

Report on
National Asthma Prevalence Study (NAPS)
in Bangladesh 1999

**ASTHMA ASSOCIATION, BANGLADESH
THE CHEST & HEART ASSOCIATION OF BANGLADESH**

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01. ABSTRACT

The prevalence of asthma has increased substantially in many countries in recent decades. But no population-based study to determine the magnitude of asthma problem has been carried out so far in Bangladesh. The aim of the study was to assess the prevalence of asthma and asthma-like symptoms in the general population of Bangladesh.

A nationwide cross-sectional prevalence study was conducted to look into the extent of asthma problem in Bangladesh. Data was collected from 6073 people belonging to 963 households. The subjects were randomly selected from primary sampling units of 38 centers of metropolitan, other urban and rural areas through a multi-stage sampling procedure covering the whole country. Face to face interview was taken with the housewives or other members of the family at the household level through a written questionnaire.

The overall prevalence of asthma that is "current asthma" (at least 3 attacks of wheeze in last 12 months) was 5.2%. Occurrence of other asthma features were : ever wheeze 8.9%, recent wheeze 7.7%, perceived asthma 8.3%, doctor diagnosed asthma 4.6% and night awaking cough 9.2%. The prevalence of childhood asthma was more than that of adults in almost all categories. For example, current asthma (7.4% vs 4.1%), ever wheeze (11.3% vs 7.8%), recent wheeze (9.4% vs 6.8%), perceived asthma (10.6% vs 7.3%) and doctor diagnosed asthma (5.1% vs 4.5%). The only exception was night awaking cough, which was experienced more by the adults (9.7%) than the children (7.8%).

The prevalence of asthma was found less in metropolitan areas (3.1%) than in other urban areas (6.7%) and in rural areas (5.6%). The 'deficit' (poor) group people were found significantly vulnerable to asthma attacks (7.1%) than the 'surplus' (affluent) group (3.9%) .

The occurrence of other atopic diseases was significantly more in asthmatics than non-asthmatics (42.9% vs. 16.8%). However, these features were less in children than adults : atopic dermatitis 7.8% vs 14.2%, allergic rhinitis 6.2% vs 7.9% and allergic conjunctivitis 2.8% vs 5.0% respectively. Exposure to cold was the commonest trigger (80.9%) followed by fumes and dusts (52.7%) and physical exercise (43.8%). Majority of the patients (60.1%) experienced frequent attacks during the winter season. Asthma features worsened mainly at early night (32.4%).

Although 90.1% of the patients took some form of treatment, 13% of them never tried allopathic medicine. Only 11% of the patients ever used inhalers.

The prevalence of asthma in Bangladesh appears to be a substantial public health problem (7-10 million people including 4 to 5 million children have asthma). Further study may be carried out to evaluate the risk factors and help-seeking behavior of the asthma patients of Bangladesh.

02. INTRODUCTION

02.01. Background

Asthma is an ancient disease and still remains a major health problem worldwide. It is one of the few chronic inflammatory diseases that is increasing in prevalence, despite better understanding of its pathogenesis and improvement of treatment.¹ In United States from 1980 to 1987 asthma prevalence rate increased by 29%.² Nowadays five out of every hundred people suffer from the disease in Western World.³

Asthma is the commonest chronic disease in childhood⁴. It affects one in five Australian children⁵. Asthma is a public health problem in developed countries. Different prevalence studies which have been conducted over time with similar methods have all indicated that the prevalence of symptoms of asthma has increased in recent years in UK and Australia.^{6,7,8}

The impact of asthma on health and quality of life is substantial. It has been estimated that the total prevalence of asthma is around 7.2% of the world population⁹. If 10% of children and 5% of adults have asthma, figures that are conservative for western countries but may be overestimates in some developing countries, the global burden of asthma is in the order of 130 million people⁶. Mortality rates from asthma in western countries vary between one and five per 100,000 and result in some 60,000 deaths annually, many of which occur in young people and are preventable¹⁰.

Chronic inflammation of the airway is the hallmark of asthma, although the exact etiology is still unknown. Increasing mortality and prevalence rates of asthma in the United States and other developed countries once led to the concern that environmental agents, particularly air pollutants, may be the culprit¹¹. It is generally thought that in urban areas, outdoor pollution is more due to rapid industrialization, heavy traffic movements, crowded accommodation etc. As a result, prevalence of asthma may be more in these areas¹². The factor or factors underlying this increase have not yet been clearly identified. It is thought that exposures related to general changes in the environment are likely to be involved.¹³

A comparative study in Ethiopia¹³ showed that all respiratory symptoms were significantly less common in the rural than in the urban group and wheeze and asthma are especially rare in rural areas. In Norway¹⁴ the life time prevalence of asthma was found to be highest in the capital city of Oslo (9.4%) compared to an industrial area Odda (5.4%), and a mountainous rural area Hallindal (8.5%).

In Ghana, it was found that, the prevalence of exercise induced bronchospasm is higher in urban than in rural school children.¹⁵ Another study conducted in a rural (West Cumbria) and an urban (New Castle) area of Northern England indicates a slight excess of chronic wheezy persons in the urban settings (44% vs. 40%).¹⁶ Survey carried out in Switzerland also showed higher prevalence of respiratory symptoms in the more polluted areas.¹⁷ In Germany, prevalence of asthma was found to be more in Munich, a metropolitan city with heavy road traffic in comparison to Leipzig and Halle.¹⁸

On the other hand, rural areas have some specific factors predisposing to asthma, which are usually absent in an urban setting. For example, agricultural dust, dump housing, emission of smoke from wood burning during cooking etc. may give rise to asthma. Recent studies suggest that the prevalence

of asthma in a farming environment is quite significant. Here numerous substances of vegetable origin; cereals, oil and fiber producing plants; allergens from mammals, chicken, birds and arthropods; agricultural pesticides and insecticides may be involved.¹⁹ A cross sectional study conducted recently among 1007 subjects from a farming area of Malaysia showed prevalence of bronchial asthma as 6.26%,²⁰ which is almost equal to the total prevalence of the said disease.

Studies on the global pattern on asthma prevalence provide evidence that air pollution is not a major risk factor for the development of asthma. For example, some regions in China and Eastern Europe with high levels of air pollution have generally low rates of asthma prevalence. Conversely, some regions with the lowest rates of air pollution such as parts of New Zealand, have high rates of asthma.²¹

Recent studies suggest that it is a multi-factorial disease²² related to both familial and environmental influences²³ including genetic predisposition, pollution, smoking, low birth weight, infections, malnutrition, improper dietary habit and high risk occupation etc.

02.02. Rationale

International comparisons of prevalence and characteristics of asthma have been greatly facilitated by the completion of two major initiatives in asthma epidemiology- the European Commission Respiratory Health Study (ECRHS)²⁴ and the International Study of Asthma and Allergies in Childhood (ISAAC)²⁵. The first phase of ISAAC has been completed in 156 collaborating centers of 56 countries covering a population of 721,601 children²⁶.

Heretofore in Bangladesh only one study²⁷ has been conducted to determine the prevalence of asthma; it was conducted on children of 1-5 years of age in a coastal region named Chakaria of Chittagong district. This study showed the prevalence of asthma to be 11.8%. Since the nationwide prevalence of asthma was not known, this study was undertaken to determine the prevalence and associated factors of asthma and wheeze in Bangladesh in all age groups. The study was jointly organised by Asthma Association, Bangladesh and The Chest & Heart Association of Bangladesh.

Our aim was to see the prevalence of wheeze and asthma of adults and children in three different settings of metropolitan cities, other urban areas and rural areas of Bangladesh. The socio-demographic and environmental factors related to asthma were also looked into along with the help-seeking behavior of asthma patients.

The management of asthma is not yet optimized in our country. The asthma campaign in our country, which is mainly carried out by the Asthma Association, Bangladesh, is in its 5th year. We were dealing with a health hazard that was presumed to be existing on a large scale. Now, by knowing the actual prevalence of asthma we can determine our future course of action in relation to asthma campaign, supply of logistics, management and human resource development etc. It will also aid in formulation of an effective intervention program for prevention of asthma in Bangladesh.



03. METHODOLOGY

03.01. Type of Study

This was a cross sectional comparative study, which quantified the distribution of asthma in Bangladeshi population. Multi-stage stratified random sampling design was followed. It was conducted under the joint auspices of Asthma Association and The Chest and Heart Association of Bangladesh with collaboration from Government Health Authorities, Local Medical Practitioners and Field Workers.

03.02. Study Period

The study was carried out from January, 1999 to August, 1999. Description of work in relation to these eight months time scale is depicted in Figure-1.

Figure 1 : Time Scale

Description of Works ↓	MONTHS →							
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Staff recruitment								
Staff orientation								
Field preparation								
Data collection								
Data management & analysis								
Reporting								

03.03. Study Population

All people of Bangladesh were included in the study. So it is termed as "National Asthma Prevalence Study (NAPS)".

03.04. Sampling

03.04.01. Sample size:

At least 6,000 population were calculated for the study. Sample size has been determined by using the following standard statistical formula :

$$\begin{aligned}n &= z^2 p (1-p)/d^2 \\z &= 1.96 \text{ (95\% confidence interval)} \\p &= .05 \text{ (Prevalence of asthma- 5\%, assumed)} \\d &= .01 \text{ (Precision)}\end{aligned}$$



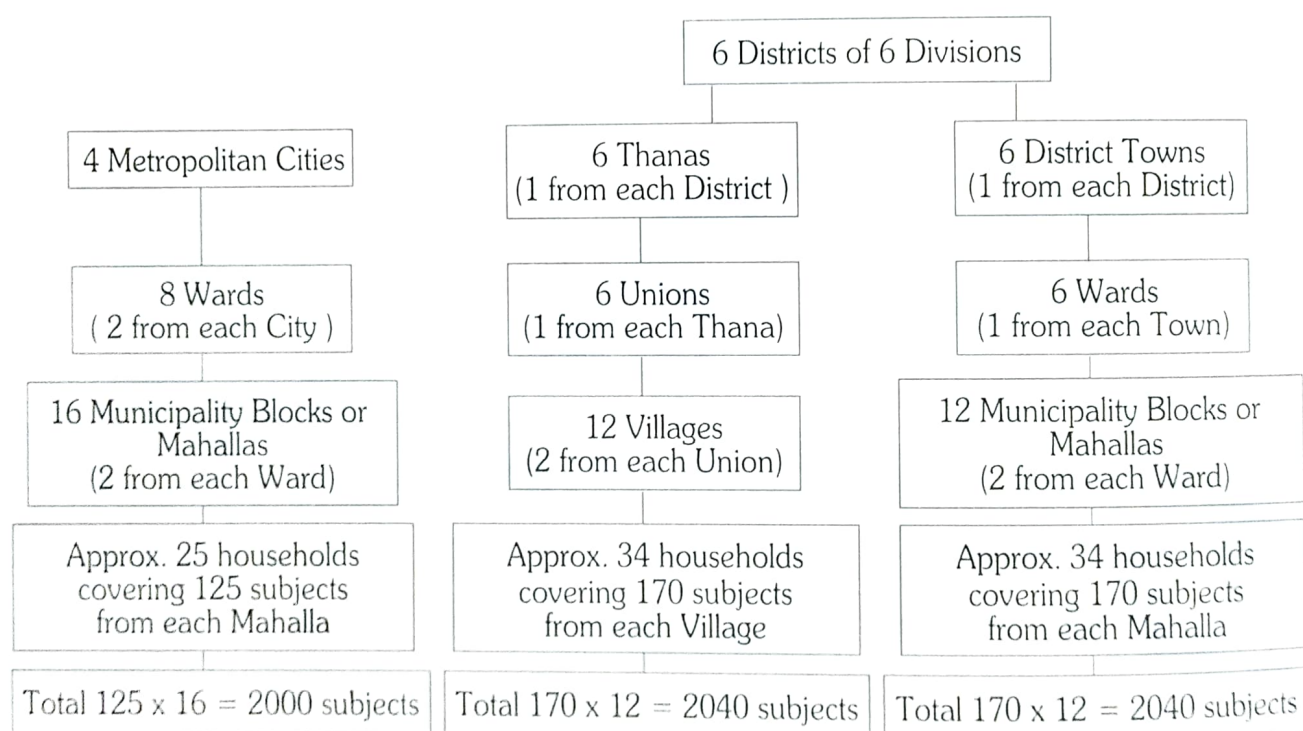
Thus the calculated sample size was 1824. The whole country was divided into three strata : (i) Metropolitan areas, (ii) Other urban areas and (iii) Rural areas. For this survey, 2000 sample size was taken for each main stratum considering non-response. So the total sample size was $2000 \times 3 = 6000$.

03.04.02. Sampling technique

Multi-stage cluster sampling design was followed. In the rural areas, the primary sampling unit was village, while in metropolitan and other urban areas, it was mahalla (municipality block).

All 4 Metropolitan Cities of Bangladesh were included. Out of the total 64 districts of Bangladesh, 6 districts (one from each of the 6 divisions) were selected randomly. Random selection of primary sampling units was done as shown in Figure-2.

Figure 2 : Random Sampling Method



In all stages, strict random selection procedure was followed. At the primary sampling unit level, households were selected randomly. Considering an average of 5 members in each household, number of households were determined as 25 ($5 \times 25 = 125$ persons) for metropolitan areas and 34 ($5 \times 34 = 170$ persons) for other urban and rural areas. Where selected number of households did not cover the required size of population in an area, the adjacent households were taken to fulfil the target number. Wherever the number of interviewed persons crossed the target number, next household was not visited.



03.04.03 Exclusion Criteria :

The following group of subjects have been excluded from the study because of diagnostic inconsistency :-

- (a) Children less than 1 year of age : Bronchiolitis, a common disease of this age group, and other lower respiratory tract infections produces asthma like symptoms among patients less than 1 year old.
- (b) Onset of symptoms at more than 60 years of age : Asthma like symptoms may be found with patients of COPD and cardiac diseases at this age group.
- (c) Smokers with history of smoking of more than 10 pack years : usually develop Chronic Bronchitis and may be confused with Bronchial Asthma.

03.05. Identification of Study Areas _____

The study areas were identified according to the above mentioned plan using randomisation technique through computer. As the 2 wards selected from Chittagong Metropolitan City consisted of only 1 mahalla each, it was decided to include 250 peoples instead of 125 from each of these two mahallas to cover the desired population. So the total number of areas became 38 in place of 40. Detailed list of the study areas are shown in Table 1.

Table 1 : Study Areas

Metropolitan Areas

Area No.	City	Ward	Mahalla
1	Dhaka	Ward No. 3	Mohammadi Housing, Mohammadpur
2			Shekhertek, Mohammadpur
3		Ward No. 12	Mirpur, Section 11 (Block-B)
4			Mirpur, Section 10 (Block-A)
5	Rajshahi	Ward No. 27	Debsinghpara
6			Serol Moth Pukur
7		Ward No. 29	Shampur Dashmari
8			Satbaria
9	Chittagong	Ward No. 7	Alkoron
10		Ward No. 26	Panchlaish
11	Khulna	Ward No. 2	Rupsa Stand Road
12			Chandmari
13		Ward No. 19	Palpara
14			Sarkarpara (Tutpara)



Other Urban Areas

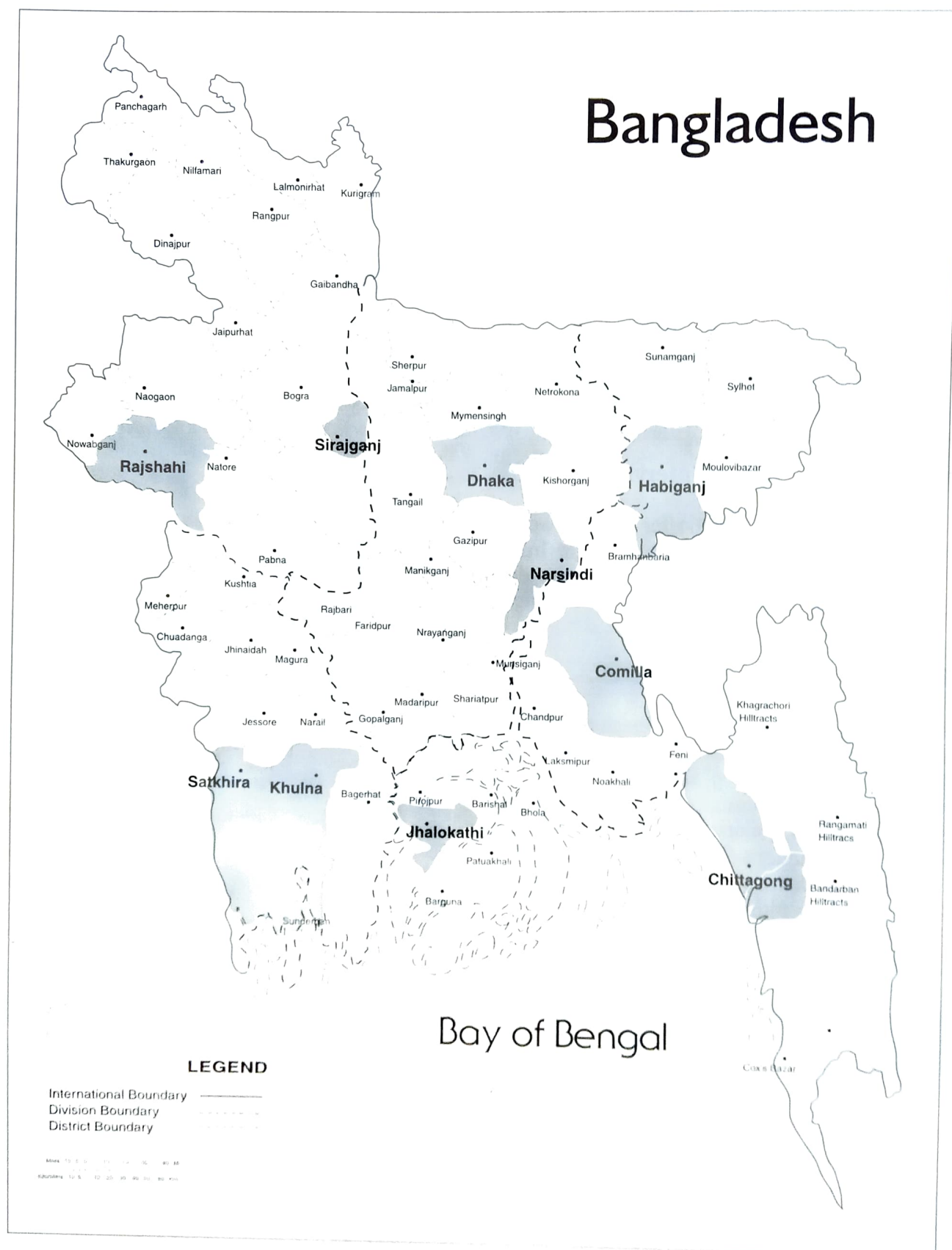
Area No.	District	Ward No.	Mahalla
15	Jhalakathi	Ward No. 2	Aroddar patti
16			Palbari
17	Comilla	Ward No. 3	Ashoktala
18			Kandirpar
19	Narsinghdi	Ward No. 1	Baniachal
20			Bhuakur
21	Satkhira	Ward No. 7	Khurivilla
22			Raispur
23	Sirajgonj	Ward No. 7	Dhanbandi
24			Hossenpur
25	Habigonj	Ward No. 1	Batirpur
26			Natirpur

Rural Areas

Area No	District	Thana	Union	Village
27	Jhalakathi	Kathalia	Kathalia	Uttar Aura
28				Lebubunia
29	Comilla	Barura	Jinsar	Karnedda
30				Jinsar
31	Narsinghdi	Monohardi	Chandanbari	Asad Nagar
32				Hebendi
33	Satkhira	Satkhira Sadar	Dhulihar	Dhulihar
34				Tetuldanga
35	Sirajgonj	Kamarkhanda	Roydaulatpur	Balarampur
36				Dhaleshwar
37	Habigonj	Ajmirigonj	Shibpasha	Dhargaon (Padmatara)
38				Jashkeshori



Figure 3 : Map of Bangladesh showing districts covered in the study.



04. RESULTS

04.01. Socio-demography

A total of 963 families were studied covering 6073 persons. Of them 3948 (65%) were adults (Male-51.3%, Female-48.7%) and 2125 (35%) were children of 1-15 years of age (Male-48.6%, Female-51.4%). According to the national population census 1991 number of children below 15 years is 40%. Male female ratio of the total population was 1.03 : 1 (national figure is 1.05 : 1). Most of the people were Muslims - 5146 (85.5%) (national figure is 89.0%); followed by Hindus - 849 (14.1%). Regarding economic status, 29.8% families belonged to deficit budget group, 44.2 % to balance group and 24.2% to surplus budget group. Study of literacy rate revealed that 22.4% were illiterate (had no year of schooling), 32.4% had primary education, 28.3% had secondary and 16.9% had higher secondary or above level of education; which means 77.6% of the study population had been enrolled into school (national enrollment figure is 78%). Majority of the respondents was students - 29.8%, followed by housewives 21.6%. Table 3 shows the characteristics of the studied population. The socio-demographic profile of the studied population is well representative of our national population data.

Table 3 : Population characteristics

Total households surveyed	963	
Total population studied	6073	
Male population	3084	
Female population	2989	
Male - Female ratio	103.2 : 100	
	Number	Percentage
Children Population (01- 15 years)	2125	35%
<u>Economic Status of Households</u>		
Surplus budget	233	24.2%
Balance budget	425	44.2%
Deficit budget	287	29.8%
No reply	18	1.8%
<u>Education Level</u>		
Illiterate	1237	22.4%
Primary (5 years of schooling)	1778	32.3%
Secondary (10 years of schooling)	1558	28.3%
Higher Secondary and above	943	17.0%
<u>Occupation</u>		
Students	1808	29.8%
Housewives	312	21.6%
Service-holders	571	9.4%



04.05 Intersting Observations

In almost all areas, our local guides or owners of the visited houses, used to ask, how could we select their village, even this specific household - while we were staying at Dhaka. As we mentioned about computerized random sampling; they were so overwhelmed with astonishment, as if they were hearing about the 8th wonder of the world. It is pretty funny - no doubt. But on the other hand, it also represents the level of ignorance of the common people of our country regarding recent advances in the field of technology.

Some food items are usually asked to be avoided by an asthmatic. The list does not include the pulse "Khesari dal" (lathyrus sativus) generally. But we found many individuals susceptible to this cheap and popular food. No statistical data can be provided, as this point was not included in our questionnaire.

Regarding environmental factors, many people told about the ebb & tide (i.e. জোয়ার-ভাটা) and full moon & dark of the moon (i.e. অমাবস্যা-পূর্ণিমা) as triggers for asthma, assessment of which was again beyond the scope of our questionnaire. We propose for further research in these regards.

We provided primary health care to the general people of the study areas. As all the members of our teams were physicians, it became a regular practice. We even faced some old patients in some remote areas, who never saw a qualified doctor in his life-time. We provided some essential medicine to them also, though the amount was scanty. Some Pharmaceutical Companies provided us with these medicines as a gesture of support to this study.



This population-based study has documented the prevalence of wheeze or asthma and related risk factors in all ages of people throughout Bangladesh. It confirms a significant prevalence of asthma in the population of Bangladesh. The prevalence of recent wheeze (7.7%) is much less than that of the developed countries like UK, Australia and USA but conforms to those of the regional countries like India and Pakistan.²⁹

The child population was found to have higher prevalence rate than those of adults in all categories of asthma as observed in most of the studies²⁴. It was observed that atopy is commoner in families of asthmatics. The adult population had higher prevalence of all the other atopic diseases i.e. conjunctivitis, rhinitis and dermatitis in comparison to children. In case of atopic dermatitis, this difference is significant (OR 1.76, CI 1.39-2.25). The prevalence of asthma was significantly higher in the less privileged social classes in this study (OR 1.83, CI 1.31-2.56) in concordance to a varying extent in previous surveys^{10,11,12,13,14}. This may be attributed to their higher prevalence of adverse environmental and social factors in the lower socio-economic group.³⁵⁻³⁸

Interestingly our study shows that asthma is more prevalent in rural (OR 1.87 CI 1.34-2.61) and other urban areas OR (2.30 CI 1.67-3.17) than the metropolitan cities. Though the city areas are more polluted in respect to the rural and other areas, there is no definite basis that macro-environmental factors such as climate and pollution are important determinants of regional variations of asthma severity³⁹. These factors are possibly important in causing variations over short period of time.

Factors underlying this rural preponderance may be that the majority of inhabitants of rural areas belong to the lower socio-economic group and are, therefore, more susceptible to asthma. In addition, people from the under privileged classes are unable to protect themselves from cold weather owing to lack of adequate clothing and are, therefore, more vulnerable to cold as a trigger. Moreover, rural areas are relatively colder in Bangladesh, which explains the higher prevalence in that setting.

It is inferred that all types of atopic illness occur more frequently in asthma patients than in non-asthmatics. Occurrence is relatively higher in Bangladesh on comparison with figures for neighbouring countries and worldwide prevalence as reported in ISAAC. Proper diagnosis and management of these concomitant illnesses is imperative for effective control of asthma.

Cold weather is the commonest trigger followed by fumes/dusts and physical exercise. Environmental control is therefore important in asthma management. Exercise induced asthma should be dealt with proper care. Asthma attacks frequently occur in the winter, which is the coldest season. Features of asthma worsen in the night, mostly during early night.

Contrary to popular belief, food and drinks are relatively less frequent triggers. This demonstrates that we should not clamp generalized restrictions on certain foodstuffs like Brinjals, Prawn, Beef etc. Dietary restrictions should be imposed after detailed history taking reveals the specific foodstuffs, which trigger episodes in that individual.

Although various studies have demonstrated a positive correlation between passive smoking and asthma⁴⁰⁻⁴⁴, our study shows no such correlation. This should be elucidated further.

Hospital admission for acute asthma attacks may not always be possible due to scarcity of bed. The population per bed in Bangladesh is as high as 3151.



As homeopathic treatment is cheap and available in remote places substantial number of people rely on this modality of treatment. Majority of patients took allopathic treatment. It indicates a success of our health service structure. Nevertheless, a considerable proportion of patients resorted to unscientific means such as spiritual and other methods.

Unfortunately, a very small proportion of patients had used inhalers. This is primarily due to ignorance but high cost of inhalers and wide spread misconception about inhalers are important contributory factors. Ignorance about inhalers in 98.6% mothers was reported earlier in a study conducted in the coastal areas of Bangladesh²⁷.



CONCLUSIONS

- True prevalence of asthma is more than assumption.
- Prevalence of asthma is more among children (<15 years) than adults.
- Male children are affected more than females whereas it is almost equal in both the sexes in total population.
- Younger children (<7 years) suffer from asthma more than older children (8-14 years).
- Prevalence of asthma in Bangladesh is similar to neighbouring countries but less than developed Western Countries.
- In Bangladesh, asthma is more prevalent among people of low socio-economic condition.
- Contrary to popular belief, asthma is more prevalent in rural areas and district towns than in metropolitan cities.
- Regarding concomitant atopic illnesses, allergic rhinitis is the commonest followed by allergic dermatitis.
- Exposure to cold is the commonest trigger of attack of asthma followed by dust and fume, physical exercise, specific food and drinks, animals and insects.
- Exposure to passive smoking is an insignificant factor observed in this survey.
- Only 11% patients suffering from asthma use inhalation therapy.



RECOMMENDATIONS

1. Asthma guidelines should be formulated on the basis of consensus. It should be uniformly practiced nationwide by all physicians.
2. Asthma awareness program for common people should be undertaken.
3. Orientation course on updated asthma management for doctors at all level should be organised.
4. Establishment of National Asthma Centre should be hastened.
5. Smooth referral system for asthma patients should be developed.
6. Further studies for elaboration of present findings need to be undertaken.
7. Association of risk factors with asthma should be further evaluated.
8. Emphasis should be given on the use of preventive inhalers.
9. Misconceptions regarding use of inhalers are to be removed.



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