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Original Research Article **Neonatology**

Clinical Spectrum and Frequency of Causes of Persistent Cough in Children Admitted in Bangladesh Shishu Hospital & Institute

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Abstract

***Background*:** A common complaint among pediatric patients is a persistent cough. Given the high incidence of persistent cough in children, it's critical to determine the most frequent reasons. Studies addressing this topic in the pediatric age group are scarce in our nation. ***Objective*:** The study's goal is to assess the range and frequency of causes of chronic cough in order to determine the most frequent. ***Methods*:** Cross sectional observational study Department of Pediatrics, paediatric unit of Dhaka Shishu Hospital & Institute, Dhaka during January 2023 to June 2023. Children who attended at outpatient department or were admitted under paediatric unit of Dhaka Shishu Hospital & Institute were included in this study on the basis of following selection criteria; 130 children with chronic cough, aged between 1 to 12 years with the duration of at least 2 weeks or more. Patients were congenital or acquired heart diseases, child with cerebral palsy, child with severe FTT, child need ICU care and parents refuse to give consent were excluded in this study. ***Results*:** All (100.0%) patients had fever (as reported by mothers), 123 (94.62%) had respiratory distress, and 85 (65.38%) had noisy breathing. Almost three-fourths (74.62%) of patients had a cough for 14-21 days, followed by 10 (7.69%) in 22-28 days and 23 (17.69%) in more than 28 days. Among 130 patients, 41 (41.8%) had asthma and allied diseases, 32 (32.7%) had pneumonia, 7 (7.1%) had primary immune deficiency, 5 (5.1%) had pulmonary tuberculosis, 3 (3.1%) had gastro esophageal reflux disease, 3 (3.1%) had cystic fibrosis, Bronchiectesis, and Measles (2.4%) each, and Pertusis, Congenital lobar emphysema, and Protracted Bacterial Bronchitis (PBB) 1% each. ***Conclusion*:** Etiology of chronic cough is identifiable and most common three causes are asthma and related diseases, pneumonia and primary immune deficiency followed by pulmonary tuberculosis, gastro esophageal reflux disease and cystic fibrosis.

Keywords: Chronic cough, Clinical spectrum, Etiology of chronic cough.

INTRODUCTION

Chronic cough affects all age groups and is one of the commonest complaints in the pediatric patients [1]. According to World Health Organization and National guidelines for the management of tuberculosis in children in Bangladesh, Persistent, non-remitting chronic cough for more than 2 weeks warrants further evaluation [2].

Cough is the most frequently encountered symptom in general practice worldwide.3,4 Cough adversely affects quality of life, sleep, work, and social activities, results in a significant social burden, and is associated with a severe disease burden if chronic [5-7]. Meta-analyses have estimated the global prevalence of chronic cough at approximately 10% [8], therefore, investigating the frequency of cough—and the causes of chronic cough in particular—is important [3, 4]. Surveys of chronic cough have been conducted in many

countries in recent years [5-7]. Viral respiratory infections are a common cause of acute coughs. Particularly frequent in pre-school age children, coughs from viral respiratory infections are generally self-limited. However, some cause sufficient concern for parents that they will seek medical care. It was reported that 20% of young children, with a mean age 2.3 years, seen at an emergency department (ED) in Brisbane Australia were still coughing 4 weeks after being seen in the ED [9].

The most common overall cause for pediatric chronic cough is infectious, including viral URTIs and acute and chronic rhinosinusitis. In addition, the other top causes of chronic cough in this subset of patients are asthma/RAD and infantile wheeze [10]. Chronic cough was more common among those subjects living close to heavy traffic compared to those not living close to heavy traffic [11]. In the heavy industrial province of Northeastern China, the high level of outdoor air pollution was positively associated with the increasing prevalence of chronic cough in children [12].

In Bangladesh, the epidemiological surveys concerning chronic cough in children are lacking. In this study, we attempted to evaluate the spectrum and frequency of causes of chronic cough which is the key component of the diagnostic evaluation.

MATERIALS AND METHODS

Cross sectional observational study Department of Pediatrics of Dhaka Shishu Hospital & Institute, Dhaka during January 2023 to June 2023. Children who attended at outpatient department or were admitted under paediatric unit of Dhaka Shishu Hospital & Institute were included in this study on the basis of following selection criteria; 98 children with chronic cough, aged between 1 to 12 years with the duration of at least 2 weeks or more. Patients were congenital or acquired heart diseases, child with cerebral palsy, child with severe FTT, child need ICU care and parents refuse to give consent were excluded in this study. Routine investigations was done for most of the patients, e.g., complete blood count with differential count, erythrocyte sedimentation rate, Mantoux test, sputum examination, throat swab for microscopy, culture and sensitivity and X-ray chest; X-ray PNS. Special investigations was done whenever indicated, e.g; Serum Immunoglobulin level, Saccharide test, primary immunodeficiency panel: lymphocyte subset analysis, bronchoscopy, sweat chloride test, HRCT, CT scan of chest and contrast X-ray esophagous in T position, ICT for filaria, echocardiography. Data was collected by interview, physical examinations and laboratory investigations using a structured questionnaire. Statistical analyses were carried out by using the Statistical Package for Social Sciences version 26.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and percentages.

RESULTS

Table 1: Distribution of the study patients by demographic characteristics (n=130)

Demographic characteristics	Number of patients	Percentage
Age (month)		
12-24	33	25.38
25-60	60	46.15
>60	37	28.46
Mean ±SD	51.72 (±29.61)	Range 12-133
Sex		
Male	76	58.46
Female	54	41.54

Table 1 shows that almost half (46.15%) patients belonged to age 25-60 month and 76(58.46%) were male. The mean age was 51.72 (±29.61) years, minimum age was 12 and maximum age was 133.

Table 2: Duration of cough of the children (n=130)

Duration of cough (days)	Number of patients	Percentage
14-21	97	74.62
22-28	10	7.69
>28	23	17.69

Table 2 shows that almost three fourth (74.62%) patients were found in duration of cough 14-21 days followed by 10(7.69%) in 22-28 days and 23(17.69%) in duration of cough >28 day.

Table 3: General presenting symptoms of the children (n=130)

General presenting symptoms	Number of patients	Percentage
Fever (reported by mothers)	130	100.00
Respiratory distress	123	94.62
Noisy respiration	85	65.38

Table 3 shows that all (100.0%) patients had fever (reported by mothers), 123(94.62%) had respiratory distress and 85(65.38%) had noisy respiration.

Table 4: General signs of the children (n=130)

General sign	Number of patients	Percentage
Respiratory distress (≥40 bpm)	48	36.92
General examination		
Chest drawing	69	53.08
SPO2 (<94%)	32	24.62
Fever (Temperature >100°)	60	46.15
Tachycardia (Heart rate >100 /m)	90	69.23
Pallor	107	82.31
Cyanosis	9	6.92
Clubbing	5	3.85
Lymphadenopathy (cervical)	19	14.62
Inspection		
Diminished chest movement	25	19.23
Palpation		
Tracheal shift	9	6.92
Apex beat shifted	8	6.15
Percussion		
Dull percussion	34	26.15
Auscultation		
Breath sound diminished	34	14.78
Bilateral wheezing	77	33.48
Unilateral wheezing	9	3.91
Bilateral crepitations	81	35.22
Localised crepitations	29	12.61

Table 4 shows that 107(82.31%) patients had pallor followed by 90(69.23%) tachycardia, 81(62.31%) bilateral crepitations and 60(46.15%) fever.

Table 5: Principal diagnosis of the children cause of cough (n=130)

Principal diagnosis	Number of patients	Percentage
Asthma & Allied diseases (n=54)		
Asthma	7	17.1
Reactive airway disease (RAD)	27	65.8
Infantile wheeze	7	17.1
Pneumonia (n=42)		
Pneumonia	22	68.75
Bronchopneumonia	5	15.6
Para pneumonic effusion	5	15.6
Primary immune deficiency (n=9)		
Infantile wheeze	4	57.1
Persistent pneumonia	2	28.6
RAD	1	14.3
Pulmonary tuberculosis	7	5.1
Gastro esophageal reflux disease	4	3.1
Cystic fibrosis	4	3.1
Bronchiectesis	3	2.0
Measles	3	2.0

Pertusis	1	1.0
Congenital lobar emphysema	1	1.0
Protracted Bacterial Bronchitis (PBB)	1	1.0

Table 5 shows that 41(41.8%) patients had asthma & allied diseases, 32(32.7%) had pneumonia, 7(7.1%) had primary immune deficiency, 5(5.1%) had pulmonary tuberculosis, 3(3.1%) had gastro esophageal reflux disease, 3(3.1%) had cystic fibrosis, Bronchiectesis & Measles (2.4%) each and Pertusis, Congenital lobar emphysema and Protracted Bacterial Bronchitis (PBB) 1% each.

Table 6: Duration of cough in relation to different cause of cough (n=130)

Cause of cough	Duration of cough	Range (Min-max)
Asthma	28.17±14.3	22.0-60.0
Pneumonia	19.76±5.3	14.0-33.0
RAD	29.73±4.7	24.0-46.0
Infantile wheeze	24.17±13.5	15.0-60.0
PID	36.13±29.12	15.0-90.0
Pulmonary TB	25.42±8.9	15.0-36.0

Table 6 observed duration of cough higher in Asthma (28.17±14.3), RAD (29.73±4.7), infantile wheeze (24.17±13.5), PID (36.13±29.12) and Pulmonary TB (25.42±8.9) days respectively.

DISCUSSION

A Cross sectional observational study conducted to find out the underlying clinical conditions of chronic cough (≥ 2 weeks) with 130 children in two tertiary care hospitals, Department of Pediatrics of Dhaka Shishu Hospital & Institute, during January 2023 to June 2023. The children age group was 1-12 years. The diagnosis of underlying clinical condition was made of history, physical examination and relevant investigations.

Out of 130 cases that 41(41.8%) patients had asthma & allied diseases, 32(32.7%) had pneumonia, 7(7.1%) had primary immune deficiency, 5(5.1%) had pulmonary tuberculosis, 3(3.1%) had gastro esophageal reflux disease, 3(3.1%) had cystic fibrosis, Bronchiectesis & Measles (2.4%) each and Pertusis, Congenital lobar emphysema and Protracted Bacterial Bronchitis (PBB) 1% each. Asilsoy *et al*., [13] study observed that 25% of the patients received diagnoses of asthma and asthma-like symptoms, 23.4% received diagnoses of protracted bronchitis, 20.3% received diagnoses of upper airway cough syndrome (UACS), and 4.6% received diagnoses of gastroesophageal reflux disease. Yu *et al*., [14] also reported upper airway cough syndrome (UACS) was found in 77 (65.3%) patients with chronic cough, cough-variant asthma (CVA) in 57 (48.3%) patients, protracted bronchitis (PB) in 15 (12.7%) patients, gastroesophageal reflux disease (GERD) in 7 (5.9%) patients, tic disorders (TD) in 3 (2.5%) patients and eosinophilic bronchitis (EB) in 2 (1.7%) patients. This dissimilarity with our study may be due to the time scale of patient enrolled which was variable. As the patients was enrolled over whole year in the study of Yu *et al*., [14] thirty-five (29.7%) patients were enrolled in spring, 40 (33.9%) in summer, 35 (29.7%) in autumn, and 8 (6.8%) in winter. But in our study cough variant asthma was not found, may be due to small sample size, lack of spirometry and the duration of time when the study was conducted; as CVA is more prevalent in winter season in our country. Similar study on chronic cough was conducted in our country where the most common diagnosis was allergic rhinitis (31%), followed by asthma (28.6%), rhinitis coexisting with asthma (23.8%), post viral cough (16.6) in the study of Islam *et al*., [15]. That results differed from our study, as in their study they excluded children with immunedeficiency, congenital anomalies of lung, congenital heart disease, gastro-intestinal disorders (e.g. gastro-esophageal reflux disease, in born error of metabolism (e.g. cystic fibrosis) and other chronic conditions (e.g. gross neuro developmental delay). In our study we have considered most of these except congenital heart disease and child with cerebral palsy. Marguet *et al*., reported in their study, they were found in 64% of children with asthma compared with 27% of infantile wheezers ($p < 0.04$) in children with chronic cough ($p < 0.06$). This results is dissimilar may be due to geographical variance with our country. The significance of chronic cough, which occurs frequently with asthma, depends on whether it is associated with wheezing [16]. They distinguished children with chronic cough and no wheezing, in whom the differential cell counts were comparable to those observed in healthy and control children, implying a cellular pathophysiology different from that of asthma. Infantile wheezers were a heterogeneous group and some would be expected to become asthmatic [17].

Pneumonia was more prevalent in this study 68.75%, similar observation was found Yu *et al*., [18] where they studied 115 cases reported of chronic cough, among them (33.9%) had pneumonia followed by bronchial foreign bodies (16.5%), upper airway cough syndrome (14.7%), bronchial asthma or cough variant asthma (14.7%), bronchomalacia (6%), bronchial congenital malformation (4%), primary ciliary dyskinesia (3%), gastro-esophageal reflux (3%),

bronchial tumor (2%), bronchial tuberculosis (1%), pulmonary fibrosis (1%) and idiopathic pulmonary hemosiderosis (1%). Present study found 3.1% of chronic cough to be caused by GERD. Similar observation was found in study of Yu and Wang [18], they showed gastro-esophageal reflux (3%) to be cause of chronic cough. GERD was found in 5.9% of patients in Yu *et al.,* [18] study. Whereas only 0.7% of patients with GERD were found in the previous Chinese study, in whose study 24-hour esophageal pH was only performed in the suspicious GERD cases. In Asilsoy's study, GERD was also reported to affect 4.6% of the school-age patients with chronic cough [13].

Present study observed duration of cough higher in Asthma (28.17±14.3), RAD (29.73±4.7), infantile wheeze (24.17±13.5), PID (36.13±29.12) and Pulmonary TB (25.42±8.9) days respectively. Khoshoo *et al*., [19] reported that the duration of cough ranged from 8 to 36 weeks (mean ± SD] duration, 18±6 weeks). That observation was dissimilar to our study which may be due to environmental variation.

CONCLUSION

Chronic cough has an identified etiology, with the most common three causes being asthma and related disorders, pneumonia, and primary immunological deficiency, followed by pulmonary tuberculosis, gastro-esophageal reflux syndrome, and cystic fibrosis.

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