

Clinical Diagnosis of Asthma in Children

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Abstract: Background: Asthma is the most common chronic respiratory disorder in childhood. Asthmatic attacks are described and classified according to the type of wheezing to Non –atopic and Atopic asthma (IgE mediated wheezing). Objective: The aim is to determine the onset of clinical diagnosis in relation to clinical presentation and of asthma in children in Jaafar Ibn-oaf and Ibrahim Malik teaching hospitals in Khartoum Capital of Sudan from May-July 2013. Materials and Methods: This was a descriptive cross-sectional hospital-based study. A 16-item self-administered questionnaire was distributed to 111 asthmatic patients at the largest two hospitals in Khartoum state. Participants were selected using convenience sampling method. Results: 111 questionnaires were analyzed. the common age of onset of symptoms is < 1 year 38.7%, > 2 years 38.7% and 1-2 years 22.5%.the common age of diagnosis is 1-2 years 30.6%, <1 year 28.8%, >3 years 26.1%, 2-3 years 14.4%.the common symptoms is cough 94.6%, SOB 94.6% , wheezes 82% , fever 61.3%, rhinorrhea 47.7% , refuse feeding and or drinking 60.4%.The most common aggravating factors are allergen 71.2% , ARI 60.4%, cold air 39.6%, irritants 30.6%, exercise 15.3% and drugs 3.6%.And there is strong family history of asthma and other allergies. Conclusion: there is over-diagnosis of asthma due to the symptoms which mimic other respiratory infections. Common symptoms of asthma are cough, SOB and wheezes. And common aggravating factors are irritants and ARI.

Keywords: Asthma, Sudanese, bronchiolitis, children

1. Introduction

Asthma is the most common chronic respiratory disorder in childhood. Asthma is a disorder that causes the airways of the lungs to swell and narrow, leading to wheezing, shortness of breath, chest tightness, and coughing. ⁽¹⁾ Asthmatic attacks are described and classified according to the type of wheezing to: Non –atopic, Atopic asthma (IgE mediated wheezing). Non- atopic wheezing: have normal lung function early in life, but a lower respiratory illness due to a viral infection usually RSV led to increased wheezing during the first ten years of life. This type seems to cause less severe persistent wheezing, and symptoms improve during adolescence.

In atopic asthma the lung function is normal at birth, but recurrent wheeze develops with allergic sensitization, with increased blood IgE and positive skin prick tests to common allergens. Atopic wheezes have persistence of symptoms and have decreased lung function later in childhood. Risk factors for the development of atopic wheeze (asthma) are family history of asthma or allergy and a history of eczema, while exposure to tobacco smoke or prematurity are not risk factors.

Atopy is an inherited predisposition to sensitization to allergens, and is present in up to 40% of children, most of whom are asymptomatic. Atopic children are at increased risk of allergic disease. ⁽¹⁾ Diagnosis is usually made on a history of recurrent wheeze, with exacerbation usually precipitated by viral respiratory infection. ⁽¹⁾ recording peak expiratory flow rate (PEFR) may be useful most children over 5 years of age can use a peak flow meter. Asthma results in increased variability in peak flow, both diurnal variability (morning PEFR usually lower than evening PEFR) and day-to-day variability. There may also be bronchodilator responsiveness, where PEFR will increase by more than 10-15% after inhaling a bronchodilator. Often response to treatment is the most helpful investigation. ⁽¹⁾ In

most children, the symptoms of asthma are readily controlled, but it is an important cause of school absenteeism, restricted activity and anxiety for the child and family. There are still about 20 deaths from asthma in children each year in the UK. Asthma is one of the commonest chronic illnesses in children. There have been important advances in the understanding of prevalence, pathophysiology, monitoring and treatment of asthma in recent years. However, there is only little information on the natural history of asthma ⁽¹⁻⁵⁾ which is one of the major obstacles to the development of preventive strategies for asthma. Factors that may influence the age of onset were also explored. It is important to diagnose Asthma at an early stage as early treatment may improve the prognosis in the long term. However, many patients do not present at an early stage of the condition, so the physician may have difficulty with the diagnosis. Under diagnosis and consequent under treatment might be important in the increased morbidity and mortality of asthma. Miss diagnosis of asthma in children is that physicians diagnose patients with asthma from the clinical diagnosis in the first attack without excluding other asthma mimickers which can be any other respiratory problem.

Diagnosing asthma in young children is difficult because children often cough and wheeze with colds and chest infections, but this is not necessarily asthma. Young children have very small, narrow airways and on average have a 6 -8 colds per year, usually between September and March. Some physicians are reluctant to give a diagnosis of asthma to young infants as other conditions can be responsible for the asthma like symptoms. Children and toddlers can wheeze when they have viral infections. Bronchiolitis is another very common cause of wheeze in children. First episodes of cough, runny nose and fever that happen in cold/flu season-fall/winter/early spring is likely not asthma. If your child has several more episodes of wheeze and cough, it is likely to be asthma. The common cold triggers 90% of asthma attacks in children, compared to 40% in adults. Since there is no

diagnostic test available for children younger than 6 years of age, making a diagnosis in this age group is more difficult than in older children. Over the age of about 6 years it is possible for a child to have a spirometer test. This is a simple test that measures a child's airflow through the large and small airways. Results reveal if the child's airflow can be improved with medication. Reversibility of airway obstruction is a key feature of asthma. If administering a bronchodilator reverses airway narrowing significantly, the diagnosis is probably asthma.

In Previous Study was done where 958 asthmatic children the median age of onset of asthmatic symptoms was 3.0 years old (2.0-4.0 IRQ), with the peak between 1 to 3. And The diagnosis may be based on the subject's self-reporting of symptoms⁽⁶⁾ or by stringent clinical criteria as used by Yunginger⁽¹⁾.

Morgan's⁽²⁾ study, showed that 79% of children with persistent asthma at 16 years old had their onset of asthma before pre-school age, with asthma had symptoms before 6 year of age. In contrast to Yunginger's⁽¹⁾ which showed that the median age of onset of asthma was 3 year for males and 8 year for female children.

Lowe et al⁽⁷⁾ suggested significant interaction between maternal asthma and lung function in early childhood; Kurukulaaratchy et al⁽⁸⁾ showed that allergic comorbidity and maternal asthma emerged as strong factors for persistent wheezing states.

Recent studies^(9, 10) suggested that the damage to lung tissues in asthma also began early in life. Longitudinal population-based study from Sear et al⁽⁹⁾ showed that derangement in lung function was already present by early school ages in whom persistent asthma would ultimately develop. Efforts have been made to manipulate the environmental risk factors like house dust mite allergen avoidance^(11,12), pet exposure^(13,14) and dietary avoidance^(15,16,17) in early life for primary prevention of asthma, but unfortunately the results so far have been conflicting. In previous studies, it was shown that the health implications could be significant in asthmatics without a proper diagnosis, because they were less treated than diagnosed asthmatics: they missed more days of school because of wheezing, they limited their physical activity, and their sleep was more disrupted⁽¹⁸⁾.

There is little if any information in the Sudanese population. We therefore set up a cross sectional survey among our asthmatic patients to collect information about the age of onset of asthma symptoms. The **General Objective of this study** to determine the onset of clinical diagnosis in relation to clinical presentation and of asthma in

2. Methods

This was a descriptive cross-sectional hospital-based study. A 16-item self-administered questionnaire was distributed to

111 asthmatic patients at the largest two hospitals in Khartoum state. Participants were selected using convenience sampling method. An interviewed (close ended) and (two open ended questions) questionnaire was developed for this study. The questionnaire is comprised of four sections: **Demographic information:** gender, age and mother level of education, **Diagnosis:** include age of onset of symptoms and age of diagnosis, **Common symptoms and Common aggravating factors.**

Data management and analysis: Data was entered and analyzed using the Statistical Package for Social Sciences (SPSS) V.19.0

3. Ethical Approval

Ethical approval was taken from the hospitals. Participants in this study were all briefed about the purpose of the study and their verbal consent was taken. Privacy and confidentiality have been assured.

4. Results

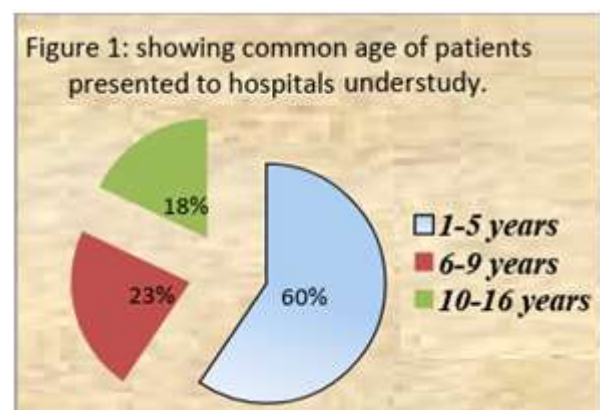
A total of 120 asthmatic patients participated in the study. Of these, 5 were excluded because they did not meet the inclusion criteria and 4 were excluded because they did not provide answers. Thus, the final analysis was based on the data collected from 111 asthmatic patients.

Age and gender distribution of the study population

Table 1: Gender distribution of the study population

Gender	Frequency	Percent
Male	67	60.4%
Female	44	39.6%

More males (60.4%) than females (39.6%) employed at the two hospitals participated in this study.



Common age presented to hospitals under-study is 1-5 years 59%.

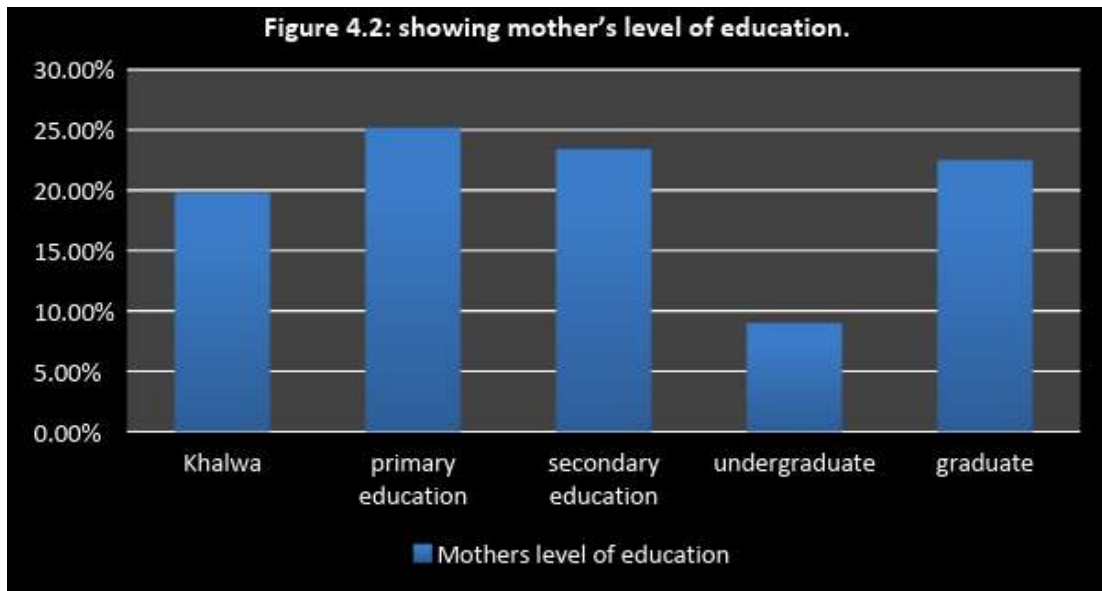


Figure 2: Mother's level of education.

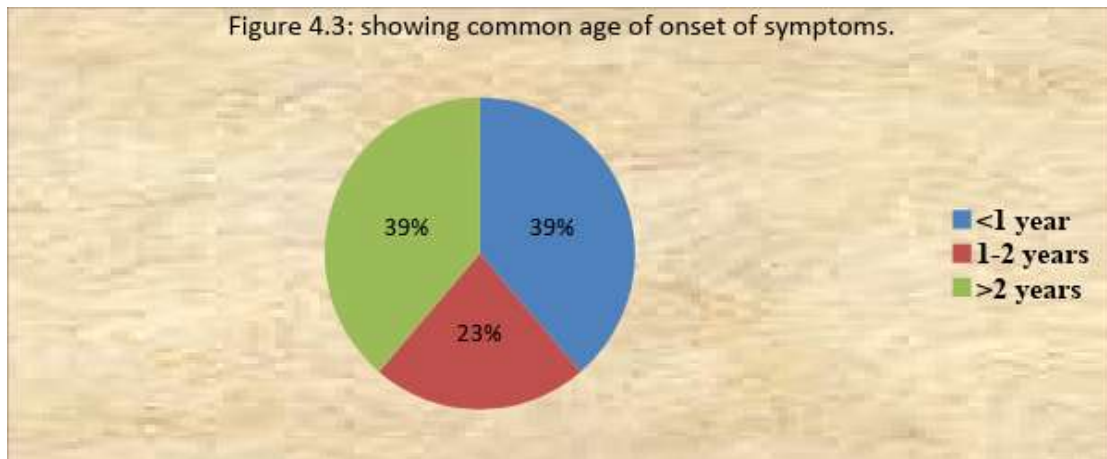


Figure 3: Age of onset of symptoms

The age of onset of symptoms was categorized into <1 year 38.7 % (n=43), 1-2 years 22.5 % (n=25) and >2 years 38.7 % (n=43).

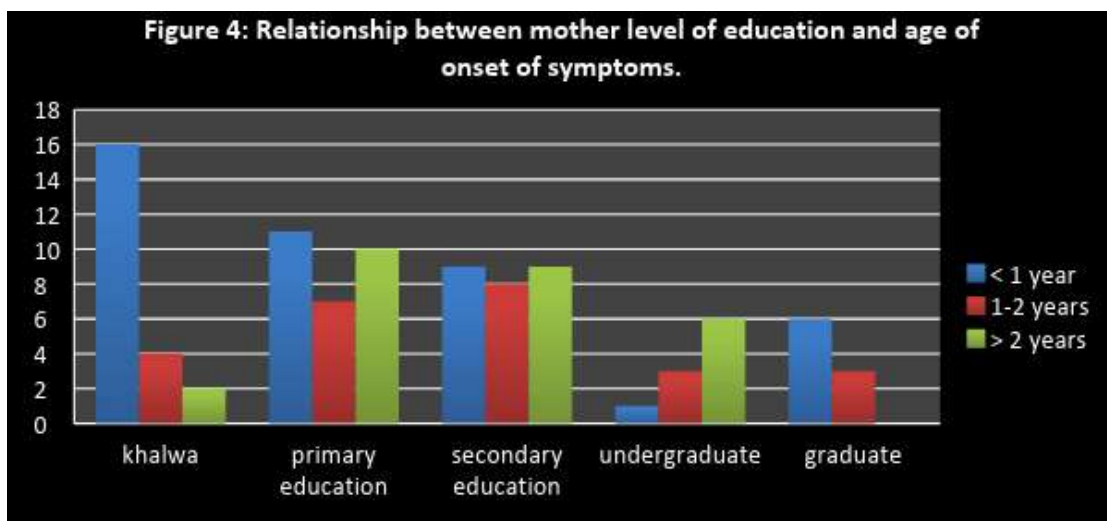


Figure 4: Relationship between mother level of education and age of onset of symptoms.

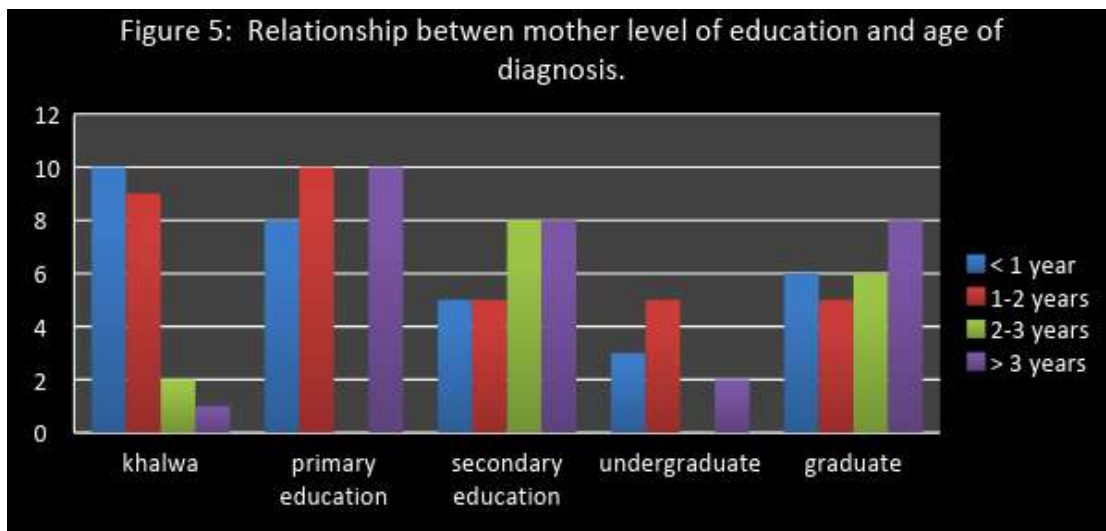


Figure 5: Relationship between mother level of education and age of diagnosis.

The common age of diagnosis of asthma is categorized into <1 year 28.8%(n=32), 1-2 years 30.6%(n=34), 2-3 years 14.4%(n=16) and >3 years 26.1%(n=29).

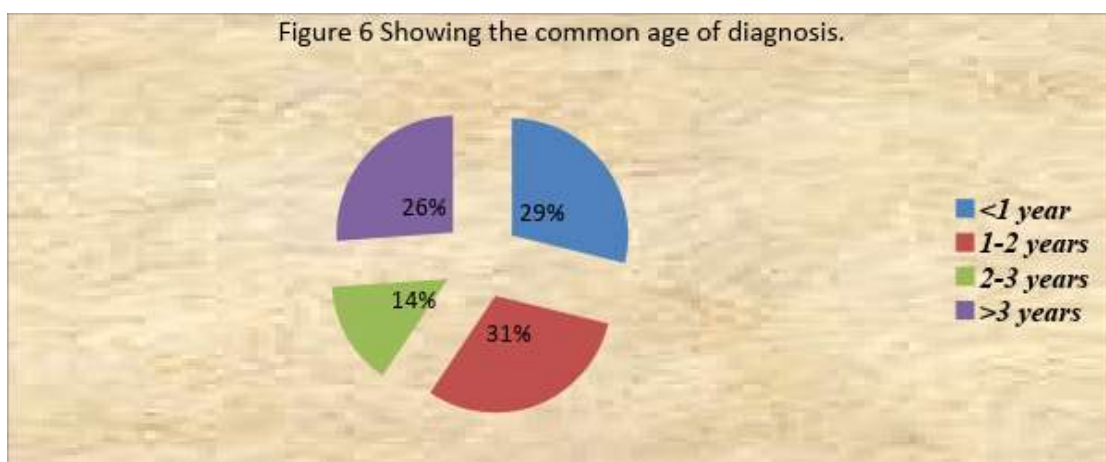


Figure 6: Common age of diagnosis of asthma in children.

Frequency of admission prior to final diagnosis

Table 2 showing the Frequency of admission prior to final diagnosis

	Total	Range	Minimum	Maximum	Mean	Std.Deviation
Frequency of admission prior to diagnosis	111	10	0	10	2.98	2.438

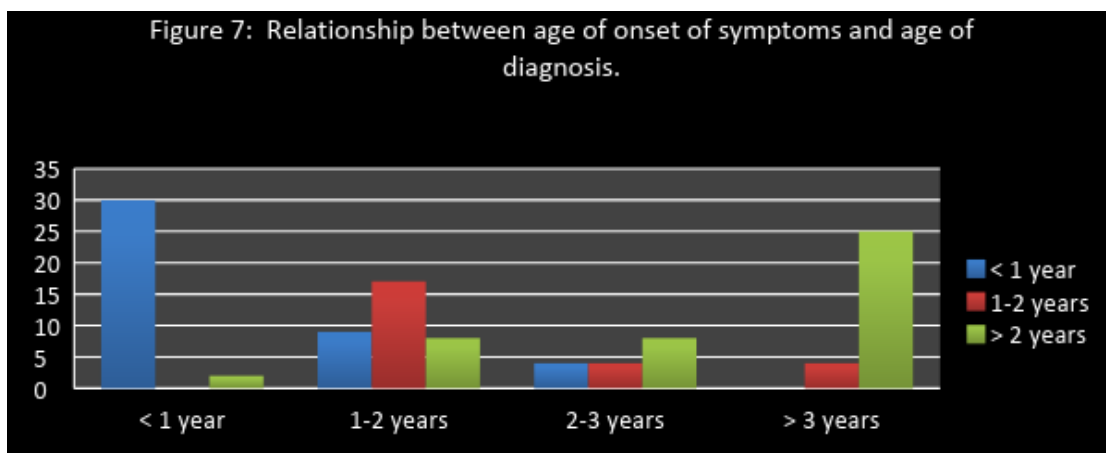
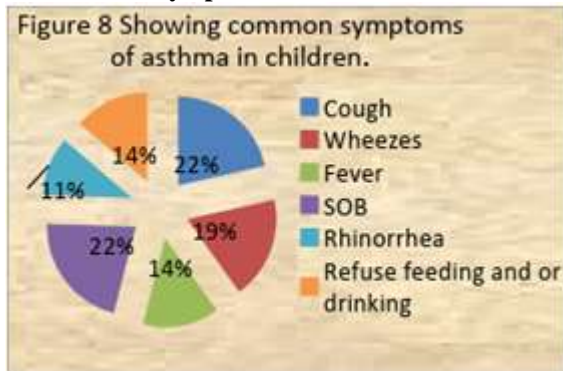


Figure 7: Relationship between age of onset of symptoms and age of diagnosis

	value	df	Asymp.sig.(2 sided)
Pearson chi-square	86.103 ^a	6	.000

Common symptoms of asthma in children



Common symptoms of asthma are cough 21%, SOB 21%, wheezes 19%.

Table 3: Showing common symptoms of asthma in children.

Common symptoms	Frequency	Percent
Cough	105	94.6%
Wheezes	91	82%
Fever	68	61.3%
SOB	105	94.6%
Rhinorrhea	53	47.7%
Refuse feeding and or drinking	67	60.4%

Common aggravating factors

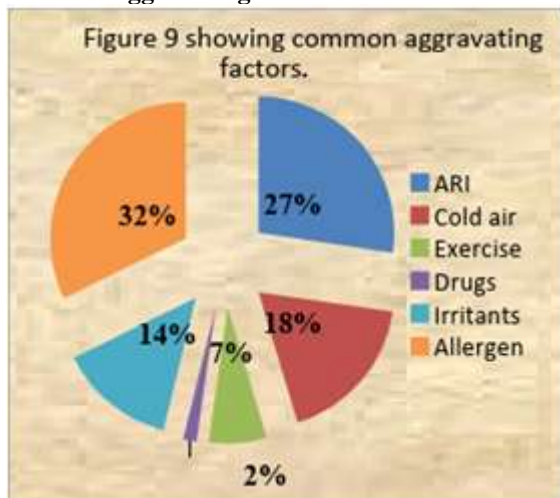
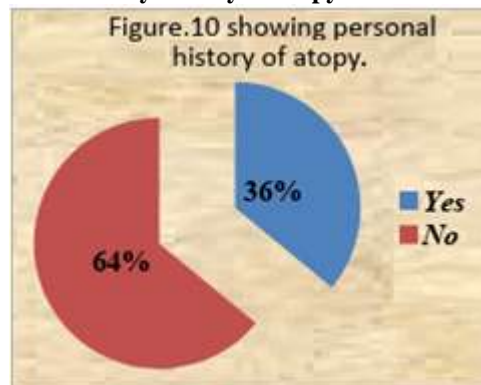


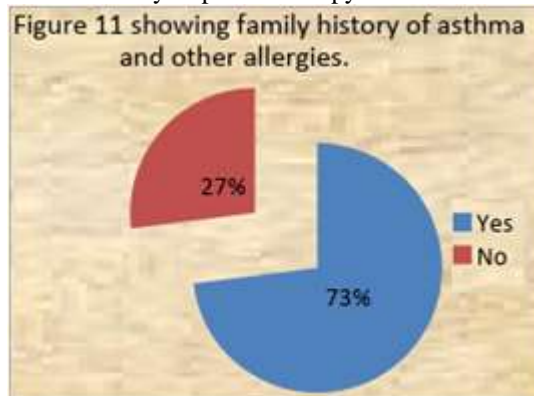
Table 4: Showing common aggravating factors.

Common aggravating factors	Frequency	Percent
ARI	67	60.4%
Cold air	44	39.6%
Exercise	17	15.3%
Drugs	4	3.6%
Irritants	34	30.6%
Allergen	79	71.2%

Personal and family history of atopy and other allergies



64% with no history of personal atopy.



73% asthmatic patients have family history of asthma and other allergies.

5. Discussion

Results of hospitals understudy is 59.5% presented at age 1-5 years this is suggesting the hypothesis of over-diagnosis as all this patient are not confirmed as asthmatic patients and diagnosed only clinically, in contrast to 22.5% presented at age 6-9 years and 18% presented at age 10-16 years which suggest also younger children has more asthmatic attacks that bring them to hospitals. According to previous researches⁽¹⁾ hypersensitivity is more in male and our study suggesting this hypothesis. Male to female ratio is 67:44. Among mothers primary education has highest percentage 25.2% ,secondary education 23.4% graduate 22.5% . And when compare mother level of education in relation to age of onset of symptoms we found that among children less than 1 year the age of onset of symptoms is inversely proportional with mother level of education as level of education increase the number of onset of symptoms decreases and vice versa we can explain this by ignorance of low level of education to caring which is most probably due to hypersensitivity rather than asthma. Contrary children with onset of symptoms more than two years is directly proportional with mother level of education explained by older aged are getting towards confirmation of asthma, as the child is more exposed to the risk factors by himself rather than by his mother. Thus we can conclude there is no relation between onsets of symptoms in older age with mother's level of education. Our study show that 39% presented at < 1year, 22% presented at 1-2 years and 39% presented at > 2 years. In contrast to (Study was done where 958 asthmatic children who fulfilled the inclusion criteria are, but 16 of them were

excluded because the age of onset could not be recalled. Of the remaining 942 subjects, 608 (64.5%) were boys and 334 (35.5%) were girls. The median age of the subjects at the time of data collection was 8.7 years old (IRQ=5.9-11.1), and they had suffered from asthma for a median of 4.7 years (IRQ=2.9-7.6). The median age of onset of asthmatic symptoms was 3.0 years old (2.0-4.0 IRQ), with the peak between 1 to 3). Conclude that 1-4 years is most common age of onset of symptoms explain that may be due to inheritance. The common age of diagnosis is 1-2 years 34 %,< 1 year 32% which may suggest that there is over-diagnosis because children often cough and wheeze with colds and chest infections but this is not necessarily asthma. Young children have very small, narrow airways and on average have a 6 -8 colds per year, usually between September and March. Some physicians are reluctant to give a diagnosis of asthma to young infants as other conditions can be responsible for the asthma like symptoms. Children and toddlers can wheeze when they have viral infections. Bronchiolitis is another very common cause of wheeze in children. First episodes of cough, runny nose and fever that happen in cold/flu season- fall/winter/early spring is likely not asthma. The most common symptoms is cough 94.6%, shortness of breath 94.6%,and wheezes 82% which are the most common symptoms also according to previous researches, then another symptoms like fever 61.3%, rhinorrhea 47.7% which may suggest that they have respiratory infection aggravating factor for them. Finally refuse feeding and or drinking 60.4% which may be due to the severity of symptoms. The most common aggravating factors are allergen 71.2% which may due to doing the questionnaire during the autumn weather, ARI 60.4% with the presentation of fever, which might lead to over diagnosis of pneumonia, cold air 39.6%, irritants 30.6%, exercise 15.3% and drugs 3.6%. The strong association between, family and personal history, and asthma added to clinical examination, are useful in differentiating between asthma and other acute respiratory conditions.

6. Conclusion

- The common age of onset of symptoms is <1 years and > 2 years.
- The common age of diagnosis is 1-2 years.
- There is over-diagnosis of asthma in children under 2 years.
- The common symptoms are cough, SOB and wheezes.
- The common aggravating factors are irritants and ARI.
- High family history of asthma and other allergies suggest strong genetic association.

7. Acknowledgment

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8. Conflicts of interest

There are no conflicts of interest

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