



## Trends of bronchial asthma in left side of Mosul city a case series study

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### Abstract

Asthma is a chronic condition that causes inflammation and narrowing of the bronchial tubes and the airway passage and this lead to dyspnea and wheezing during breathing. The aim of this study is to describe the trends of bronchial asthma (socio demographic characteristics, severity of asthma, etiological factors, body mass index, symptoms and sign of asthma and drugs taken by the patients to relieve asthma symptoms) for the asthmatic patients who attend the primary health care centers and hospitals in left side of Mosul city and to achieve this aim a case-series study was performed. This study revealed that [60.33%] of patients had intermittent severity of asthma, and [26.66%] had mild persistent, then moderate persistent [8.66%], finally severe persistent [4.33%]. Also this study revealed that [28%] of patients had a genetic factor [family history] and [63.33%] of patients their asthma caused by environmental factors. On the other hand, this study revealed that [42.33%] of the patients had attacks of breathlessness, and [27.66%] of the patients had attacks of cough, then [11.33%] had wheezing and [9.33%] had chest pain [tightness], then [6.33%] presented with feeling weak or tired when exercising, finally only [3%] presented with trouble sleeping with night time asthma. According to the BMI, this study revealed that [61.33%] of the patients were within normal weights, over-weight patients were about [22.33%], obese patients were about [10.66%], & very obese patients were only [5.66%]. According to the results of this study we can conclude that males were affected more than females, also bronchial asthma mainly affects young age group 5-15 years old, most asthmatic patients were living in urban areas, illiterates, show intermittent clinical pattern of asthma, and finally more than one third of patients use inhaled B2 agonists and about 25% of the patients use inhaled steroid to relief their asthma symptoms.

**Keywords:** asthma, symptom, steroid

### Introduction

Asthma is a disease characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person. Bronchial asthma is due to inflammation of the air passages in the lungs and affects the sensitivity of the nerve endings in the airways so they become easily irritated leading to recurrent episodes of wheezing, breathlessness, chest tightness and coughing especially at night or early morning. During the attacks, the lining of the airway passage swell causing the passages to narrow and reducing the flow of air in and out of the lungs <sup>[1]</sup>.

### Etiological factors of asthma

The cause of bronchial asthma is unknown but it is likely that multiple factors (environmental, genetic, medical, drugs, & psychological factors) act in concert or perpetuate the disease. These factors influence both its severity and its responsiveness to treatment <sup>[2]</sup>.

### Epidemiology

As of 2011, there are 235-330 million people worldwide affected by asthma <sup>[3]</sup>, and approximately 250000-345000

People die per year from the disease. Rate vary between countries with a prevalence between [4-30%] <sup>[3]</sup>. It is more common in developed than developing countries <sup>[3]</sup>. Within developed countries it is more common in those who are in low socioeconomic state while in contrast in developing countries it is more common in people who are in high socioeconomic state <sup>[8-11]</sup>. Asthma is twice as common in boys as girls <sup>[3]</sup>. Asthma was recognized as a major public health problem since the 1970s. Asthma affects approximately 5% of people in the United Kingdom, Canada and New Zealand have rates of about 14-15% <sup>[4]</sup>. In a cross sectional study on asthma prevalence among school children in Baghdad which was done between October 2010 and June 2012, the prevalence of asthma of primary school children between 6-15 years old was 22.3% <sup>[5]</sup>.

### Classification of asthma

Asthma is clinically classified according to the frequency of symptoms, nighttime symptoms per month or week, and number of Short Acting Beta adrenoceptor Agonist [SABA] drug use per week or per day <sup>[6]</sup>. This classification explained in the table 1-1 below.

**Table 1:** Clinical classification of asthma <sup>[6]</sup>

Severity	Symptom frequency	Night symptoms	SABA use
Intermittent	≤ 2/week	≤ 2/month	≤ 2 days/week
Mild persistent	> 2/week	3-4/month	> 2 days/week
Moderate persistent	Daily	> 1/week	Daily
Severe persistent	Continuously	Frequent [7x/week]	≥ twice/day

**Signs and symptoms**

Asthma is characterized by episodes of wheezing, shortness of breath, chest tightness and coughing [3]. Sputum may be produced from the lung by coughing but it is often hard to bring up. Symptoms are usually worse at night and in the early morning or in response to cold air or exercise [7]. Signs of asthma include blue lip or finger nail due to lack of oxygen, Rapid heart rate, When exercising patient feel weak or tired, easily upset, grouchy or moody, Change in the face color (pale or flushed), Eczema-flare up, The use of accessory muscle of respiration, A paradoxical pulse, Over inflation of the chest [8,9].

**Diagnosis of asthma**

There is currently no precise test for the diagnosis, which is typically based on the pattern of symptoms and response to therapy over time [1]. A diagnosis of asthma should be suspected if there is a history of recurrent wheezing, coughing, or difficulty breathing and these symptoms occur or worsen due to exercise, viral infection, air pollution or allergens [10].

**Spirometry**

Spirometry is recommended to aid in diagnosis and management, it is the single best test for asthma [11].

**Management of asthma**

There is no cure for asthma [3]. Bronchodilators are recommended for short term relief of symptoms in those with occasional attacks, no other medication is needed. If mild persistent disease is present [2 attacks per week], low dose inhaled corticosteroids or an oral leukotriene antagonist [zafirlukast, montelukast] or a mast cell stabilizer such as cromolyn Sodium is used. For those who have daily attacks, a higher dose of inhaled corticosteroids is used, in moderate or severe exacerbation of asthma, oral corticosteroids are added to these treatments [12]. Avoidance of triggers is a key component of improving control of asthma and preventing attacks, the most common triggers include allergens, smoke [tobacco and Other], air pollution, non selective beta blockers, and sulfite containing food, cigarette smoking and second hand smoking [13].

**Aim of study**

The aim of this study was to describe the trends of asthmatic patients who attended the primary health care centers and hospitals in left side of Mosul city. This study was achieved in left side of Mosul city that is located in northwestern of Iraq. It is one of the biggest cities in Iraq. This study was conducted in four randomly selected primary health care centers which were: Al-zahra'a, Alaqsa • Al- muharebeen and Al-noor and two hospitals: IbnAlatheer and Al Salam hospitals.

**Study design**

A case series descriptive design was selected in order to achieve the objectives of the study.

**Duration of study**

The study started from the 1st of February to the 1st of August 2017 over six months period.

**Study population**

The present study included 300 asthmatic patients [including

20 pregnant woman] between 5-50 years of age, from both sexes who attended the primary health care centers and hospitals in left side of Mosul city during study period.

**Statistical analysis**

Percentage rates of socio demographic, risk factors and severity of asthma of the study sample have been.

**Results**

Table 3.1 shows the percentage of male patients [53.33%] which is slightly higher than the percentage of female patients [46.66%].

**Table 2:** Distribution of the study sample by sex of the patient

Sex	NO.	%
Male	160	53.33
Female	140	46.66
Total	300	100%

Table 3.2 clarifies that [61%] of the patients in the study sample in both male and female were between [5-15] years old, and [14%] of the patients were between [16-25] years old, while [17.66%] of the patients between [26-35] years old, and finally only [7.33%] of the patients between [36-50] years old.

**Table 3:** Distribution of the study sample according to the age

Age	Male		Female		Total	
	NO.	%	NO.	%	NO.	%
5-15	98	32.66	85	28.33	183	61
16-25	22	7.33	20	6.66	42	14
26-35	28	9.33	25	8.33	53	17.66
36-50	12	4	10	3.33	22	7.33
Total	160	53.33	140	46.66	300	100%

Table 3.3 reveals that the majority of the asthmatic patients were living in urban area (84.66%) in comparison to rural which was [15.33%].

**Table 4:** Distribution of the study sample according to residence

Residence	Male		Female		Total	
	NO.	%	NO.	%	NO.	%
Rural	24	8	22	7.33	46	15.33
Urban	136	45.33	118	39.33	254	84.66
Total	160	53.33	140	46.66	300	100%

Table 3.4 explains that the highest percentage of asthmatic patients were illiterate in case of male [19.66%] and female [20.66%], followed by the primary level in which male [17.66%] and female [14%], then secondary, male [9.33%] and female [7.33%], and finally college and higher education in male (7%) and female [4.66%].

**Table 5:** Distribution of the study sample according to the education level

Education	Male		Female		Total	
	NO.	%	NO.	%	NO.	%
Illiterate	59	19.66	62	20.66	121	40.33
Primary	52	17.33	42	14	94	31.33
Secondary	28	9.33	22	7.33	50	16.66
Collage and higher education	21	7	14	4.66	35	11.66
Total	160	53.66	140	46.33	300	100%

Table 3.5 illustrates that the highest percentage of asthmatic

patient's occupation in both males and females was students [33.33%] and the lowest percentage in both sexes was at the clerk group [5%].

**Table 6:** Distribution of the study sample according to the occupation

Occupation	Male		Female		Total	
	No.	%	No.	%	No.	%
Child	58	19.33	32	10.66	90	30
Student	65	21.66	35	11.66	100	33.33
Housewife	0	0	55	18.33	55	18.33
Manual worker	23	7.66	10	3.33	33	11
Clerk	10	3.33	5	1.66	15	5
Health worker	2	0.66	2	0.66	4	1.33
Engineer	2	0.66	1	0.33	3	1
Total	160	53.33	140	46.66	300	100

Table 3.6 explains that the main etiological factor of the study sample for both sexes were the environmental factors [34%] followed by genetic factor accounts [28%].

**Table 7:** Distribution of study sample according to etiological factor of asthma

Etiological factor	Male		Female		Total	
	No.	%	No.	%	No.	%
Genetic	47	15.66	37	12.33	84	28
House dust mite	22	7.33	19	6.33	41	13.66
Smoking	19	6.33	13	4.33	32	10.66
Pollen & allergen	17	5.66	14	4.66	31	10.33
Red bricks	18	6	11	3.66	29	9.66
Atopic triad	11	3.66	15	5	26	8.66
Animal dander	9	3	13	4.33	22	7.33
Cement	10	3.33	10	3.33	20	6.66
RSV infection	7	2.33	8	2.66	15	5
Total	160	53.33	140	46.66	300	100

Table 3.7 demonstrates that normal weight patients accounts [61.33%], overweight patients accounts [22.33%], then obese patients accounts [10.66%] and finally very obese which accounts [5.66%].

**Table 8:** Distribution of the study sample according to BMI measurement

BMI measurement	Male		Female		Total	
	No.	%	No.	%	No.	%
Normal weight	95	31.66	89	29.66	184	61.33
Over weight	38	12.66	29	9.66	66	22.33
Obese	17	5.66	15	5	32	10.66
Very obese	10	3.33	7	2.33	17	5.66
Total	160	53.33	140	46.66	300	100%

Table 3.8 demonstrates that the majority of asthmatic patients in the study sample had intermittent severity of asthma [60.33%], followed by the mild persistent [26.65%], then moderate persistent [8.66%], finally the lowest proportion were severe persistent [4.33%].

**Table 9:** Distribution of the study sample according to the severity of asthma

Severity	Male		Female		Total	
	NO.	%	NO.	%	NO.	%
Intermittent	98	32.66	83	27.66	181	60.33
Mild persistent	43	14.33	37	12.33	80	26.66
Moderate persistent	11	3.66	15	5	26	8.66
Sever persistent	8	2.66	5	1.66	13	4.33
Total	160	53.33	140	46.66	300	100%

It is clear from Table 3.9 that the attack of breathlessness had the highest proportion in this distribution of symptoms and signs among both sexes which account [42.33%].

**Table 10:** Distribution of the study sample according to the symptoms and signs.

Symptom & sign	Male		Female		Total	
	No.	%	No.	%	No.	%
Breathlessness	68	22.66	59	17.66	127	42.33
Cough	46	15.33	37	12.33	83	27.66
Wheezing	19	6.33	15	5	34	11.33
Chest tightness	12	4	16	5.33	28	9.33
Tiredness on exertion	10	3.33	9	3	19	6.33
Trouble sleep with night asthma	5	1.66	4	1.33	9	3
Total	160	53.33	140	46.66	300	100

Table 3.10 demonstrates that inhaled B2 agonist [salbutamol] had the highest proportion in the study sample which account (36.33%), followed by [23.66%] for inhaled steroid, then (16.33%) for oral aminophylline.

**Table 11:** Distribution of the study sample according to the type of drug taken by the patient

drug	Male		Female		Total	
	No.	%	No.	%	No.	%
Inhaled B2 agonist	58	19.33	51	17	109	36.33
Inhaled steroid	37	12.33	34	11.33	71	23.66
Oral aminophylline	28	9.33	21	7	49	16.33
Oral prednisone	8	2.66	11	3.66	19	6.33
Nebulized B2 agonist without oxygen	10	3.33	7	2.33	17	5.66
Montelukast	7	2.33	5	1.66	12	4
LABA (salmeterol)	4	1.33	6	2	10	3.33
Nebulized B2 agonist with oxygen	5	1.66	3	1	8	2.66
I.V aminophylline	3	1	2	0.66	5	1.66
Total	160	53.33	140	46.66	300	100

**Discussion**

The present study revealed that the percentage of male patients was (53.33%) & female patients was (46.66%) which seems to be similar to that in a Saudi study, Moradi-Lakeh *et al.* 2013, which accounts (50.7%) in males & (49.3%) in females [14]. This study showed that [61%] of the patients were between [5-15] years of age which was parallel to the result in a study conducted in Al-Taif area, Fayez Hamam *et al.* Kingdom of Saudi Arabia 2015 which accounts [53.7%] [15], but it disagrees with the result of a study done in urban

area of India 2014 which accounts [7.5%] only [16]. Also this study clarified that [14%] of the patients were between [16-25] years of age which was close to the result in the Saudi study, Moradi-Lakeh *et al.* 2013 [14], which accounts (10%) but this result was lower than that in the study of Haminad MA. *et al.* Asthma in Abha, Kingdom of Saudi Arabia 2016 [17] which accounts [60.9%]. This study found that [84.66%] of the patients were from urban area & [15.33%] were from rural area which was close to the result in the study of Mansoura University, Egypt 2009 [18], which accounts [79.2%] & [20.8%] respectively, but it disagree with the result in the study of prevalence of self-reported asthma in Indian people between 2005-2006, Asthma 2014 [19], which accounts [28.75%] & [71.25%] respectively. This study demonstrated that the highest proportion of asthmatic patients were illiterate which accounts [40.33%], & [31.33%] of them had primary level of education & [16.66%] had secondary level of education & this was parallel to the results in a research in Saudia 2001 [20], which accounts [41.8%], [28.2%], [14.5%] respectively, but it was higher than the results of Indian study on Epidemiology of Asthma(2006-2009) [21], which accounts [21.1%], [13.4%], [37.9%] respectively. The present study illustrated that the highest percentage of asthmatic patient's occupation in both males and females was students [33.33%], and this result agrees with the result of a research in Saudia 2001 [20], which accounts [34, 5%], but disagree with the result of California Health Interview Survey 2007 which accounts (66.3%) [22]. Red bricks which accounts [9.66] of the aetiological factors in this study which is close to the results of Abdulaziz Al-Mazam, DFETP and Ashry G. Mohame 2001 [20]; which accounts [13.6%]. Atopic triad [asthma, allergic rhinitis and atopic eczema] which accounts [8.66%] of the patients in this study was similar to result of symptom prevalence and risk factors for asthma at the rural regions of Denizli, Turkey 2013 [23] which accounts [9.6%] and lower than that result in the research of Saudia 2001 [20], which accounts [62.7%]. The present study illustrated that the normal weight patients accounts [61.33%] which was close to the result in the study of prevalence and risk factors for asthma in Indian population 2005-2006 [24], which accounts [60.1%], but higher than that result in the study of New York city 2012 [25], which accounts [44%]. Over weight patients accounts [22.33%] which was parallel to the result in the study of New York city 2012 [25], which accounts [18.8%], but disagree with be result in the study of prevalence and risk factors for asthma in Indian population 2005-2006 [24], which accounts [12.3%], on the other hand the present study revealed that [10.66%] of patients were obese which was parallel to the result in the study of New York city 2012 [25] which accounts [19.1%], but it was not similar to the result of the prevalence and risk factors for asthma in an Indian population 2005-2006 [24], which accounts [5.7%]. This study illustrated that [5.66%] of the patients were very obese which was much lower than that result in the study of New York city 2012 [25], which accounts [28.1%], and parallel to the result in the study of prevalence and risk factors for asthma in Indian population 2005-2006 [24], which accounts [3.2%]. Regarding the severity of asthma this study found that [60.33%] of the patients had intermittent severity of asthma which was similar to the result in study of king Khalid universal hospitals 2017 [26], which accounts [63.5%], but disagree with the result in the study of the relationship between Asthma and Obesity in Urban area of New York city 2012 [25], which accounts [1.3%] only. Also

this study demonstrated that [26.66%] of the patients had mild persistent asthma which was close to the result in study of king Khalid universal hospitals 2017 [26] which accounts [27.6%] but it was higher than the result of Asthma in Abha, Kingdom of Saudi Arabia 2016 [17], which accounts [10.6%]. On the other hand moderate persistent asthma accounts [8.66%] of patients in this study which appear to be similar to the result of King Khalid Universal Hospitals 2017 [26], which accounts [8.9%] but it was lower than the result of Asthma in Abha, Kingdom of Saudi Arabia 2016 [17], which accounts [16.9%]. Finally this study illustrated that [4.33%] of the patients had sever persistent asthma which was close to the result of Asthma in Abha, Kingdom of Saudi Arabia 2016 [17], which accounts [2.9%] and lower than the result in the study of the relationship between Asthma and Obesity in Urban area of New York city 2012 [25], which accounts [33.8%]. The present study revealed that [42.33%] of the patients had attack of breathlessness and this agrees with the result of a multicentre study [Delhi] 2005 [27] which accounts [37.8%] but disagree with the result of symptom prevalence and risk factors for asthma at the rural regions of Denizli, Turkey 2013 [23] which accounts [20.5%], also this study demonstrated that [27.66%] of the patients had cough symptoms which was close to the result of symptom prevalence and risk factors for asthma at the rural regions of Denizli, Turkey 2013 [23] which accounts [19.9%] and far away from the result of a multicentre study [Delhi] 2005 [27] which accounts [10.1%], on the other hand wheezing accounts [11.33%] in this study which was close to the result of multicentre study [Bangalore] 2005 [27] which accounts [9.1%] but lower than the result in the research of symptom prevalence and risk factors for asthma at the rural regions of Denizli, Turkey 2013 [23] which accounts [32.7%]. The present study showed that the highest proportion of patients use inhaled B2 agonist (36.33%) which was close to the result in a study of African Health Sciences 2012 [28] which accounts [37.9%], also the present study showed that [23.66%] of the patients use inhaled steroid which was parallel to the result in study of Uganda" Mulago hospital 5010 [28] which accounts [24.2%], on the other hand [16.33%] of the patients use oral aminophylline which was similar to the result in the study of Uganda" Mulago hospital 2012 [28], which accounts [15.8%]. Regarding oral prednisolone [6.33%] of the patients used this drug in the present study which was close to the result of Asthma in Abha, Kingdom of Saudi Arabia 2016 [17], which accounts [7.7%]. Also this study demonstrated that [15.66%] of the patients used Nebulized B2 agonist [ventolin] without oxygen, which agrees with the result in Uganda" Mulago hospital [28] 2012 which accounts [5.3%], on the other hand [4%] of the patients used singularir [montelukast] in this study which was also in agreement with the result of in Abha, Kingdom of Saudi Arabia 2016 [17], which accounts [3.4%]. Nebulized B2 agonists [ventolin] with oxygen accounts [2.66%] of the patients in this study which was parallel to the result in the study Uganda" Mulago hospital 2012 [28] which accounts [2.4%]. On the other hand [3.33%] of the patients used LABA [salmeterol] which was close to the result of Asthma in Abha, Kingdom of Saudi Arabia 2016 [17] which revealed that [2.2%] of the patients used LABA. Finally only [1.66%] of the patients used intravenous aminophylline in this study which was in agreement with the result in the study of Uganda" Mulago hospital 2012 [28] which revealed that only [1.1%] of the patients used this drug.

## Conclusion

The following conclusions were obtained from this study:

1. Males were affected more than females.
2. Bronchial asthma mainly affects young age groups between [5-15] years.
3. The majority of asthmatic patients live in urban area.
4. Most of the patients with bronchial asthma were illiterate.
5. The highest proportion of female patients was housewives and most male patients were students.
6. Most of the patients affected by environmental factors, followed by genetic factors and finally atopic factors.
7. The present study illustrated that according to the BMI measurements most of the patients had normal weight.
8. Most patients with bronchial asthma showed intermittent clinical patterns of asthma.
9. The main clinical presentation of patients with bronchial asthma in this study was the attack of breathlessness.
10. The most common drug taken by the patients was inhaled B2 agonist (salbutamol).

## Recommendations

1. Early detection of the type and severity of asthma is very important in the management.
2. It is very important to detect the etiological factors (especially environmental) and try to prevent or reduce these factors in order to prevent exacerbation of asthma.
3. Also it is very important to teach the patient how to use the drugs (especially inhaled b2 agonists, inhaled LABA, and inhaled steroid).
4. Regular follow-up is important to maintain a good asthma control.

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