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Short Communication

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Prevalence and incidence of asthma among underprivileged children in polluted urban areas of India: a childhood asthma intervention and referrals study

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ABSTRACT

Background: Childhood asthma has emerged as an important public health issue which is often under diagnosed or undertreated, especially in underprivileged children from slum communities in India. This study aims to increase awareness and facilitate early diagnosis and treatment of childhood asthma.

Methods: Americares India Foundation organized 167 asthma screening camps in the city of Bengaluru, Bhubaneswar, Cochin, Lucknow and Nagpur in India from August to November 2016. A total of 10,017 underprivileged children aged ≤16 years were screened for asthma; symptomatic treatment was provided else the children were referred for further investigations and treatment. The camps were organized in collaboration with St. Philomena's Hospital, Bengaluru; Lourdes Hospital, Cochin; Indian Institute of Public Health, Bhubaneswar; Lata Mangeshkar Hospital, Nagpur; and St. Mary's Polyclinic, Lucknow.

Results: New and known cases of asthma were diagnosed in 199 and 166 children, respectively. The prevalence of asthma was found to be 2.7% in Bhubaneswar, 3.7% in Bengaluru and Lucknow, 3.9% in Cochin and 4.3% in Nagpur.

Conclusions: Due to increase in the prevalence of childhood asthma in India, it is important to create awareness and communicate with families/caregivers about asthma and related disorders.

Keywords: Childhood asthma, Prevalence, School going, Children, Awareness, Respiratory

INTRODUCTION

Asthma is a major non-communicable chronic inflammatory disorder of the airways, characterized by recurrent attacks of breathlessness and wheezing. World Health Organization estimated that approximately 235 million people are currently suffering from asthma globally. The prevalence of asthma has increased steadily over last decades, especially in the pediatric population. Asthma is among the top 10 chronic conditions for a global ranking of disability-adjusted life years in children in age group of 5–14 years.

Childhood asthma has now been recognized as the leading cause of emergency department visits and hospital admissions for school going children.²⁻⁵ Prevalence of childhood asthma is continually increasing in India owing to change in lifestyle and increase in urbanization, industrialization, automobiles, and air pollution.⁵ A positive association between asthma prevalence and exposure to environmental factors such as exposure to high-intensity truck traffic, tobacco smoke, and open fire cooking in non-affluent countries.³ Limited data is available on the prevalence of asthma among school going children in India. Amidst wide interregional variation, few Indian studies have reported the

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prevalence of childhood asthma in range of 3.5% to 29.5%.

Americares India Foundation, a health-focused, relief and development organization, initiated the project Childhood Asthma Intervention & Referrals (CAIR) in underprivileged children in the age group 0 to 16 years living in urban slum communities. This foundation with its in-depth experience in health sector especially in vulnerable communities led the project with the help of teams of doctors, nurses & trained health workers. The foundation aims to increase awareness, facilitate early diagnosis and provide the right treatment for asthma and related disorders in underprivileged children between the age of 0-16 years and their families through special intervention and referral in 5 major cities of India.

METHODS

Americares India Foundation organized 167 screening camps between August 2016 and November 2016 across 5 major cities of India with the objective to increase awareness about the disease and to facilitate early diagnosis and early treatment of asthma. The camps were organized in collaboration with St. Philomena's Hospital, Bengaluru; Lourdes Hospital, Cochin; Indian Institute of Public Health, Bhubaneswar; Lata Mangeshkar Hospital, Nagpur; and St. Mary's Polyclinic, Lucknow. An NGO conducted orientation and onsite training on the Program Implementation Plan, Standard Treatment Protocols, Patient Intake Form, Personal Asthma Action Plan (PAAP) for asthmatics, recording formats, and other

study materials. The patient's reference materials were translated into the local language.

More than 10,000 underprivileged children in the age group of 0-16 years old attended the camp. Medical history, physical examination, and spirometry/peak flow meter test for lungs function were performed to screen for respiratory problems. During the screening camps, the children were diagnosed with respiratory tract infections or chronic obstructive pulmonary disease and were mapped/listed for further investigation, symptomatic treatment or consultation. Parents and children were interacted on a one-to-one basis and were educated and counseled on the implementation of self-management plan including correct knowledge, trigger factors, risk factors, and importance of awareness for early diagnosis of asthma.

Referrals to nearby charitable or partner hospital were done to ensure correct treatment and availability of medicines at an affordable rate because asthma often needs continuous medication & follow up visit.

RESULTS

Total 10,017 school going children were screened in 167 camps conducted in 5 cities in India. There were 4991 (49.8%) male and 5026 (50.2%) female children, with mean (SD) age of 8.6 (4.0) years. Demographic and disease-related data collected from study population during camps is presented in Table 1.

Table 1: Data collected from study population during camps.

Cities	Bengaluru	Bhubaneswar	Cochin	Lucknow	Nagpur	Overall
Start month	Sept 2016	Oct 2016	Aug 2016	Nov 2016	Sept 2016	
Deliverables/indicators						
Number of camp conducted	28	49	22	28	40	167
Number of children screened	2000	2014	2000	2000	2003	10017
Age (mean±SD) years	8.2±3.9	8.2±3.7	10±2.4	6.8±4.2	10.0±4.4	8.6±4.0
Sex (M:F)	990 (49.5%): 1010 (50.5%)	1072(53.2%): 942 (46.8%)	1003 (50.2%): 997 (49.9%)	985(45.2%): 1015 (50.8%)	941(46.96%): 1062 (53.04%)	4991 (49.8%): 5026 (50.2%)
Peak flow meter test conducted	109	53	116	633	89	1472
Known cases of asthmatics on correct treatment regimen	37	09	47	55	18	166
Newly diagnosed cases of asthma	37	46	30	18	68	199
Number of children treated for other respiratory ailments	164	516	264	530	211	1685
Number of families educated on asthma and related disorders	414	440	115	330	1769	3068

Of 10,017 children, new cases of asthma were diagnosed in 199 (1.9%) children and only 166 (1.6%) children had known cases of asthma who were receiving correct treatment regimen. As compared with other cities, the prevalence of newly diagnosed asthma was higher in Nagpur city (3.4%) followed by Bhubaneswar city (2.3%) and Bengaluru city (1.8%). Similarly, the prevalence of known cases of asthma on correct treatment regimen was higher in Lucknow city (2.7%) and lower in Bhubaneswar city (0.45%). Overall, Lucknow has the lower prevalence of newly diagnosed asthmatics (0.9%) and higher prevalence of known cases of asthma (2.7%).

Peak flow meter test was conducted in 1472 (14.6%) children. About 30.6% (3068/10,017) of families were provided education on asthma and other respiratory disorders including 57.6% (1769/3068) of families in Nagpur.

Table 2: Prevalence of asthma among school-going children.

City	Number of asthmatic patients* n (%)
Bengaluru	74 (3.7)
Bhubaneswar	55 (2.7)
Cochin	77 (3.9)
Lucknow	73 (3.7)
Nagpur	86 (4.3)

^{*} Known plus newly diagnosed cases of asthma

Table 2 depicts the prevalence of asthma among school going children in underprivileged slum communities. The prevalence ranges from 2.7% to 4.3% across all the 5 cities where the study was conducted.

DISCUSSION

The prevalence of childhood asthma in the present study ranges from 2.7% to 4.3%; these results showed lower prevalence of childhood asthma compared with the findings from other Indian studies wherein the prevalence ranged from 3.5% to 29.5%.⁵ A cross-sectional ISAAC questionnaire-based study done among 331 school-going children with asthma reported the prevalence of asthma to be 13.9%.⁵ Another cross-sectional modified ISAAC questionnaire-based study conducted in 3321 children (age 5-15 years) Jaipur, Rajasthan in the year 2008-2009 suggested that the prevalence of asthma is more in younger children (5-8 years; 8.11%) than older children (12-15 years; 7.19%).⁶ Similar study was conducted in Srinagar and the asthma prevalence was found to 7.4% in school going children aged between 10 and 16 years.⁷

Vyankatesh and colleagues reported the prevalence of newly diagnosed asthma to be 87% (40/46).⁵ The results are in contrast with the findings of the current study which showed the much lower prevalence of newly

diagnosed cases of asthma (1.9%; 199/10,071). In our study, known cases of asthmatics or Physician-diagnosed asthma were reported in 1.6% children. This result is consistent with the study conducted by Vyankatesh et al (1.8%).⁵ Similar study done in Jaipur, Rajasthan reported that only 5.3% children have Physician diagnosed asthma.⁶

There's an increased risk of respiratory-related disorders such as asthma among school going children. It has been reported that around 6% of school-going children are suffering from asthma. A study conducted in a hospital in Bengaluru, India showed a steady increase in asthma prevalence in children aged below 18 years in 20-year span from 9% in year 1979 to 29.5% in year 1999. The possible reasons could be poor access to healthcare services and medicines, higher environmental pollution, industrialization in urban areas, lack of awareness about the preventive measures and poor adherence of Physician/Pediatricians to asthma treatment guidelines. The such as the preventive measures and poor adherence of Physician/Pediatricians to asthma treatment guidelines.

ISAAC have also found positive associations between asthma prevalence and exposure to a range of other environmental factors such as exposure to traffic, tobacco, and open fire cooking smoke; dampness and molds in homes; use of medicines like paracetamol and antibiotic; fast food intake; obesity; inverse associations between fresh fruit and vegetable intake; and breastfeeding in non-affluent countries.³

Air pollution can be linked directly to increase in asthma incidence. Most of the schools in urban cities are situated in heavy traffic areas and children unnecessarily get exposed traffic pollution and smoke. These children are more prone to develop respiratory disorders. Lucknow and Nagpur have poor air quality index.

Early diagnosis using cost-effective screening methods and access to quality care including preventive education are needed to minimize the risk of the diseases. Another preventive measure is to develop a program wherein children could be screened and diagnosed with asthma and related disorders in a school setting. School teachers may have a lack of knowledge about asthma. Therefore, it is essential to create awareness about childhood asthma among parents, children, and school teachers by detailed counseling at diagnosis and ensuring compliance to asthma medications. Furthermore, this could also be achieved by facilitating early screening of asthma (by medical history, examination, questionnaire, peak-flow meter, spirometer etc.), offering proper asthma treatment guidelines and management, and improving quality of life. School-based asthma management program will help school teachers to identify the asthmatic child in their class and to guide them to pediatrician for further consultation and treatment. School teachers can also help providing first-aid interventions during emergency. Further studies are recommended to be conducted in a school setting as it can offer a unique platform for early diagnosis and treatment of asthma and related disorders.

Education plays a supporting role in recognizing the correct signs and symptoms or managing asthma at parental and school levels. Thus, appropriate education should be provided to children, parents/guardians, and school teachers. Early diagnosis and treatment of asthma will improve the quality of life in asthmatic children.

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