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Growth Assessment In Asthmatic Children (A Prospective Study)

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ABSTRACT

hospital in city compared the weight, height or length, and midarm circumference percentiles of 75 children with asthma and a similar number of control group children of the same age and sex between March 1 and September 30, 2018, taking into account some social and economic factors for both groups (educational status, family income, and occupation). individuals were classified as having mild, moderate, or severe asthma based on the severity of their daytime and nighttime symptoms (steroid-dependent individuals were excluded).There were twice as many male patients as female patients, according to the study's findings, and the majority of patients (30 percent) were young children (aged one to four years old)

Patients And Methods: A prospective case control study which was conducted on 75 children from ages 1 to 12 years of both sexes who were known cases of asthma and had visited the outpatient clinic of Hospital during the period from the first of March to the 30th of September, 2018. Another sample of 75 healthy children (without history of chronic disease coming for simple mild diseases such as flu or sore throat) matched for age and sex and was also outpatient visitors were taken as a control group

Conclusion: Asthma patients' weight, height or length, and midarm circumference were all significantly altered (p 0.001). Retardation in growth metrics is proportional to the severity and duration of the condition. Patients with asthma should be monitored closely for signs of growth retardation, since this condition may be avoided with early diagnosis and treatment. Education and explanation to the family about the nature, progression, therapy and other aspects of the disease like preventive measures

Keywords: *Asthma, growth, weight, height or length, and midarm circumference*

INTRODUCTION

Asthma is a chronic lung condition that causes symptoms like in fits of wheezing, coughing, and breathlessness. Asthma is the most prevalent chronic respiratory condition in children, affecting over 14% of children globally.The impacts of uncontrolled asthma on children and their families are numerous and far-reaching. They have poorer educational achievement, for instance, and are more likely to be absent from school or have special education requirements.Two, caregiving often results in lost income and time away from the workforce. Some of these youngsters may endure life-threatening attacks and very serious symptoms.4 Using the United Kingdom as an example, we can see that the overall results for children with asthma are bad, with significant associated morbidity

and high rates of emergency hospital admissions, and most importantly, many needless fatalities each year.5 The National Review of Asthma fatalities (NRAD) uncovered alarming evidence that many child asthma fatalities may have been averted by addressing a variety of modifiable risk factors.6Asthma in children is difficult to diagnose and manage for a number of reasons. The purpose of this study was to delve into these concerns and shine a light on effective clinical procedures for diagnosing and treating paediatric asthma.

Aim Of The Study

The purpose of this study was to examine the association between socioeconomic factors such as parental occupation, level of education, and smoking habits, as well as the presence or absence of asthma in the patient's family.

Asthma Clinical Presentation

Wheezing, shortness of breath, and cough are the classic trifecta of symptoms for children with asthma. However, "asthma" is an umbrella word used to describe these symptoms, so doctors should always inquire, "What type of asthma is this?" when they're present. Asthma comes in many forms, each with its own set of symptoms and treatment requirements. The diagnostic process should not end after asthma symptoms and modifiable or curable qualities have been identified.7 Because asthma symptoms tend to come and go, it might be difficult to make a diagnosis during a clinical evaluation.8 Disease phenotypes are not static but can change over time, therefore monitoring symptoms and adjustments to treatment are essential. In the absence of wheezing, a diagnosis of childhood asthma is quite improbable. Inflammation and restriction of the tiny airways cause wheezing, an expiratory high-pitched whistle. When a parent reports their child has a wheeze, it's important to get specifics about what they mean.10Diagnosing asthma in young children is difficult enough without having to contend with the widespread phenomenon of 'preschool wheeze. Many infants and young children wheeze, but not all of them go on to develop asthma. Asthma diagnoses should be revisited often to confirm the presence of the disease and adjust therapy accordingly.11 A positive reaction to an adequate trial of asthma medication is crucial for confirming the diagnosis. If children and adolescents with asthma appear during times of no symptoms, a clinical evaluation may be normal. Wheezing and the utilisation of respiratory accessory muscles are possible during acute bouts.12 Hyperinflation of the chest can be a symptom of both sudden illness and long-term conditions.

Etiology

Multiple disease activity patterns suggest that many genetic, microbiological, environmental, and age-related factors contribute significantly to the initiation, propagation, and, in many cases, resolution of the syndrome known as asthma, even though its cause has not been determined. (1, 2). In vulnerable individuals, asthma is the outcome of a complicated interplay between inflammatory cells, their mediators, the airway epithelium and smooth muscle, and the neurological system (5).

Genetics

Asthma has been associated to around 22 loci across 15 autosomal chromosomes. Consistent evidence suggests that asthma is associated with the IL-4 gene cluster on chromosome 5, which contains pro-allergic and proinflammatory genes. Additional chromosomal regions that may be involved are 5q31 (perhaps IL-12) (2, 6, 7).

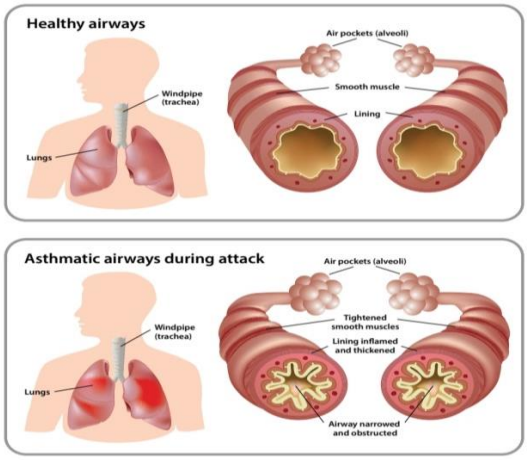
Environment

The common cold, the flu, the parainfluenza virus, and human metapneumovirus are just a few of the viruses linked to recurrent wheezing episodes in young children.

Clinical Findings

Some children, especially those with cough-variant asthma, may not exhibit wheezing despite it being the most prominent symptom of asthma. Shortness of breath and a persistent cough are other possible side effects. "chest congestion," persistent coughing, inability to exercise, shortness of breath (dyspnea), and recurring bouts of bronchitis or pneumonia are all symptoms. Even in the absence or modest presence of symptoms, a prolonged expiratory phase and wheezing may be heard on chest auscultation during forced expiration. Wheezing sounds increase in pitch and breath sounds

decrease as the severity of the blockage increases. When airflow is severely restricted, it may be impossible to detect a wheeze. Nostril flaring, retractions of the intercostal and suprasternal spaces, and the recruitment of the respiratory accessory muscles are all symptoms of severe blockage. You can get a dry mouth and dry, flushed skin. Lip and nail cyanosis may indicate a lack of oxygen in the body. In addition, tachycardia and pulsus paradoxus may develop. Possible symptoms of respiratory failure include restlessness and fatigue (9, 10).



Growth In Asthmatic Children

Understanding what constitutes "normal" infant development is crucial for early illness detection and prevention. Despite the inseparability of the two processes, "growth" is commonly understood to refer to the overall or localised expansion of the body, while "development" is reserved for alterations in physiologic function, including those influenced by the individual's emotional and social milieu (3, 11).

Despite their lack of specificity, deviations in development patterns are a crucial sign of a potentially life-threatening medical illness. They are frequently the earliest indicator of trouble, even in cases when adults already have suspicions. At each checkup, it's important to have an exact weight and height measurement (3). Long recognised that asthma itself can impede the growth (1), current attention in the growth of asthmatic children has focused on growth failure as a potential side effect of corticosteroid therapy. Sedentary lifestyle and persistent respiratory symptoms are two contributing factors to linear growth retardation in children with chronic perennial asthma (1).

In lesser cases, the allergic condition has little effect on height, but with increasing severity, there is impeded development and eventually delayed sexual maturation. Having the allergic condition under control was linked to better calorie intake and normal growth, while uncontrolled asthma was linked to stunted development. (12) Prepubertal growth and development are prolonged in those with asthma and maybe allergies in general. It's unlikely that something like this would have much of an impact on a person's height as an adult. One may assume that the reduced nocturnal growth hormone secretion in children with asthma who frequently experience nighttime symptoms and the resulting sleep disruption is related to the fact that (1) growth hormone therapy has no effect on the growth of children with asthma.(13) Asthma, like most systemic disorders, can affect appetite and energy supplementation, so it wouldn't be surprising if the diversion of energy resources to maintain the enhanced metabolic demands of increased work of breathing led to growth impairment in children with persistent asthma and an elevated basal metabolic rate.(14) Boys with moderate asthma whose symptoms improved before puberty were substantially larger and heavier than those with more severe

illness; there was a minor decrease in all growth parameters in connection with greater severity(15). It has also been hypothesised that a kid's delayed maturation and eventual attainment of a normal height may be an indicator that the youngster has severe asthma. (16)

TABLE 1-1: Early Childhood Risk Factors for Persistent Asthma (2)

Parental asthma
Allergy
Atopic dermatitis
Allergic rhinitis
Food allergy
Inhalant allergen sensitization
Severe lower respiratory tract infection
Pneumonia
Bronchiolitis requiring hospitalization
Wheezing apart from colds
Male gender
Low birthweight
Environmental tobacco smoke exposure

TABLE 1-2: Asthma Predictive Index for Children (2)

MAJOR CRITERIA	MINOR CRITERIA
Parent asthma	Allergic rhinitis
Eczema	Wheezing apart from colds
Inhalant allergen sensitization	Eosinophils ≥ 4%
	Food allergen sensitization

TABLE 1-3: Asthma Triggers (2)

❖ Common viral infections	❖ Environmental tobacco smoke	• Cleaning agents
❖ Animal dander	❖ Air pollutants	❖ Cold air, dry air
❖ Indoor allergens	• Ozone	❖ Exercise
• Dust mites	• Wood- or coal-burning smoke	❖ Crying, laughter, hyperventilation
• Cockroaches	• Endotoxin, mycotoxins	❖ Co-morbid conditions
• Molds	• Dust	• Rhinitis
❖ Seasonal aeroallergens	❖ Strong or noxious odors or fumes	• Sinusitis
• Pollens (trees, grasses&weeds) •seasonal molds	• Perfumes, hairsprays	• Gastroesophageal reflux

TABLE 1-4: Classification of Asthma Severity (2)

Classification	Step	Days With Symptoms	Nights With Symptoms	For Adults And Children Age > 5 Years Who Can Use A Spirometer Or Peak Flow Meter	
				FEV1 or PEF[*] % Predicted Normal	PEF Variability (%)
Severe persistent	4	Continual	Frequent	≤60	>30
Moderate persistent	3	Daily	>1/wk	>60–<80	>30
Mild persistent	2	>2/wk, but <1 time/day	>2/mo	≥80	20–30

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Mild intermittent	1	≤2/wk	<2/mo	≥80	<20

TABLE 1-5: stepwise asthma medications

❖ Step 1 - Mild intermittent
○ Treatment with short-acting inhaled bronchodilators only as needed
○ Systemic glucocorticoids for severe exacerbations
❖ Step 2 - Mild persistent
○ Treatment with daily low-dose inhaled glucocorticoids and short-acting inhaled bronchodilators as needed
○ Alternative daily therapy - Mast cell stabilizers (cromolyn or nedocromil) can be considered before inhaled steroids, especially in children.
❖ Step 3 - Moderate persistent
○ Treatment with daily low-to-medium–dose inhaled glucocorticoids. Combinations of inhaled CCS and LABA are extremely effective in step 3 asthmatics. All patients require short-acting bronchodilators as needed.
○ Alternate daily therapy - Increase inhaled glucocorticoids (to medium dose) or low-to-medium–dose inhaled glucocorticoids and either a leukotriene modifier or theophylline
○ Leukotriene synthesis inhibitors, such as zileuton
○ Allergy immunotherapy for appropriately selected patients
❖ Step 4 - Severe persistent
○ Treatment with daily high-dose inhaled glucocorticoids and daily long-acting inhaled beta-agonist and short-acting bronchodilators as needed
○ Additionally, if needed, oral glucocorticoids at lowest dose and for the shortest duration required for relief (<2 mg/kg/d, ie, <60 mg/d) or consider alternative or contributing diagnoses
○ Zileuton (may be helpful in some patients)
○ Omalizumab (anti-IgE), in allergic patients requiring high-dose inhaled or oral CCS

PATIENTS AND METHODS

Between March 1 and September 30, 2018, 75 children, aged 1 to 12, of both sexes, who were already diagnosed with asthma and had attended the hospital's outpatient clinic were included in a prospective case control study. As a comparison group, we used a sample of 75 children who were both healthy and well-matched in age and gender who visited an outpatient clinic for minor illnesses. For inclusion in the research, the patient must meet the following requirements.One-person-1-12-year-old age range.

Two, you need to have had more than one episode of reversible airway blockage (asthma) that required medical attention.Three, you must not be receiving steroid medication (not steroid dependent), as steroid treatment has its own influence on linear growth that we did not investigate. Interviews and a questionnaire tailored to the goals of the study (appendix 1) were used to compile the data. Patients' names, ages, sexes, places of residence, number of hospitalisations, daytime and nighttime symptoms, employment status, smoking habits, and parental education levels (educated; primary, secondary, or higher, or non educated; could not read or write) were also recorded. The same information was gathered for the control group, with the exception of asthma symptoms, asthma severity, and asthma treatment.

Patients were divided into three categories (2) based on the severity and duration of their daytime and nighttime symptoms:

Group 1: Mild asthma

- Mild intermittent : A- Daytime symptoms 2 or less per week
  B-Nocturnal symptoms 2 or less per month
- Mild persistent : A- Daytime symptoms more than 2 per week but not daily.
  B- Nocturnal symptoms more than 2 per month.

Group 2: Moderate asthma:

- Daily symptoms
- Nocturnal symptoms more than once per week

Group 3: Severe asthma:

- Continual daytime symptoms

- Frequent nocturnal symptoms

Then, we took each patient's midarm circumference, weight, and height. The youngsters in the control group were evaluated using the same scales. We used Seca scales (manufactured in Germany, ranging from 0.5 to 16 kilogrammes) to determine the weight of babies and toddlers, and Seca scales (ranging from 1 to 110 kilogrammes) to determine the weight of children older than two years old.

Children between the ages of one and two had their length determined by a supine measurement (England made, minimum 23.5 cm, maximum 113 cm). The measurement of the length required the use of two people. The infant's head rests with its back on the rear plate and its crown against the base plate. The legs were stretched out, and the foot plate was slid down to rest on the soles. Children between the ages of two and twelve had their heights measured by standing barefoot against a measuring scale with their backs supported while their heads were held in the frankfurter plane and a light upward pressure was applied on the mastoid. Stadiometer (manufactured in Germany by Seca; range: 75 cm to 200 cm) used for measurement. A specialised tape was used to measure the circumference of the left upper arm at midway, and the results were compared to age and gender percentiles. You may see some instances of these percentiles, sourced from the WHO, in Appendices 2 and 3. Growth charts for children (NCHS Percentile "NCHS") were used to make comparisons to actual findings.

The significance of the observed differences between patient and control groups was determined by applying statistical analysis to the findings using the Chi Square test and the Fisher Freeman Halton test.

Statistical analysis

The information was cleaned and analysed by SPSS (SPSS Inc., Chicago, IL, USA) version 21. Percentages and frequency counts were used to illustrate the outcomes. The 95% confidence interval was based on a p-value of less than 0.05, the threshold for statistical significance.

RESULTS

4.1. Age And Sex

The study showed that 30 of asthmatic patients about 40% were between one and four years and 27 of them about 36% between 5-8 years old, while 18(24%) were between 9-12 years old. Also the study showed that males were affected more than females 53(70%) compared with 22 (30%) respectively, male: female ratio is 2:1, as shown in table (4-1).

A corresponding number of the same age groups and sex were selected as a control group.

TABLE 4-1: The distribution of age and sex for both patients and controls.

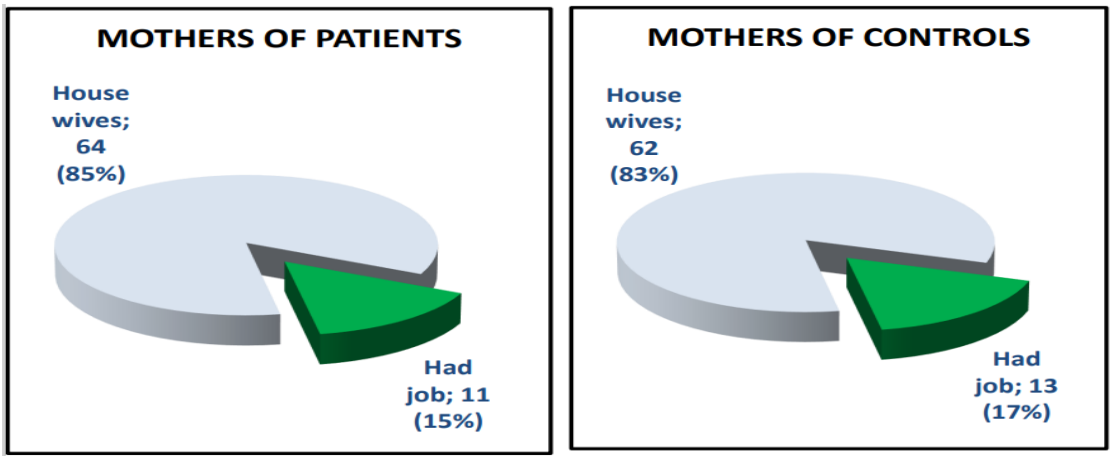
Age group(years)	**No. of patients**		**%**	**No. of controls**		**%**
1-4	30	Male: 22 Female: 8	40	30	Male: 22 Female: 8	40
5-8	27	Male: 21 Female: 6	36	27	Male: 21 Female: 6	36
9-12	18	Male: 10 Female: 8	24	18	Male: 10 Female: 8	24
Total	75		100	75		100

Age groups p. value 0.21(NS)

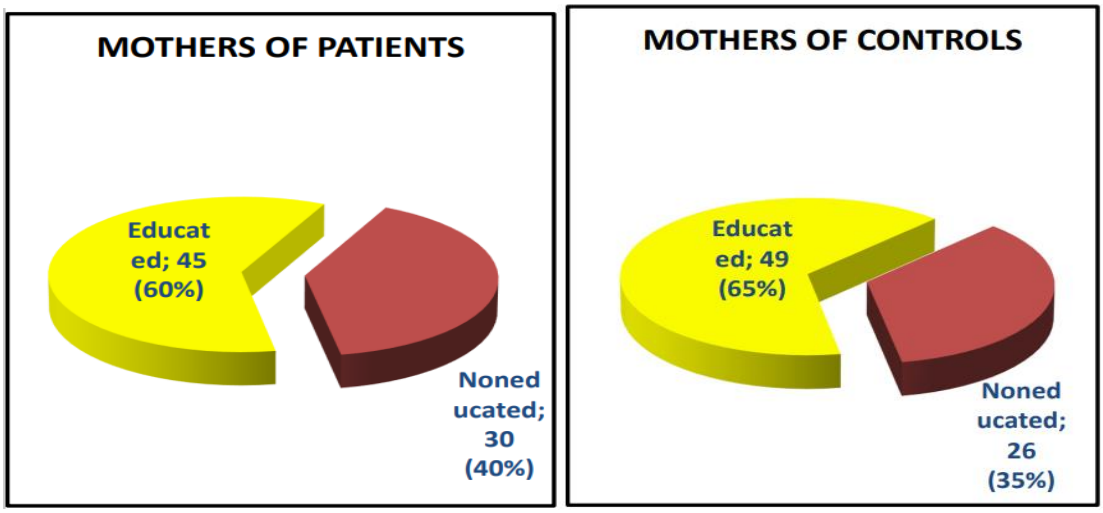
Male: female p. value <0.001(S) using Chi square test

4.2. Social And Economic Status

There was no significant difference between the social and economic status of both patients and controls. Sixty four (85%) of the mothers of patients and 62 (83%) of mothers of controls were housewives, all of them were not smokers, and 45 (60%) of mothers of patients were educated in comparison with 49 (65%) of mothers of controls. This was shown in figure 1 and figure 2.

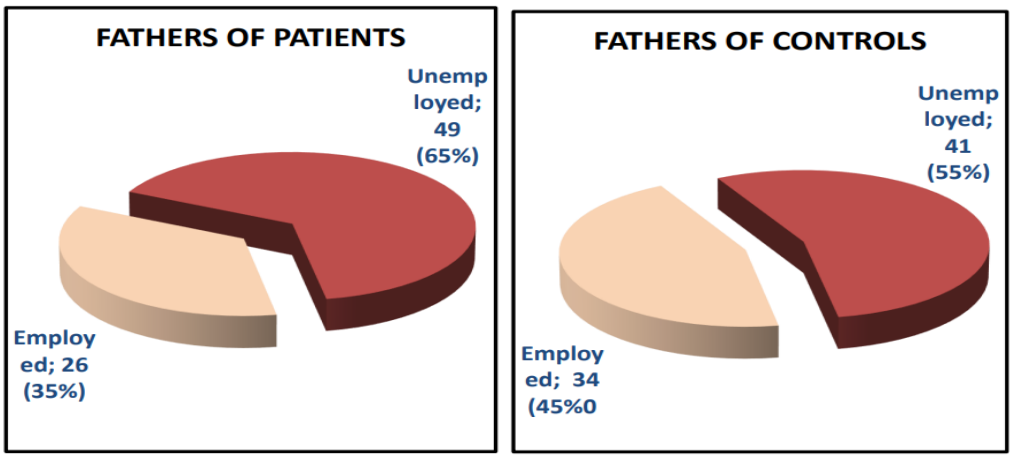


P. value 0.431 (NS) using Chi square test
FIGURE 1: Status of work of mothers



P. value 0.315 (NS) using Chi square test
FIGURE 2: Educational status of mothers

Regarding the fathers, the study showed that the majority were unemployed 49 (65%) of fathers of patients and 41 (55%) of fathers of controls. As shown in figures 3.



P. value 0.398 (NS) using Chi square test
FIGURE 3: Status of work of fathers

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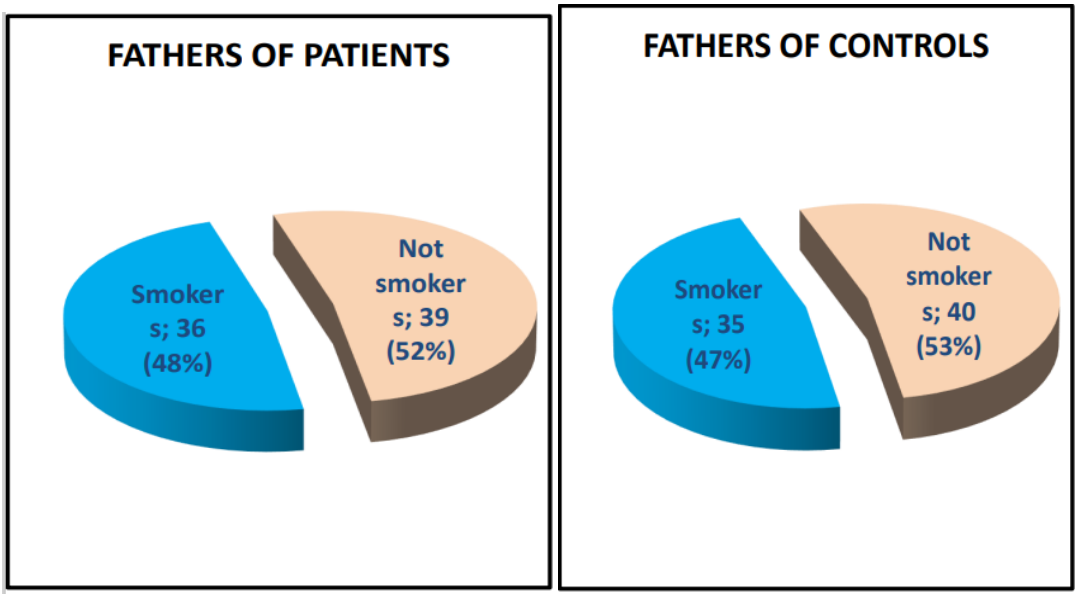
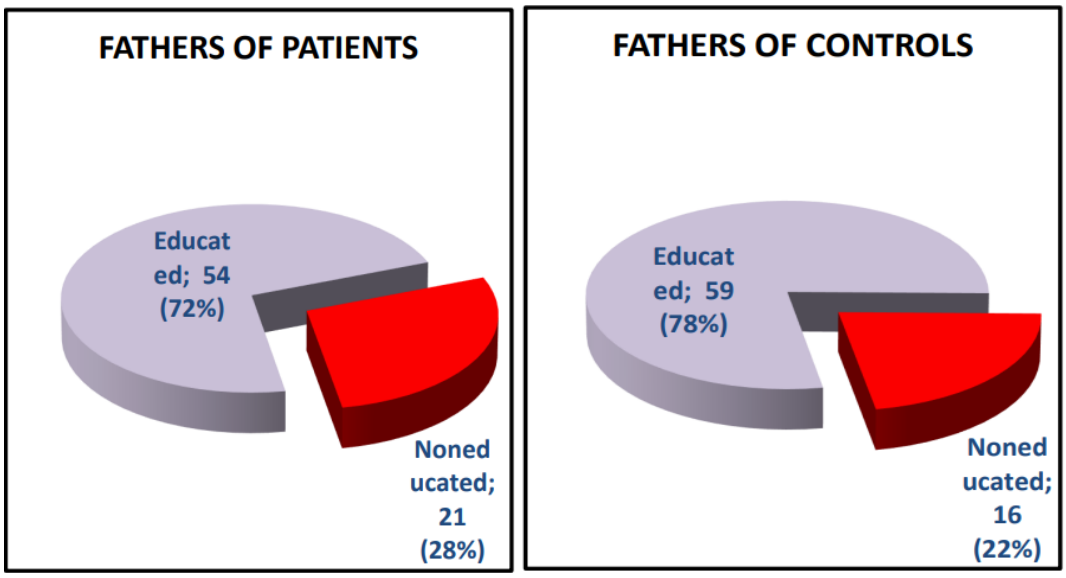
Concerning smoking history, 36 (48%) of patients fathers were smokers and 35 (47%) of controls fathers were so. As shown in figure 4.



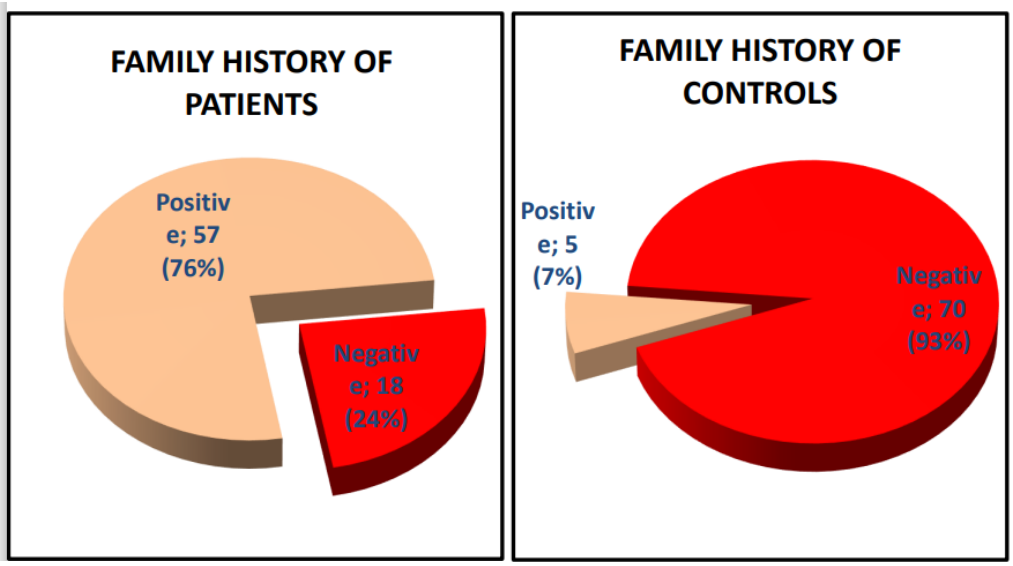
P. value 0.51 (NS) using Chi square test
FIGURE 4: Smoking history of fathers

The majority of fathers were educated, 54 (72%) of patients fathers were educated and 59 (78%) of controls fathers were so. As shown in figure 5.



P. value 0.416 (NS) using Chi square test
FIGURE 5: Educational status of fathers

Concerning the family history of asthma or atopy, most of asthmatic patients had positive family history57 (76%) in comparison to 5 (7%) only of controls, as shown in figure 6.



P. value <0.001 (S) using Chi square test
FIGURE 6: Family history of asthma or atopy

4.3.The Duration And Severity Of Asthma

Patients with duration of one or two years mostly have mild asthma,15 out of 21 (71.4%) and 11 out of 16 (68.7%) respectively, while those with five years or more duration tend to have moderate asthma 15 out of 23 (65.2%), as shown in table (4-2).

TABLE 4-2: The relation between duration and severity of asthma.

Severity of asthma	Duration					Total	
	1y	2y	3y	4y	5&more	No.	%
Mild	15	11	5	4	4	**39**	**52%**
Moderate	5	4	2	2	15	**28**	**37.3%**
Severe	1	1	1	1	4	**8**	**10.6%**
Total No.	**21**	**16**	**8**	**7**	**23 30.6%**	**75**	
%	**28%**	**21.3%**	**10.6%**	**9.3%**			**100%**

P. value <0.001(S) using Fisher Freeman Halton test

4.4.Weight

The weight of both the patients and controls was affected, but the asthmatic patients were affected more than the controls. There were only 21 (28%) of patients within the mean (50th percentile) and 41 (55%) were below the mean and only 13 (17%) were above.

Regarding the controls, 30 (40%) were within the mean, 27 (36%) below and 18 (24%) above the mean. As shown in table (4-3).

TABLE 4-3: Weight percentile of patients and controls.

Wt. percentile	Patients		Controls	
	No.	%	No.	%
>95th	0	0	1	1.3
95th	1	1.3	2	2.6
90th	3	4	2	2.6
75th	9	12	13	17.3
50th	21	28	30	40
25th	9	12	8	10.6

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10th	10	13.3	7	9.3
5th	12	16	6	8
<5th	10	13.3	6	8

P <0.001(S) using Fisher Freeman Halton test

4.5.Height Or Length

The height or length for both patients and controls were affected, but those of patients affected more. Only 17 (22.6%) of patients were within the mean, while 44 (58.6%) below and only 14 (18.5%) above the mean. Concerning the control group, 32 (42.6%) were within the mean, 19 (25.3%) above and 24 (32%) below the mean as shown in table (4-4).

TABLE 4-4: Height or length percentiles of patients and controls.

Ht. or length percentile	Patients		Controls	
	No.	%	No.	%
>95th	0	0	0	0
95th	1	1.3	3	4
90th	5	6.6	6	8
75th	8	10.6	10	13.3
50th	17	22.6	32	42.6
25th	12	16	9	12
10th	13	17.3	7	9.3
5th	10	13.3	4	5.3
<5th	9	12	4	5.3

P <0.001(S) using Fisher Freeman Halton test

4.6.Midarm Circumference

The study showed that the midarm circumference was affected almost evenly in both groups, patients and controls.

Regarding the patients, 25 (33.3%) were within the mean, 37 (49.3%) below and only 13 (17.3%) above the mean.

While in control group, 26 (34.6%) were within the mean, 33 (44%) below and only 16 (21%) above the mean as shown in table (4-5).

TABLE 4-5: Midarm circumference percentiles of patients and controls.

Midarm circumference percentile	Patients		Controls	
	No.	%	No.	%
99th	0	0	0	0
97th	0	0	1	1.3
95th	1	1.3	2	2.6
85th	2	2.6	2	2.6
75th	10	13.3	11	14.6
50th	25	33.3	26	34.6
25th	9	12	11	14.6
15th	12	16	9	12
5th	5	6.6	6	8
3rd	7	9.3	4	5.3
1st	4	5.3	3	4

P <0.001(S) using Fisher Freeman Halton test

4.7.The Duration Of Asthma

4.7. A.Weight With Duration Of Asthma

Weight had a strong relationship with the duration of the disease where 5 out of 21 (24%)

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of patients with one year duration of the disease were below the 50th percentile, while 4 out of 8 (50%) of those with three years duration were below the 50th percentile and 20 out of 23 (87%) of those with five years or more duration were so. As shown in table (4-6).

TABLE 4-6: The relation between wt. percentiles of the patients and the duration of asthma.

Wt. percentile	Duration					Total	
	1y	2y	3y	4y	5&more	no.	%
>95th	0	0	0	0	0	0	0
95th	1	0	0	0	0	1	1.3
90th	1	2	0	0	0	3	4
75th	5	1	1	0	2	9	12
50th	9	6	3	2	1	21	28
25th	3	1	1	1	3	9	12
10th	1	2	2	1	4	10	13.3
5th	1	3	1	1	6	12	16
<5th	0	1	0	2	7	10	13.3
Total	**21**	**16**	**8**	**7**	**23**	**75**	**100**

P <0.001(S) using Fisher Freeman Halton test.

4.7. B. Height Or Length With Duration Of Asthma

The study showed that the more prolonged the disease, was the more height or length retardation. There were 7 out of 21 (33.3%) of patients with one year duration of asthma with height or length below the mean, while 4 out of 8 (50%) of those with three years duration were below the mean and 20 out of 23 (87%) of those with five years or more were so. This was shown in table (4-7).

Table 4-7: The relation between height or length percentiles of the patients and the duration of asthma.

Ht. or length percentile	Duration					Total	
	1y	2y	3y	4y	5&more	no.	%
>95th	0	0	0	0	0	0	0
95th	1	0	0	0	0	1	1.3
90th	3	1	1	0	0	5	6.6
75th	4	2	1	1	0	8	10.6
50th	6	4	2	2	3	17	22.6
25th	3	5	1	1	2	12	16
10th	3	2	2	1	5	13	17.3
5th	1	1	1	1	6	10	13.3
<5th	0	1	0	1	7	9	12
Total	**21**	**16**	**8**	**7**	**23**	**75**	**100**

P <0.001(S) using Fisher Freeman Halton test

4.7. C. Midarm Circumference With Duration Of Asthma

The study showed that midarm circumference was directly proportional to the duration of asthma, where 5 out of 21 (24%) of patients with one year history of the disease were below the mean percentile, while 4 out of 8 (50%) of those with three years history were below the mean and 16 out of 23 (70%) of those with five years or more history were below the mean, as shown in table (4-8).

TABLE 4-8: The relation between the midarm circumference percentiles and the duration of asthma.

Midarm circumference	Duration					Total	
	1y	2y	3y	4y	5&more	no.	%
99th	0	0	0	0	0	0	0
97th	0	0	0	0	0	0	0
95th	1	0	0	0	0	1	1.3
85th	1	1	0	0	0	2	2.6
75th	5	2	1	1	1	10	13.3
50th	9	5	3	2	6	25	33.3
25th	3	2	1	1	2	9	12
15th	1	3	2	1	5	12	16
5th	1	0	0	1	3	5	6.6
3rd	0	2	1	0	4	7	9.3
1st	0	1	0	1	2	4	5.3
Total	**21**	**16**	**8**	**7**	**23**	**75**	**100**

P <0.001(S) using Fisher Freeman Halton test

4.8. The Severity Of Asthma

4.8. A. Weight With Severity Of Asthma

There were 15 out of 39 (38%) of patients with mild asthma had weight percentiles below the mean, while 20 out of 28 (71%) of those classified as having moderate asthma were below the mean and 6 out of 8 (75%) of patients with severe asthma were so, with no great difference from those with moderate disease, as shown in table (4-9).

TABLE 4-9: The relation between the wt. percentiles and the severity of asthma.

Wt. percentile	Mild	Moderate	Sever	Total	
				No.	%
>95th	0	0	0	0	0
95th	1	0	0	1	1.3
90th	2	1	0	3	4
75th	6	2	1	9	12
50th	15	5	1	21	28
25th	5	4	0	9	12
10th	4	5	1	10	13.3
5th	4	6	2	12	16
<5th	2	5	3	10	13.3
Total	**39**	**28**	**8**	**75**	**100**

P <0.001(S) using Fisher Freeman Halton test

4.8. B. Height Or Length With Severity Of Asthma

The results showed that 18 out of 39 (46%) of patients having mild asthma were below the mean, while 19 out of 28 (68%) of those with moderate disease were so and 7 out of 8 (88%) of patients with severe asthma were below the mean, as shown in table (4-10)

TABLE 4-10: The relation between height or length percentiles and the severity of the disease.

Ht.or length percentile	Mild	Moderate	Sever	Total	
				No.	%
>95th	0	0	0	0	0
95th	1	0	0	1	1.3
90th	4	1	0	5	6.6
75th	6	2	0	8	10.6

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50th	10	6	1	17	22.6
25th	7	4	1	12	16
10th	7	5	1	13	17.3
5th	3	5	2	10	13.3
<5th	1	5	3	9	12
Total	**39**	**28**	**8**	**75**	**100**

P <0.001(S) using Fisher Freeman Halton test

4.8. C. Midarm Circumference With Severity Of Asthma

The study showed that 15 out of 39 (38%) of patients with mild asthma were below the mean midarm circumference percentile. While there was no great difference between patients with moderate asthma 17 out of 28 (61%) below the mean and those with severe disease 5 out of 8 (63%) below the mean, as shown in table (4-11).

TABLE 4-11: The relation between MAC percentiles and the severity of asthma

Midarm circumference	**Mild**	**Moderate**	**Sever**	**Total**	
				No.	**%**
99th	0	0	0	0	0
97th	0	0	0	0	0
95th	1	0	0	1	1.3
85th	1	1	0	2	2.6
75th	6	3	1	10	13.3
50th	16	7	2	25	33.3
25th	5	4	0	9	12
15th	6	6	0	12	16
5th	2	2	1	5	6.6
3rd	1	4	2	7	9.3
1st	1	1	2	4	5.3
Total	**39**	**28**	**8**	**75**	**100**

P <0.001(S) using Fisher Freeman Halton test

DISCUSSION

53 (70%) of our patients were males, (p0.001), and our findings were consistent with those of other studies, including those by Aws Hazim in 2005(11), where the male percent in his study was 71%; Kalyoncu AF, Selcuk ZT in 1999(12), where 73% of the patients were males; and Sabah Hasan in 1998(13), where 62% of the patients were males.

The majority of our patients (n = 30; 40%) were between the ages of 1 and 4 years old, which is in line with the findings of Aws Hazim(11) (1-5 years were 47%), Sabah Hasan(13) (1-4 years were 55%), and Ziad khalil(1997).

The study found no statistically significant difference in socioeconomic position between the study group and the control group.

In accordance with Sabah Hasan(13)(92%), 64 (85%) of the mothers of patients and 62 (83%) of the mothers of controls were stay-at-home moms; however, only 45 (60%) of the mothers of patients had any level of formal education, while 49 (65%) of the mothers of controls did. The country's predicament during the past two decades may account for this variation.

In contrast to two studies, one by FRANK D. GILLILAND in 2001(14) (27% of mothers smoked) and the other by RI Ehrlich, D. Du Toit in 1996(15) (21% of mothers smoked), our study found that none of the mothers had smoked in the past, which I attribute to differences in community cultural issues and religious beliefs.

While Sabah Hasan claims that eighty percent of the population is working, our research shows that the vast majority of dads are not; 49 (65%) of fathers of patients and 41 (55%) of fathers of controls. Furthermore, 54 (72%) of patient dads were college-educated, compared to 59 (78%) of control fathers, and 36 (48% of both groups) of patient fathers were smokers. This final percentage was also lower than in Sabah Hasan

(94% educated), which may be attributable to the country's precarious political and economic situation, but is consistent with data from Wilson SR. 2001 (52% smokers and 83% educated).

An key risk factor for the development of paediatric asthma was shown to be a positive family history of asthma or atopy, with 57 (76%) asthmatic patients having a positive family history compared to just 5 (7%) controls. Consistent findings were also found in tests conducted by Aws Hazim(11) (72% positive), Lundback B. (69%) in 1998, Mohamed E. (67% in 1999), and R. Ronchetti and M.P. Villa (74% in 2001).

In terms of illness severity, almost half of the patients presented with only moderate asthma. 39 (52%), 28 (37.3%), and 8 (10.6%) had mild, moderate, or severe disease, respectively. Asthma also appears to be more severe the longer it has been present; that is, a clear correlation was shown between asthma severity and asthma chronicity (p0.001). Similar findings were reported by Sabah Hasan (53.3% mild, 36.6% moderate, and 10% severe) in 1998(13) and Ziad khalil (1997).

Both the patients and the controls saw their weights go up and down, but the patients with asthma saw greater swings. Our findings, in which 41 (55%) of our patients were below the mean compared to 27 (36%) of the control group (p0.001), were consistent with those of Sabah Hasan (50% of his patients were below the mean) and Maria Angela (2003) (49%), and provided the best explanation. The severity of weight loss or gain coincided with the chronicity of the underlying condition. Five patients (24%) with a disease duration of one year were below the 50th percentile, four patients (50%) with a disease duration of three years, and twenty patients (87%) with a disease duration of five years or more were below the 50th percentile (p 0.001). There appeared to be a clear correlation between the degree of the disease and the occurrence of weight retardation, albeit there was nothing to differentiate individuals with moderate disease from those with severe disease. There were 15 patients with mild asthma (38%) who had weight percentiles below the mean, 20 patients with intermediate asthma (71%), and 6 patients with severe asthma (75%), (p 0.001). Similar findings were reported by Sabah Hasan in 1998(13) and Maria Angela 2003(44).

In terms of stature, 44 patients (58.6%) fell short of the median compared to just 24 controls (32%; p 0.001). Sabah Hasan in 1998(13) found that 58% of his patients were below the mean, and Maria Angela in 2003 (53%).Seven (33.3%) of patients with a duration of asthma of one year were found to have height or length below the mean, compared to 4 (50%) of those with a duration of asthma of three years, and 20 (87%) of those with a duration of asthma of five years or more (p 0.001). Once again, the severity of the illness correlated with the degree of growth delay. Eighteen patients with mild asthma (46%), nineteen with intermediate illness (68%), and seven with severe asthma (88%), all had values below the mean (p 0.001). There was agreement between their findings and those of Maria Angela (2003), Sabah Hasan (1998)(13), and Sant'Anna CA (1996).

In terms of midarm circumference, the impact was nearly same across the two groups: 37 patients (49.3% of the total) and 33 controls (44%) were below the mean (p 0.001). Midarm circumference values, like those for height and weight, were inversely related to asthma severity with time. Five patients (24%) with a 1-year disease history, four patients (50%) with a 3-year disease history, and sixteen patients (70%) with a 5-year disease history or longer were below the mean percentile (p 0.001). Similarly to how weight loss correlates with illness severity, midarm circumference retardation does as well, however there is nothing to differentiate individuals with moderate disease from those with severe disease. Fifteen (38% of the sample) individuals with mild asthma, seventeen (61% of the sample), and five (63%) patients with severe illness had midarm circumferences below the mean (p 0.001).

Mid-arm circumference was not used as a growth criterion in any research assessing children with asthma.

CONCLUSION

The results of this investigation show that: 1) Asthma affects development across the board, including body mass index, height, and upper arm circumference.

2) There is a strong correlation between the rate of expansion and the persistence and intensity of the disease.

Asthma severity can be measured in part by the presence of growth deficiency.

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4) A history of asthma or atopy in the family is a strong predictor of the disease in offspring.

RECOMMENDATIONS

1. provide the family with information on the disease and its symptoms, as well as a thorough explanation of the diagnosis and treatment options.
2. Paediatricians' prompt diagnosis, which allows for effective treatment and illness management.
3. To prevent any growth retardation, patients should be monitored as they would be for any chronic condition by repeated monitoring of growth parameters.
4. The severity of growth retardation can be mitigated by encouraging patients with asthma to maintain a healthy nutritional status, which is essential for optimal growth.

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