (65)	20 (35)
>25,000 - 50,000	99	19 (19)	80 (81)
>50,000	20	7 (35)	13 (65)
MATERNAL EDUCATION			
No education	24	15 (62.5)	9 (37.5)
Primary	55	36 (65)	19 (35)
Secondary	97	22 (23)	75 (77)
Graduate	24	7 (29)	17 (71)
MATERNAL OCCUPATION			
Housewife	140	81 (58)	59 (42)
Occupant/service holder	70	29 (41)	41 (59)
HOUSING			
Not crowded & well ventilated room	90	20 (22)	70 (78)
Overcrowded & not well ventilated	110	84 (76)	26 (24)

The overall prevalence of ARI was 56%. More ARI cases (64%) were seen in children aged 6 to 36 months of age. The prevalence of ARI was more in male child

(66%). The children who were not exclusively breast fed had more prevalence of ARI (57%). Regarding vaccination, 70% of the children had ARI who were not vaccinated as per EPI. ARI was also higher in children who were not given vitamin A supplementation (79%). Among the children who had personal/family history of atopy, 63% of them had ARI. According to social class, prevalence of ARI was higher in lower and lower middle class (monthly income of families <10,000 BDT-67% and in 10,000 - 25,000 BDT-65%). Prevalence of ARI was highest in children of illiterate (62.5%) and mothers with primary level of education (65%) mothers. According to occupation of mother, the prevalence of ARI was higher 58% in children whose mother was housewife and 41% in children with service holder mother. Overcrowding and inadequate ventilation has a direct relationship with prevalence of ARI. ARI was higher in children (76 %) who were living in overcrowded houses as compare to children who were living in well ventilated room (22%) (Table V).

Study results shows that socio-demographic variables Child's age (in month Odd ratio (1.260) was associated with ARI and p-value (0.001) which was significant followed by Child's Sex Odd ratio (6.547) higher than Child's age with ARI and p-value (0.003) was significant and Housing Odd ratio (2.594) moderately higher and p-value (0.015) was significant. The Odd ratio calculate at 95% Confidence interval and p-value <.05 considered as significant. The following table VI shows binary logistic regression of ARI among children (6-59 months) on various covariate of Bangladesh.

Table VI: Logistic regression of ARI among children (6-59 months) on various covariates of Bangladesh

Variable	Odd Ratio (95% CI)	p-value
Child's Age (In Months)	1.260	0.001
Child's Sex	6.547	0.003
Breast Feeding Status	0.000	0.997
Immunization Status	0.000	0.997
Vitamin A Status	0.000	0.997
Family/Personal History of Atopy	0.628	0.001
Mothers' Education	0.604	0.202
Mother's Occupation	0.067	0.001
Monthly Family Income (BDT)	1.000	0.000
Housing	2.594	0.015

DISCUSSION

Acute respiratory tract infection (ARTI), is one of the major cause of under 5 mortality and morbidity in our country next to malnutrition. The current study was conducted among 6 to 59 months old children attending Pediatric OPD at a tertiary care center Dhaka, with an aim to observe the prevalence, sociodemographic variables of study population and respondent parent, common symptoms at presentation and parental perception on antibiotic uses in respiratory illness of their children. Various socioeconomic and demographic characteristics such as, child's age, gender, breast feeding status, vitamin A supplementation, maternal education level and housing were found to

be strongly linked with the prevalence of ARTI in children.

The overall prevalence of ARTI in our study was 51%. This finding was similar to study by Rahman and Rahman which revealed a prevalence of ARTI was 58.7% among pediatric age group in Bangladesh**.**[11] Studies from other countries across the world showed higher prevalence (22-40%) of ARTI among children, while a study of 40 developing countries showed an average prevalence of ARTI of 13%.[12] The prevalence of ARTI has seasonal variation throughout the monsoon and winter in Bangladesh and other countries.[13] This could be attributed to differences in temperature patterns and season length across nations, which could be linked to varied ARTI prevalence.

In general, the problem of ARTI is greater among children under 5 years old because of their anatomical structure which makes them more susceptible to infection, ongoing lung development, relative immune immaturity and high risk of exposure to infection.[14,15] Age group in our study was categorized into 6-36 months and 37-59 months. (Figure 1) Majority (59.5%) study population belonged to earlier age group. Prevalence of ARI was more (64%) in under 3 years old children compared to 27% in the latter group. (Table 5) Higher prevalence of ARI among young children was found in other studies by Kazi Abul Kalam Azad et al, Marufa et al and Dagne et al.[16,17,18] Kapil Guel et al in his study found high prevalence of ARI (46.1%) among 1-4 years old children followed by lowest (11.9%) among 4-5 years old group.[19] However, study by Seada Hassen et al found ARI prevalence was 53.2% among 24-59-month group followed by 25.2% among 12-23 month old and 21.6% among <1-year group.[15]

Figure 2 shows distribution of study population by gender. ARTI in our current study was more prevalent among boys (62%). Other studies in Bangladesh and abroad found similar findings of male predominance of ARTI. [16,17,19,20]

Table I shows, majority (82.5%) of our study population were exclusively breast fed followed by history of mixed feeding among 17.5% children during 1st 6 months of age. Prevalence of ARTI was higher (57%) among the latter group whereas, only 19% children with history of exclusive breast feeding presented with features of ARTI. (Table 5) Mostafa Kamal et al in his study showed, period of breast feeding had a positive correlation with vitamin A. The serum concentration of retinol was found to be significantly high in the ARI children who were breast fed for more than 1 year (p=0.02). Adequate vitamin A level in the body in turn has protective effect on maintaining integrity of respiratory and gastrointestinal epithelium.[21]

Majority of our study population (90%) either completed or were on ongoing vaccination as per EPI schedule. (Table I) Only 19% children from this group presented with ARTI compared to occurrence of ARTI among 70% of children who were not vaccinated as per EPI schedule. (Table V) Immunization coverage of children by EPI in study by Shireen et al was 94% whereas, it was 85% in a study at Kenya.[22,23] Availability of pneumococcal, influenza, measles and pertussis vaccine under EPI coverage has reduced the burden of ARTI in pediatric population to a great extent. The optimal use of these vaccines should be ensured to reduce the burden of respiratory illness in under 5 children.[24]

Childhood macro and micro nutrient deficiency associated with undernutrition results in deterioration of immune function that can lead to increased incidence and severity of infectious disease morbidity including ARTI.[25] In our study total 175 (87.5%) children received vitamin A supplement in last 6 months. (Table V)

Among them only 21% presented with ARTI. Prevalence of ARTI was more (68%) among children who didn't receive vitamin A in last 6 months. AMS Ahmed et al in his study found that both normal and underweight children with moderate to severe vitamin A deficiency had higher risk of acute lower respiratory tract infection (ALRTI). Kazi Abul Kalam Azad et al in his study found, a child without taking vitamin A in last 6 months had 29% higher odds of from suffering from ARTI.[16] Mostafa Kamal et al in his study revealed, vitamin A level was significantly low in ARI children compared to non ARI controls ($p<0.001$).[21]

In our current study we enrolled mothers of the study population as mostly they were the accompanying person during enrollment in the study. Table V shows impact of maternal education level with development of ARI in their children. In our study, Majority (48.5%) of respondent mothers completed secondary level of education. Development of ARTI in children belonging to this group was only 23%. Children of mothers with no, primary and graduate level of education were 62.5%, 65% and 29% respectively. Other studies from Kazi Abul Kalam Azad et al, AMS Ahmed et al, Marufa et al, Shireen et al, Micheline Joycee et al revealed that children born to mothers with no educational background or primary education had significant higher odds of suffering from ARTI compared to children born to mothers with secondary or higher educational background.[16,17,22,26] A well-educated mother has good and proper knowledge on importance of exclusive breast feeding, child's nutrition, vaccination, vitamin A supplementation, personal hygiene and seeking appropriate medical care when required. All these factors predispose to less chance of contamination in their child.

Mothers in the family who are occupant particularly in professional jobs are usually well educated and have the basic knowledge on preventive factors of ARTI in their children. Majority (70%) mothers in our current study were housewives. (Table I) Among this majority group, nearly half (58%) of their children presented with ARTI. (Table V) Whereas, prevalence of ARTI was lower (41%) among children from occupant mothers. Shireen et al in her study showed 92% mothers were housewives though 80% of them had higher educational background.[22] Literate mothers are more vigilant in seeking medical care for their children. Shireen et al and Seada Hassen et al in her study showed, children whose mothers were housewives were more likely to be affected by ARTI.[15,22] This finding was consistent with previous studies by Fekadu et al and Ujunwa et al. Mothers who spent most of their times at home are likely involved in cooking and cleaning, all of which may expose young children to smoke and dust. Another study by Geberetsadik et al showed less chance of ARI in children from families with professional mother (AOR 0.1, 95% CI 0.01-0.6). Maternal profession would also be expected to supplement household financial resources, leading to better socioeconomic status.[15]

There is an association between economic status of the family and development of ARTI in their children. (Table V) Prevalence of ARTI was highest (67%) among families with monthly income <10,000 BDT. A family with monthly income of >25,000 BDT had lower prevalence of ARTI in their children (9% and 35% respectively). Kazi Abul Kalam Azad et al, Marufa et al, Guel et al in their study found significant association between ARTI and social class. ($p<0.001$)[16,17,19] Impact of social class in development of ARTI in children lies in the fact that, families belonging to poor class usually live in crowded and unhealthy environment and do not

maintain the basic hygiene, promoting spread of infection.

In our current study we categorized housing status into not crowded and well ventilated (<3 person sleeping/room) and crowded not well ventilated (≥3 person sleeping/room). Among 90 children who lived in well ventilated room only 22% presented with ARTI, whereas among 110 children residing in overcrowded houses 76% presented with ARTI. (Table V) Association of housing and ARTI lies in the fact that crowded and poor ventilation predispose to spread of infection within the same household. Burden of ARI in under 5 children can be reduced by proper ventilation in the house.[15] Marufa et al in her study showed, 51% of the households were crowded with an average family size 5 members per house.[17] Overcrowding has a direct relationship with prevalence of ARI; it was higher (70.9%) in children who were living in overcrowded houses compared to no overcrowding (29%). This difference was statistically highly significant ($p<0.001$).[19]

Only 17.5% of our study population had history of atopy, among which majority (63%) presented with ARTI. (Table I, V). Whereas prevalence of ARI was lower (24%) among children without history of atopy. (Table V)

Table II shows symptoms of study population at presentation. Fever (88%) was the most common symptom followed by runny nose (80%), cough (67.5%), wheeze (43%), dyspnea (19%), ear ache and/discharge (17.5%), sore throat (14%), chest in drawing (10%) and facial pain and/tenderness among (7.5%). Study by Shireen et al showed cough was the predominant symptom (40%) in their study sample followed by fever (34%), sneezing (12%), wheeze (9%), ear ache and sore throat among 5%.[22]

Table III shows knowledge of respondent parent on use of antibiotic in their sick child with ARTI. About half (55%) of respondent mother didn't have the knowledge on the causative agent of ARTI and role of use of antibiotic, 67% mother didn't know that unnecessary and misuse of antibiotics leads to development of drug resistance and 60% parent had no ideas on adverse effects of antibiotics. 55% respondent parent believed that antibiotics reduces the duration of illness and has a faster cure rate. Higher incidence of use of antibiotic was reported by Chan et al (68%) and Bhanwra et al (46%).[27,28] Saed H. Zyoud et al in his study found, only 11.2% parents strongly agreed that URTIs are mostly viral and self-limited without need for antibiotic use. 35.8% believed that antibiotics have adverse effects and 47% parents agreed inappropriate use of antibiotics reduces their efficacy and drives bacterial resistance.[29] In contrast, study by Shireen et all showed, only 8% of mothers believed that antibiotics were necessary for ARTI.[22] In her study, 81% mothers had higher level of education and were aware of the unnecessary use of this drug.

Frequency of parental attitude on use of antibiotic for ARTI in their children is shown in Table IV. Fever was the most frequent cause (82.5%) for demanding antibiotic use by parents followed by dyspnea (65%), cough (42.5%) and sore throat (15%). Majority (65%) parents admitted that they should be provided with appropriate knowledge regarding need of antibiotics in common respiratory illness. Self-medication/giving antibiotic without prescription from pediatrician was relatively low (32.5%) in our study. Micheline Joycee C et al in his study compared parental level of education with practice of antibiotic use in children with URTI.[26] Parents with higher level of educational background had less tendency (42%) to give antibiotic to their children without prescription. Saed H. Zyoud et al in his study showed, parents demanded for antibiotics for symptoms like ear ache

(68%), fever (64%), cold (52%), cough 34% and vomiting 30% and majority (85%) parent didn't refuse to give antibiotic to their child as per pediatrician's advice when it was actually indicated. [29] Study by Shireen et al showed, only 8% mothers had history of giving self-medication (antibiotic) to their children with ARTI as majority mothers had higher level of education and were aware of consulting qualified doctors (89%) for their child's problem.[22]

CONCLUSION:

Next to severe acute malnutrition, ARTI is one of the leading cause of under 5 morbidity and mortality in Bangladesh. Diagnosis of pediatric ARTI by using simple clinical tools and their proper management will reduce the case fatality from this illness and also minimize unnecessary use of antimicrobial agents. Creating awareness and provision of appropriate information by health care professionals, government and public sectors and media plays a vital role in early and accurate diagnosis of this condition and also minimize antibiotic misuse. Besides, identification of the preventable and modifiable risk factors for pediatric ARTI will help to adopt targeted interventions for this illness.

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