

# Prevalence of childhood asthma among children in Sri Lankan urban setting

Samarasinghe A.P<sup>1</sup>, Arnold S.M<sup>2</sup>, Pushpa Fonseka<sup>3</sup>, Saravanabavan N<sup>4</sup>

<sup>1,2,4</sup>Ministry of Health, Sri Lanka

<sup>3</sup>Sri Jayawardena University, Sri Lanka

## Abstract:

**Background:** Bronchial asthma is an important cause of morbidity in both children and adults. Due to better diagnosis, a true incidence of the occurrence of the disease has been documented in most countries. With the increase of prevalence rates around the world, the Sri Lankan situation also is no different. Control of childhood asthma, especially severe type is a big challenge. Priority in management is geared toward alleviation of the often very frightening symptoms of severe form of the disease.

**Methods:** A community based descriptive cross-sectional study was conducted in the Colombo Municipal Council area. A sample of 1380 children in the age group 5 – 11 years consisted the study sample. An interviewer administered questionnaire was used as the study instrument.

**Results:** The overall prevalence of childhood asthma in the 5 – 11 age group was 12.8 per 100 children. prevalence was 22.4% (95% CI 20.2-24.7) in ever wheezing category while the prevalence of wheezing during the period of 12 months prior to the data collection was 12.8%(95% CI 11.1-14.7). Prevalence of exercise induced childhood asthma was 7% (95% CI 6.8-7.3).

**Conclusion:** The prevalence of asthma was substantially high among the children in the age group 5- 11 years.

**Key words:** Childhood asthma, Prevalence, Urban setting, Children

children whereas in South America it varies from 20 percent to 30 percent<sup>5</sup>.

As reported by the World Health Organization (WHO) in the Western Pacific region, the incidence varies from over 50 percent among children in the Caroline Island to zero percent in Papua New Guinea<sup>5</sup>. This difference may be due to a difference in exposure to risk factors or to the lack of a clear-cut definition of asthma in the studies conducted.

The WHO has identified asthma as a disease of major public health importance. The WHO plays a unique role in coordination of the international efforts to combat the disease. In 1992, the WHO and the United States based Heart Lung and Blood Institute jointly formed GINA (Global Initiative for Asthma) to reduce the number of deaths by developing and implementing an optimal strategy for asthma management and prevention. The main goal of the GINA is to build active networks with multiple organizations involved in all aspects of the disease in order to ensure better patient care worldwide.

To highlight the plight of asthma sufferers and to raise public and professional awareness about this disease, the WHO launched the “World Asthma Day”. The World Asthma Day is marked each year under different themes<sup>5</sup>.

## II.METHODS

A community based descriptive cross-sectional study was conducted in the Colombo Municipal Council area. Colombo Municipal Council area (CMC) considered as the business and commercial centre for the country. The CMC area is divided into two Divisional Secretariats (DS) Divisions for the administrative purposes, but for voting purposes, it is divided into 47 wards. The CMC area has a population of 642,000 persons. A large number of the working population of the city resides outside the city and travel to the city daily. The current daily floating population of Colombo is estimated to be around 600,000. CMC covers a total area of 37.3 square kilometers, which is about 5.7 percent of the total land area of the Colombo district. The CMC area is the most densely populated city in the island with 17,200 persons per square kilometer, about five times higher than that of the Colombo district and sixty times higher than that of national average. The population is not evenly distributed over these DS divisions or wards. It has a relatively mixed ethnic structure with Sinhalese 41.4%, Sri Lankan Tamils 28.9%, Sri Lankan Moors 23.9% and the balance comprises of Indian Tamils,

## I.INTRODUCTION

The prevalence of asthma has markedly increased over recent decades in both developed and developing countries. Several prevalence studies of similar methodologies have shown the increased prevalence of morbidity of childhood asthma over the years<sup>1,2</sup>. In Australia, about one-quarter of children are diagnosed with asthma while in America the numbers of childhood asthmatics have doubled between 1990 and 1995. Meanwhile, several other studies have claimed that the true magnitude of asthma is likely to be higher than available estimates, because of the reluctance of health workers to diagnose asthma in young children and especially because of the stigma associated with it<sup>3,4</sup>.

Today, asthma is a major global public health concern and about 150 million people live with asthma. Estimates of prevalence of asthma vary worldwide and range from 15 percent to 20 percent in children and 2 percent to 6 percent in adults. Rough estimates indicate a prevalence of 10 percent to 15 percent in the age group between 5-11 year old Indian

Burghers, Malays, Sri Lankan Chetty, Bharatha and other ethnic groups. It has widespread socio-economic distribution and also has heterogeneous religious groups<sup>6</sup>.

The study population consisted of children aged 5-11 years residing in the Municipal Council area for a minimum period of six months at the time of the data collection. Children who are temporarily boarded in a house for the purpose of schooling, Institutionalized children, Children who did not have a permanent residence (street children), Children with a history of chronic lung disease other than asthma and Children with a heart disease were excluded from the study.

A sample of 1380 were selected for the study. The study sample was selected using the cluster sampling method which was considered as the only practical solution of getting a probability sample in a cross-sectional survey where a proper sampling frame was not available<sup>7</sup>. The clusters were allocated on the basis of probability proportionate to size (PPS) of the population.

The study instrument was an interviewer administered questionnaire. The contents to be included in the questionnaire were identified by a thorough literature survey and discussions with the paediatricians (n=3) and chest physicians (n=3). After developing Part B, they assessed the relevancy of these questions in the Sri Lankan context.

Each ward has a separate road map which includes all the roads in that area. By using this map, one road was selected randomly. In the selected road, a house was selected randomly. The interviewer visited the first identified house and inquired whether an eligible child aged of 5-11 years resided. If such a child was available, the mother or the caregiver of the child was selected as the respondent. Before starting the interview, an information leaflet was given to the selected respondent by the interviewer. The persons who were fluent in speaking Sinhala and understand Sinhala were taken. If he/ she was unable to read, the interviewer read the content and obtained the consent from the informant before the interview was started. If there were more than one child between 5 to 11 years all were enrolled.

### III. RESULTS

The distribution of the care givers are given in Table 1. There were 1380 care givers among them 88.8% are mothers, 4.9% fathers.

Table 1: Distribution of the caregivers

Caregiver	No	Percentage (%)
Mother	1,226	88.8
Father	68	4.9
Other	86	6.3
Total	1,380	100.0

Age, sex, religion and ethnic distribution of the children is presented in table 2. The mean age of the children was 8.4 years  $\pm$  2.1 years. 45.3% were females with male female ratio

of 0.8:1 The ethnic distribution of the children includes 42.2% Sinhalese, 29.8% Tamils and 25.1% Muslims. Among the children, 36.4% were Buddhists while Hindus and Catholics/Christians accounted for 13.6% and 22.9% respectively.

Table 2: Distribution of some socio-demographic characters of children

Characteristic	Number	Percentage (%)
<b>Age (years)</b>		
5 – 6	322	23.3
7 – 8	412	29.9
9 -10	372	26.9
11 - 12	274	19.9
Mean (SD)	8.4yrs ( $\pm$ 2.1ys)	
<b>Sex</b>		
Male	755	54.7
Female	625	45.3
<b>Ethnicity</b>		
Sinhala	579	41.5
Tamil	411	29.8
Muslim	347	25.1
Burger	19	1.3
Malay	24	1.7
<b>Religion</b>		
Buddhist	503	36.4
Hindu	188	13.6
Catholic/ Christian	316	23.0
Islam	373	27.0

Asthma prevalence was measured by “Ever Wheezing”, “Wheezing during past twelve months” and “Child ever had asthma”. In addition to exercise induced asthma and Night Cough without infection. The prevalence of each category is presented in table 3.

Table 3: Prevalence by type of asthma (n=1380)

Type	Number	Prevalence per 100 children
Ever Wheezing	309	22.4
Wheezing during past 12 months	177	12.8
Child ever had asthma	102	7.4
Exercise included asthma	96	7.0
Night Cough without Infection	145	10.5

The prevalence was 22.4% (95% CI 20.2-24.7) in ever wheezing category while the prevalence of wheezing during the period of 12 months prior to the data collection was 12.8% (95% CI 11.1-14.7). Prevalence of exercise induced childhood asthma was 7% (95% CI 6.8-7.3).

Children with a history of wheezing during the period of 12 months prior to the data collection were considered for further analysis. Table 4 shows the prevalence of asthma by age. Approximately 12.8% of children had wheezing for a period of 12 months. The prevalence was highest in the age groups 7-8 years and 11-12 years. Lowest prevalence of 12.8% was in age group 9-10 years. There is no trend by age group.

Table 4: Prevalence of asthma by age

Age group (years)	Number	Prevalence per 100 children
5 – 6 (n=322)	40	12.3
7 -8 (n=412)	56	13.5
9-10 (n=372)	44	11.8
11 – 12 (n=274)	37	13.5
<b>Total (n=1380)</b>	<b>177</b>	<b>12.8</b>

#### IV.DISCUSSION

Bronchial asthma is an important cause of morbidity in both children and adults. A worldwide increase in the incidence of childhood asthma (CA) has been described especially during the last two decades<sup>8</sup>. Due to better diagnosis, a true incidence of the occurrence of the disease has been documented in most countries<sup>9,10</sup>. This variation has been attributed to hereditary factors and racial differences in susceptibility of the individuals to the disease. But in recent studies, most have agreed that a combination of genetic and environmental factors was largely responsible for the onset of the disease<sup>11</sup>.

With the increase of prevalence rates around the world, the Sri Lankan situation is also no different. A recent study conducted by Karunasekara et al<sup>12</sup> among 5 –11 year old children of 3 schools in Gampaha district found that prevalence rate among this age group was 25% whereas the Respiratory Study Group of Sri Lanka showed a prevalence of over 20% among children. These studies have been done only in few areas of Sri-Lanka and therefore further studies are needed to assess the prevalence of CA in other areas of Sri Lanka. These data will help the health planners to arrive at decision particularly for allocation of resources for management and control of CA

Control of CA, especially severe type is a big challenge. Priority in management is geared toward alleviation of the often very frightening symptoms of severe form of the disease. Many of the drugs used namely bronchodilators and steroids aim at minimizing or reversing the progression and effects of the pathophysiological changes involved in an asthmatic attack.

Children of 5–11-year group was selected as the study population. Below 5 years of age were excluded from the study because respiratory viral infections play an important part in production of wheezing in young children<sup>13</sup>. In Sri Lanka, the maximum age considered for admission to paediatric wards is 11 years. Therefore 11 years was selected as the upper limit. The sample of 1380 for this phase of the

study is a satisfactory representation of the reference population of 642,025 in the CMC area, as it closely resembles and reflects the ethnic distribution and religious sub groups of the population.

In most community-based prevalence studies of asthma, school based samples had been selected<sup>8</sup>. School based samples sometimes may not be representative of the children in some community, and it is a potential source of bias. If a large proportion of children absent, on the day of the survey were asthmatics, the results of the prevalence may be underestimated.

In population based epidemiological studies of asthma there is no universally accepted definition or “gold standard” diagnostic criteria to identify asthma<sup>13</sup>. Several methods are available to diagnose CA at community level. They include interviewer or self-administered questionnaire, asthma provocation tests, video questionnaire or combination of the above.

Researchers have agreed that questionnaire assessment is a valid method for collecting data on asthma prevalence and severity. This method is easy and cheap to perform<sup>14,15</sup>. Most epidemiological studies on asthma, where a questionnaire used as the data collection tool, the symptoms suggestive of asthma ever or recent and parental awareness are commonly relied upon. This method of diagnosis would inflate the number of asthma cases due to similar presentations of the other diseases. On the other hand, the number of cases could be under reported due to the long recall period.

Four methods of validation of asthma detection questionnaires were reported in previous studies. These include comparing the questionnaire response to a physiological investigation, such as bronchial challenge test<sup>16</sup>, comparing questionnaire response with physician’s diagnosis<sup>15,16</sup>. Comparing questionnaire response with video questionnaire<sup>15</sup> and comparing questionnaire response with responses of another questionnaire<sup>15,17</sup>. The most commonly used questionnaires found in the literature includes modified American Thoracic Society (ATS) questionnaire, Modified Medical Research Council Questionnaire (MRC), International Study of Asthma Allergy in childhood (ISSAC) questionnaire and International Union against Tuberculosis and lung disease (IUTLD) questionnaire.

In the present study expert opinion was obtained from eight experts about the suitability of using the above four questionnaires in the community for determine the prevalence of CA at a community level. A rate of 84% preference was given by team of experts for the ISSAC questionnaire and it was selected for the present study

The present study asthma prevalence was measured as life time prevalence and twelve months prevalence. It was found that life time prevalence was 22.4% and twelve- months prevalence was 12.8%. A Sri Lankan study using the similar criteria to diagnose by Karunasekara et al<sup>12</sup> among 5 – 11 age

group, the twelve months prevalence was 25%. This school-based study was done among 2195 children aged 5 -11 years in 3 schools in a semi urban area in the Gampaha District.

The parents of the asthmatic children in the present study, may have given more concerned for prophylactic treatment of their CA children and the twelve months prevalence may have therefore decreased than the life time prevalence in the present study.

Using the similar definitions to diagnose asthma as in the present study, Paramesh<sup>18</sup> in Bangalore found a prevalence of 16.6% and in Bangladesh Hassen et al<sup>13</sup> found the prevalence of 7.3%. Although those studies have been conducted in neighboring countries because of the different population used in these studies these results cannot be directly compare with the present study. The prevalence of childhood asthma in the present study, is much lower than that of the developed countries like U.K (29%), Australia (30%), New Zealand (30%) and U.S.A (21%)<sup>8</sup>.

Within the specific age group of asthma of the present study, in response to leading question of “Has your child had asthma” was 7.4%. Karunasekera et al<sup>12</sup> in their Sri Lankan study reported that it was 19%. This may be due to the fact most parents do not like to reveal that their children are having asthma because of the associated stigma. The other explanation for this may be that, though their children have the whistling sound in the chest, parents don’t think that it is asthma. Several studies in the other countries have also showed that the prevalence of questionnaire diagnosed asthma is more than the physician diagnosed asthma<sup>19</sup>. Joseph et al<sup>20</sup> on their study among 250 school children found that the prevalence of undiagnosed asthma was 8.5%.

Exercise Induced Asthma (EIA) is a common and often unrecognized problem in school age group<sup>21</sup>. Hallstrand et al<sup>22</sup> in their study found that E.I.A. was 9.4% among adolescents and they have stated that recognition of E.I.A. before sports participation may allow for the initiation of safe and effective preventive therapy and also it will help to monitor the worsening of asthma. The present study EIA is 7%.

## V.CONCLUSION

The prevalence of asthma was substantially high among the children in the age group 5-11 years. The findings can be used by the health planners to arrive at decision particularly for allocation of resources for management and control of CA. Also, these findings will be helpful to the paediatricians who manage these children.

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