

Air Pollution's Impact on Asthma Disease in Dhaka City: A Hospital Based Survey

Nusrat Parvez Proma, Ambia Khatun and Md. Abdul Mannan*

Department of Pharmacy, Stamford University Bangladesh, Dhaka, Bangladesh

*Corresponding Author: Md. Abdul Mannan, Department of Pharmacy, Stamford University Bangladesh, Dhaka, Bangladesh.

Received: January 19, 2025; Published: February 28, 2025

Abstract

Asthma is a chronic inflammatory disease of the airways that has several contributing factors. Since the word "asthma" comes from the Greek for "short of breath," any patient who had this condition was said to have asthma. This study aims to assess a hospital-based survey on the relationship between air pollution and asthma in the city of Dhaka. One of the main contributing factors to the etiology and pathogenesis of asthma is airway inflammation. The fact that current asthma treatments, especially combination inhalers, are quite safe, reasonably priced, and effective, and that there is a solid scientific basis for them, provide a significant obstacle to the development of new drugs. The National Institute of Disease of the Chest and Hospital (NIDCH) in Mohakhali, Dhaka, was the site of the survey. The study was conducted in 2024 between January and March. The purpose of the survey was to gather information from at least 100 asthmatic patients who were receiving medication therapy and had adequate signs and symptoms. One hundred hospitalized asthmatic patients participated in this study, yielding a variety of findings that showed the influence on the patients in diverse ways. As per the survey data supplied, there were more male asthmatic patients (68%) than female asthmatic patients (32%). Patients between the ages of 61 and 70 (27%) and 71 and 80 (25%) were older than the other age groups in the institution. The survey result shows a wide range of weights, with 31% of patients with asthma having a weight between 41 and 50. Furthermore, there were differences between the normal (43%) and abnormal (57%) blood pressure of asthma patients. Notably, the survey report shows that the percentage rate of smoking habit is higher among asthma patients (39%), and it displays the various signs and symptoms of asthma patients, with shortness of breath (72%) and persistent cough (65%) being the most common. This study effectively demonstrated the severe effects of asthma due to the impact of air pollution in Dhaka city, and as a result, the government of this nation should take the necessary steps to prevent this disease.

Keywords: Asthma; Symptoms; Survey; Patient; Disease

Introduction

Asthma

Asthma is a chronic inflammatory disease of the airways that has several contributing factors. Since the word "asthma" comes from the Greek for "short of breath," any patient who had this condition was diagnosed with asthma [1]. Asthma symptoms can occasionally be moderate, meaning they don't affect the individual too much. Not every asthmatic exhibits every symptom of the condition at all times. During one asthma episode, a person may exhibit certain signs and symptoms, but during another, they may exhibit different symptoms. Whether someone has mild, moderate, or severe asthma also relies on the type of asthma they have. Additionally, some asthmatics may

only exhibit symptoms at specific times of the day. For certain people, viral respiratory tract infections-often those brought on by human rhinoviruses-can induce or exacerbate the symptoms of asthma. Physical changes that a person with asthma experiences before to an asthma attack are known as early warning symptoms. A person may be able to prevent an asthma attack or, in the event that one does occur, prevent it from growing worse by being aware of the early warning symptoms [2].

It is believed that asthma results from the intricate interaction of environmental factors, including the timing and dosage of allergens, co-exposure to infections, and genetic vulnerability. This results in an unwarranted inflammatory reaction to typically innocuous airborne allergens, driven by T-helper type (Th)-2 cells. Atopy, a genetic propensity to mount a local mucosal immunoglobulin (Ig) type E (IgE) response, is one of the biggest risk factors for developing asthma, even though no one gene or environmental factor can completely explain the condition. Atopy is linked to most cases of asthma. However, the condition can also have clinically characterized variant forms that are not related to atopy. Non-atopic or intrinsic asthma is similarly characterized by Th2 related inflammation and IgE production, albeit it is unclear what causes these symptoms. In fact, according to Murdoch, *et al.* [3], asthma is now seen as a diverse illness with several endotypes.

Aim of the Study

This study aims to assess a hospital-based survey on the relationship between air pollution and asthma in the city of Dhaka. One of the main contributing factors to the etiology and pathogenesis of asthma is airway inflammation. The fact that current asthma treatments, especially combination inhalers, are quite safe, reasonably priced, and effective, and that there is a solid scientific basis for them, provide a significant obstacle to the development of new drugs.

Methodology

A brief explanation of the study's nature, length, design, inclusion and exclusion criteria, operational mode, and fieldwork is included in the presentation.

Study type: Cross sectional.

Study duration: 3 months (From January to March, 2024).

Study design

My project was titled "A Hospital-Based Survey on the Impact of Air Pollution on Asthma Disease in Dhaka City." The National Institute of Disease of the Chest and Hospital (NIDCH) in Mohakhali, Dhaka, was the site of the survey. The study was conducted in 2024 between January and March. The purpose of the survey was to gather information from at least 100 asthmatic patients who were receiving medication therapy and had adequate signs and symptoms.

Inclusion and exclusion criteria

Every asthmatic patient sought treatment at the National Institute of Disease of the Chest and Hospital (NIDCH), Mohakhali, Dhaka, in the Department of Respiratory Medicine. We closely monitored if any patients experienced asthmatic symptoms during the research period. As soon as we noticed the patients' good signs and symptoms, we included them to the research. The study omitted the patient who did not exhibit sufficient signs and symptoms.

Operational modality

Microsoft Excel software was used to examine the data and information that were created utilizing elements such as age, sex, biophysical features, diagnosis, treatment, suspected asthmatic medications, and medications used to treat asthma.

Field work

One interviewer was committed to interviewing asthmatic patients one-on-one. The interviewer plans to finish their pharmacy undergraduate degree. The interviewer is knowledgeable with data gathering methods both practically and theoretically.

Data collection form

Questionnaires' for patients:

1. **Patient's name:**

2. **Sex/Gender:**

Male	Female	Child
------	--------	-------

3. **Marital status:**

Married	Unmarried
---------	-----------

4. **Age (yr.):**

5. **Area of residence:**

Rural	Urban	S-Urban
-------	-------	---------

6. Biophysical information:

a. Weight (Kg): b. Blood pressure: c. Temperature (°C):

7. **Educational level:**

Illiterate	Can read only	Can write a letter	SSC or equivalent	HSC or more
------------	---------------	--------------------	-------------------	-------------

8. **Occupation:**

Professional	Managerial	Business	Clerical	Technical	Skilled worker
--------------	------------	----------	----------	-----------	----------------

9. **Smoking habit:**

Never	Ex- smoker > 6 month	always
-------	----------------------	--------

10. **Age distribution (yr.):**

05-20	21-40	41-60	61-80	81-100
-------	-------	-------	-------	--------

11. Signs and symptoms of respiratory disease:

Signs and symptoms of early stage or first stage	Mark (✓)	Signs and symptoms of middle stage	Mark (✓)	Signs and symptoms of last stage or final stage	Mark (✓)
Persistent cough		Shortness of breath		Severe shortness of breath, even at rest.	
Weight loss		Chronic cough		Chronic cough with blood-tinged sputum.	
Mucus production		Frequent respiratory infections		Severe chest pain	

12. Do these symptoms restrict your daily activities in any way?

Yes	No
-----	----

13. Have you been exposed to any environmental pollutants, such as cigarette smoke, chemical fumes, or dust?

Yes	No
-----	----

14. Do you have a history of asthma, COPD (Chronic Obstructive Pulmonary Disease), or any other lung conditions?

Yes	No
-----	----

15. Have you recently traveled to any areas with poor air quality or where respiratory infections are prevalent?

Yes	No
-----	----

Result

Male and female of asthma patients are presented in the following table 1.

Sex	Number	Percentage
Male	68	68%
Female	32	32%

Table 1: Sexual/gender types of asthma patients.

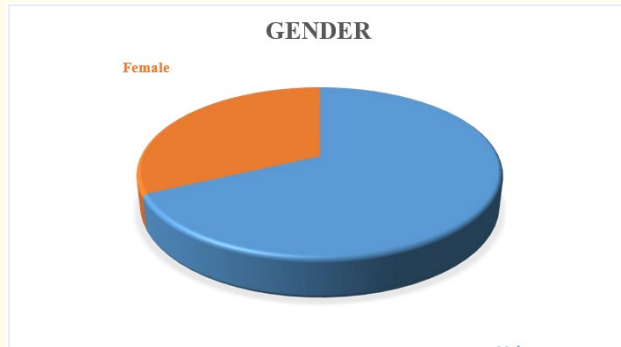


Figure 1: Sexual/gender types of asthma patients.

The table and image shown indicate that there were more male patients than female patients. According to the figure and table, there were 28.8% more female asthmatic patients than male asthmatic patients (61.2%).

Age distribution of asthma patients is presented in the following table 2.

Age	Number	Percentage
01-10	00	00%
11-20	11	11%
21-30	02	02%
31-40	03	03%
41-50	14	14%
51-60	16	16%
61-70	27	27%
71-80	25	25%
81-90	02	02%
91-100	00	00%

Table 2: Age distribution of asthma patients.

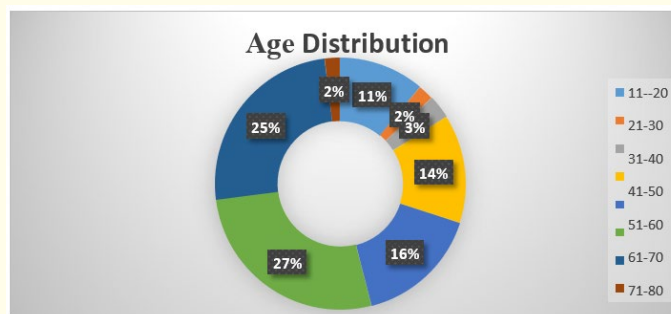


Figure 2: Age distribution of asthma patients.

The age groups of 61-70 and 71-80 patients were older than the other age groups above, as seen in the table and figure that were presented. The age groups of asthmatic patients aged 21-30 and 81-90 were smaller than the other age groups mentioned above, as the figure and table clearly show.

Weight of asthma patients are presented in the following table 3.

Weight	Number	Percentage
31-40	07	07%
41-50	31	31%
51-60	14	14%
61-70	25	25%
71-80	19	19%
81-90	04	04%
91-100	00	00%

Table 3: Different weight of asthma patients.

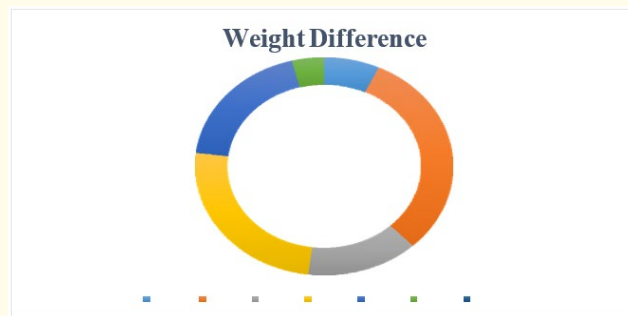


Figure 3: Different weight of asthma patients.

The table and statistics that are presented show the various weight variations among the asthmatic patients. The results indicated that the weights of groups 41-50 and 61-70 were greater than those of the groupings that were displayed here.

The percentage of asthma patients with their blood pressure status are given below.

Blood pressure status	Number	Percentage
Normal	43	43%
Abnormal	57	57%

Table 4: Blood pressure status of asthma patients.

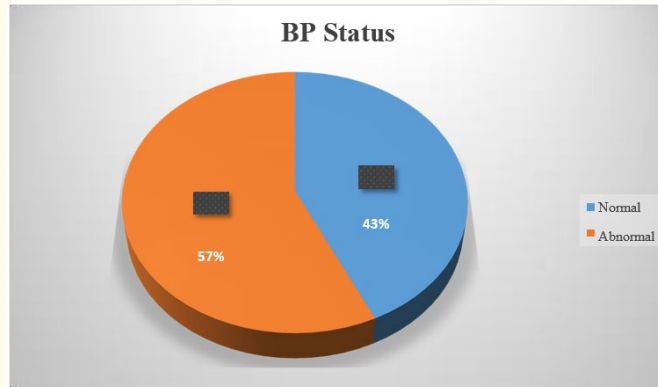


Figure 4: Blood pressure status of asthma patients.

The above table and picture show how asthma sufferers’ blood pressure can be both normal and problematic. Asthma sufferers have abnormal blood pressure, as evidenced by the fact that the rate of irregularity is higher than normal. The majority of individuals with the condition had low blood pressure.

The percentage of measured body temperature of asthma patients are given below.

Temperature status	Number of patients	Percentage
Normal	69	69%
Abnormal (High)	31	31%

Table 5: Body temperature status of asthma patients.

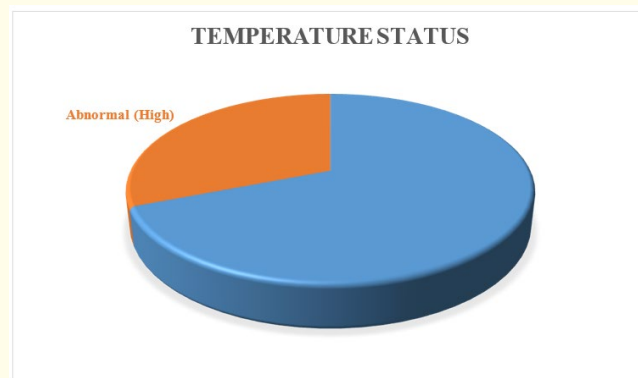


Figure 5: Body temperature status of asthma patients.

According to the standardized human body temperature (37°C), the percentage rate of asthma patients was displayed in the table and figure that were supplied. Normal patient body temperature was determined to be greater than abnormal.

Educational level of the asthma patients is presented below.

Level of education	Number of patients	Percentage
Illiterate	12	12%
Can read only	19	19%
Can write a letter	12	12%
SSC or equivalent	33	33%
HSC or more	24	24%

Table 6: Educational level of asthma patients.

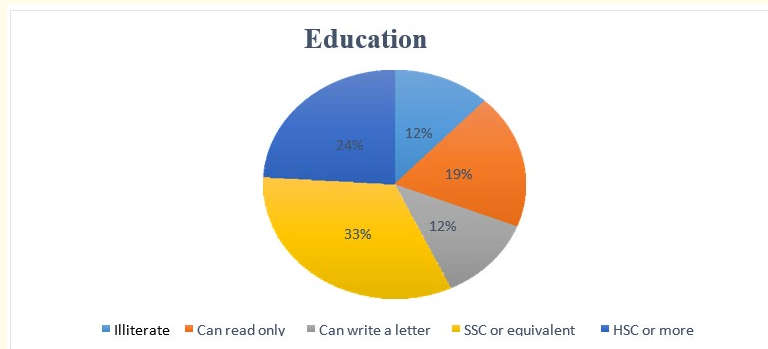


Figure 6: Educational level of asthma patients.

The percentage rate of asthma patients’ educational attainment is shown in the table and figure, where the SSC or comparable group of individuals had a larger percentage than all other groups and the illiteracy rate was lower than all other levels.

Different categories of occupational status of asthma patients are given below.

Level of occupation	Number of patients	Percentage
Professional	14	14%
Managerial	04	04%
Business	21	21%
Clerical	06	06%
Technical	20	20%
Skilled Worker	35	35%

Table 7: Occupational status of asthma patients.

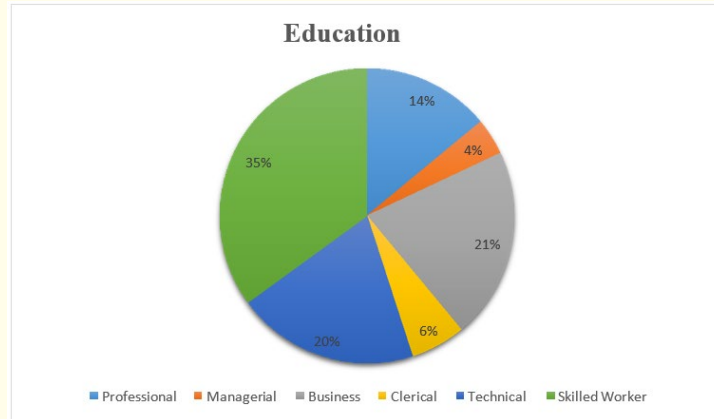


Figure 7: Occupational status of asthma patients.

Asthma patients’ occupational status is depicted in the table and figure, where the proportion of skilled workers is greater than that of other employment groups and the percentage of managers is lower than that of any occupation listed.

The smoking habit of asthma patients are given below.

Smoking habit	Number of patients	Percentage
Never	32	32%
Ex-smoker > 6 months	29	29%
Always	39	39%

Table 8: Smoking habit of the asthma patients.

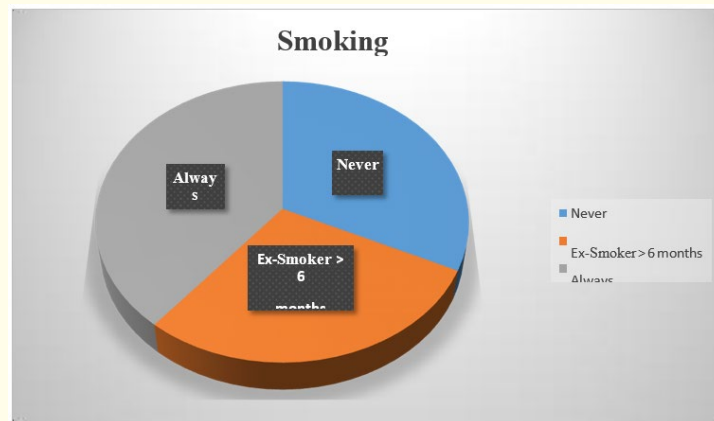


Figure 8: Smoking habit of the asthma patients.

The percentage rate of smoking among asthma patients is shown in the table and figure that are supplied. A significant fraction of patients-roughly 39%-are constantly addicted to smoking, and 32% have never smoked in their lives.

Signs and symptoms of asthma patients are given below.

Signs and symptoms	Number of patients	Percentage
Persistent cough	65	65%
Weight loss	08	08%
Mucus production	11	11%
Shortness of breath	72	72%
Chronic cough	33	33%
Frequent respiratory infections	21	21%
Severe shortness of breath, even at rest	15	15%
Chronic cough with blood-tinged sputum	04	04%
Severe chest pain	18	18%

Table 9: Signs and symptoms of asthma patients.

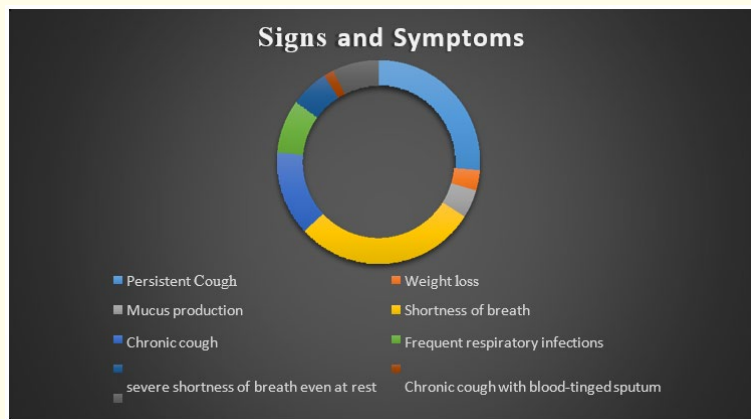


Figure 9: Sign and symptom of asthma patients.

The accompanying table and chart listed the many signs and symptoms of asthma sufferers, with chronic coughing and shortness of breath being more common than the other signs and symptoms.

Asthma sufferers’ limitations in doing daily tasks as a result of their symptoms are listed below.

Having restrictions	Number of patients	Percentage
Yes	35	35%
No	75	75%

Table 10: Restrictions of doing daily activities of asthma patients.

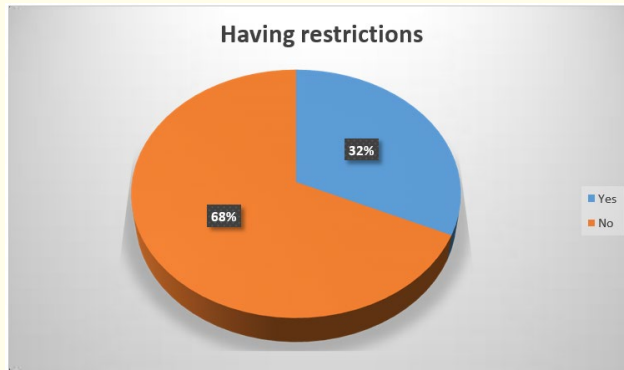


Figure 10: Restrictions of doing daily activities of asthma patients

The aforementioned table and figure show that just 35% of asthma patients had limitations on their ability to do everyday tasks, whereas 75% of patients had no additional constraints.

Exposure to any environmental contaminants, such as cigarette smoke, chemical fumes, or dust of patients are listed below.

Exposure status	Number of patients	Percentage
Yes	64	64%
No	36	36%

Table 11: Exposure to any environmental pollutants, such as cigarette smoke, chemical fumes, or dust.

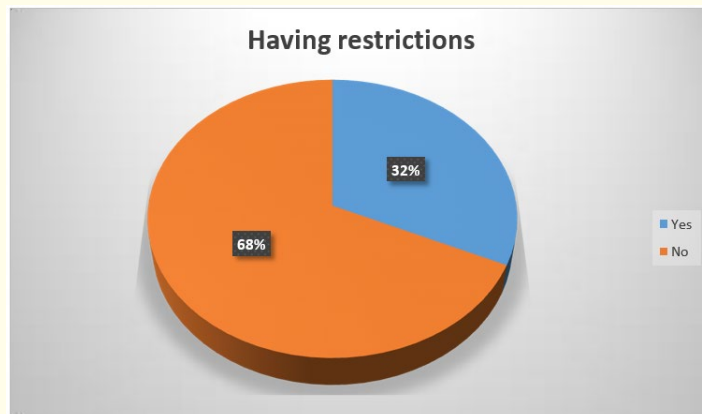


Figure 11: Exposure to any environmental pollutants, such as cigarette smoke, chemical fumes, or dust.

The aforementioned table and figure show that 64% of asthma patients had exposure to any environmental contaminants, such as dust, chemical fumes, or cigarette smoke, whereas 36% had no other exposure data.

The status of having a history of asthma, COPD (Chronic Obstructive Pulmonary Disease), or any other lung conditions of the patients are given below.

Status of history	Number of patients	Percentage
Yes	19	19%
No	81	81%

Table 12: Status of having a history of asthma, COPD (Chronic Obstructive Pulmonary Disease), or any other lung conditions.



Figure 12: Status of having a history of asthma, COPD (Chronic Obstructive Pulmonary Disease), or any other lung conditions.

The aforementioned table and figure show that 81% of asthma patients had no prior history of disease, whereas 19% of patients had a history of asthma, COPD (chronic obstructive pulmonary disease), or any other lung problems.

Below is a history of recent trips to any places with poor air quality or where asthma sufferers frequently get respiratory infections.

History of travel	Number of patients	Percentage
Yes	59	59%
No	41	41%

Table 13: History of recently traveled to any areas with poor air quality or where respiratory infections are prevalent of asthma patients.

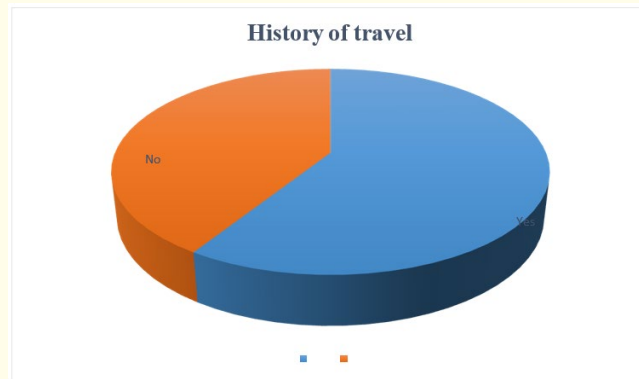


Figure 13: History of recently traveled to any areas with poor air quality or where respiratory infections are prevalent of asthma patients.

As seen by the above table and figure, 59% of asthma patients reported having recently visited any places with poor air quality or where respiratory infections are common, whereas 41% reported having no prior travel experience in such locations.

Discussion

One of the main causes of impairment, the usage of medical resources, and the low quality of life for individuals who have it is asthma. Because of its early onset (one in four people in the general population gets asthma before the age of 40), it is the most prevalent chronic illness among children and young adults [4]. Improved implementation of asthma guidelines and patient education are necessary to address ongoing issues such as patients' acceptance of the burden of asthma and their seeming lack of conviction regarding treatment recommendations and goals.

Although it appears to have declined over the past ten years, the study underlined that asthma remains a public health problem in Bangladesh. Red meat consumption and nutritional status, among other things, were highly correlated with asthma; nevertheless, the relationship between these two factors is still unclear and requires more research. Few research have examined the different asthmatic preconditions in Bangladesh. With respect to the status of modifiable and unmodifiable variables, this study aims to investigate these asthma preconditions and post-effects. The research population's sociodemographic characteristics reveal that the respondents were widely dispersed across age groups, sexes, and educational levels. While the majority of the female respondents were housewives, the male respondents had a variety of jobs, and very few respondents had never been married [5].

The survey result that was presented indicated that there were more male patients than female patients, with 61.2% of male patients having asthma and 28.8% of female patients having the condition. Patients in the 61-70 and 71-80 age groups were older than the other age groups in the hospital. Additionally, it shows that asthmatic patients in the age categories of 21-30 and 81-90 were smaller than the other age groups mentioned above. According to the survey data, there was a significant weight fluctuation among the patients with asthma. The statistics showed that the weights of groups 41-50 and 61-70 were greater than those of any other group. Furthermore, there was a differentiation between asthmatic individuals' normal and abnormal blood pressure. Patients with asthma have abnormal blood pressure because the rate of irregularity is higher than the usual rate. The majority of individuals with the condition had low blood pressure. The proportion of asthmatic patients was then determined using the standardized human body temperature of 37°C, where a patient's normal body temperature was found to be greater than abnormal.

Furthermore, asthma patients' percentage rates of educational attainment differed according to their various levels; for example, the illiteracy rate was lower than that of all levels, while the SSC or comparable group of persons was greater than that of all groups. Asthma sufferers, on the other hand, have a larger percentage of skilled workers than any other occupational category, and a lower percentage of managers than any of the occupations listed. Importantly, the study result shows that a significant number of asthma patients smoke, with 39% of patients having a smoking habit that they have never had and 32% never having smoked. Additionally, it displayed the various signs and symptoms of asthma, with chronic coughing and shortness of breath being more common than the other signs and symptoms listed. Conversely, just 35% of asthma patients reported experiencing limitations on their ability to do everyday tasks, while 75% reported no constraints at all.

According to the survey report, 64% of asthma patients reported having been exposed to any environmental pollutants, such as dust, chemical fumes, or cigarette smoke, while 36% reported having no other exposure records. In a similar vein, 81% of asthma patients had no previous medical history, whereas 19% had a history of asthma, COPD (chronic obstructive pulmonary disease), or any other lung problems. The percentage of asthma patients who had previously visited any places with poor air quality or where respiratory infections are common was 59%, whereas 41% of asthma patients had no prior travel experience in such regions. One hundred individuals with various types of asthma, including acute and chronic, participated in this survey period.

Strengths and Limitations

This study's strength is its thorough analysis of the complex link between Dhaka City's public health and unplanned urbanization. It makes use of a wide variety of data sources, such as demographic, environmental, and health-related data, to provide a comprehensive analysis of how the urban environment affects public health. The study's conclusions also add significant information to urban planning and policymaking by offering insights that can guide measures to reduce the health hazards associated with rapid urbanization in Dhaka and other comparable metropolitan places throughout the world. This study's dependence on secondary data sources, which might be prone to errors or inconsistencies, is its drawback. Long-term health effects might not be taken into consideration. The research may not adequately represent the range of health hazards in Bangladesh's various urban environments due to its exclusive emphasis on Dhaka City. Lastly, the report doesn't go into great detail on certain policy suggestions or health treatments. Notwithstanding these drawbacks, it offers insightful information on the intricate relationships between urbanization and public health in Dhaka [6,7].

Conclusion

One hundred hospitalized asthmatic patients participated in this study, yielding a variety of findings that showed the influence on the patients in diverse ways. As per the survey data supplied, there were more male asthmatic patients (68%) than female asthmatic patients (32%). Patients between the ages of 61 and 70 (27%) and 71 and 80 (25%) were older than the other age groups in the institution. The survey result shows a wide range of weights, with 31% of patients with asthma having a weight between 41 and 50. Furthermore, there was a difference between asthma patients' blood pressure levels that were normal (43%) and abnormal (57%). Significantly, the survey report shows that smoking is more common among asthma patients (39%). It also shows the various signs and symptoms of asthma patients, with persistent cough (65%) and shortness of breath (72%) being more common than the others. This study effectively shown how Dhaka's air pollution has a significant influence on asthma. Therefore, in order to avoid this sickness, the government of this nation should adopt the appropriate measures.

Competing Interests

The author claims that there aren't any competing interests.

Acknowledgements

The author would like to express gratitude to Stamford University Bangladesh's Pharmacy Department for their ongoing assistance with this survey.

Bibliography

1. Salter SA. "A biographical sketch". *Thorax* 40.12 (1985): 887-888.
2. Rosenthal LA., et al. "Viral respiratory tract infections and asthma: the course ahead". *Journal of Allergy and Clinical Immunology* 125.6 (2010): 1212-1217.
3. Murdoch JR. "Chronic inflammation and asthma". *Mutation Research* 690.1-2 (2010): 24-39.
4. To T., et al. "What is the lifetime risk of physician-diagnosed asthma in Ontario, Canada?". *American Journal of Respiratory and Critical Care Medicine* 181.4 (2010): 337-343.
5. Rakhshanda S., et al. "Self-reported prevalence of asthma and its associated factors among adult rural population in Bangladesh: a cross-sectional study using WHO PEN protocol". *BMJ Open* 13.12 (2023): e074195.
6. Rahaman MA Kalam and A Al-Mamun M. "Unplanned urbanization and health risks of Dhaka City in Bangladesh: uncovering the associations between urban environment and public health". *Frontiers in Public Health* 11 (2023): 1269362.
7. Saharan SLR. "Management of status asthmaticus in children". *Indian Journal of Pediatrics* 77.12 (2010): 1417-1422.

Volume 13 Issue 3 March 2025

© All rights reserved by Md. Abdul Mannan., et al.