Ain Shams University

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Study of Intelligence Quotient and Behavioral Affection In Children Suffering From Some Chronic Diseases at Primary School Age

Thesis

Submitted for Fulfillment of PhD in childhood Studies

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بسم الله الرحمن الرحيم

(وَأَنْزَلَ اللهُ عَلَيْكَ الْكِتَابَ وَالْحِكْمَةَ وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ وَكَانَ فَضْلُ اللهِ عَلَيْكَ عَظِيمًا)

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LIST OF ABBREVIATIONS

Abbrev.	Meaning
BA	Bronchial asthma
EIA	Exercise induced asthma
HS	Highly significant
NS	Non significant
S	Significant
GINA	Global initiative of asthma
RRR	Relative risk ratio
CD	Conduct disorder
SA	Socialized aggression
AP	Attention problems
AW	Anxiety withdrawal
PB	Psychotic behavior
ME	Motor excess
IQ	Intelligence Quotient
WHO	World Health organization
PEF	Peak expiratory flow
FEV1	Forced expiratory volume at 1second
PEFR	Peak expiratory flow rate
RSV	Respiratory synsitial virus
TLC	Total lung capacity
P"EF	Peak expiratory flow
RV	Residual volume
FRC	Functional residual capacity

LIST OF ABBREVIATIONS (Cont...)

Abbrev.	Meaning
ARF	Acute rheumatic fever
GABHS	Group A Beta hemolytic streptococci
CHF	Congestive heart failure
NSAID	Non steroidal anti-inflammatory drugs
PSRA	Post streptococcal reactive arthritis
ESR	Erythrocyte sedimentation rate
CRP	C-reactive protein
ASO	Anti streptolysin O
ADHD	Attention deficit hyper activity disorder
WAIS	Wechsler adult intelligence scale
WISC	Wechsler intelligence scale for children
RHD	Rheumatic heart disease
GAS	Group A streptococci
ACE	Angiotensin converting enzyme

ABSTRACT

Introduction: Bronchial asthma and rheumatic fever are common chronic diseases of childhood, they can affect the behavior and intelligence of the children.

Objectives: To assess any deterioration of behavior and intelligence quotient in school aged children suffering from bronchial asthma and rheumatic heart disease.

Design: Case control study carried out in eh period from August 2006 to August 2008 in the outpatient clinic of Ain Shams University hospitals. Sample included 200 subject in the age of 6-12 years. Child behavior checklist and draw and man test were used in this study to detect behavioral disorders and IQ scores.

Results: 16% of bronchial asthma patients are of IQ less than 90 conduct disorder is present in 6% of asthmatic patients, socialized aggression in 12%, motor excess in 20%, anxiety in 14%, psychotic behavior 8% and attention problems in 22% regarding the rheumatic fever group. 10% of them had IQ scores less than 90, conduct disorder is present in 12%, socialized aggression in 8%, motor excess in 20%, anxiety in 18%, psychotic behavior in 10% and attention problems in 16%.

Conclusions: Bronchial asthma and rheumatic fever are at more risk for some behavioral disorders than control group.

Key words: Bronchial asthma – Rheumatic fever – IQ – Behavior disorders – Conduct disorder – Anxiety motor excess attention problems – socialized aggression – psychotic disorder.

Introduction

INTRODUCTION

The population of children seeking health care is rapidly growing. The prevalence of chronic conditions among such children range from 44% to 82% ***(Jee et al., 2006).***

Chronic disease generally is one that has lasted or is expected to last more than a definite period of time usually 3 months or longer ***(Ellen et al., 1993).***

In spite of the great progress in the diagnosis and treatment of these diseases, psychological developmental studies of children with chronic illness have not kept pace with other medical advances ***(Cook et al., 1994).***

Asthma is by far the commonest of all chronic diseases of childhood; its prevalence has increased dramatically in recent years ***(Sigari et al., 2007).***

Asthma is rapidly growing chronic disease in the general population mostly in children. Up to 10% of adults and 35% of children worldwide suffer from asthma ***(Seguinot et al., 2006).***

Asthmatic children had no marked behavioral and cognitive dysfunction if the level of the disease is mild to moderate but when the disease is severe there is marked behavioral and cognitive problems e.g., social withdrawal, depression, educational problems and language dysfunction ***(El Defrawi et al., 2000).***

Rheumatic fever is no longer a significant health problem in most socioeconomically advanced countries but it still causes 25-40% of all cardiovascular disease in the world ***(Lennon, 2004).***

Rheumatic heart disease poses a major challenge to public health and is the most prevalent heart disease in children. The major determinants of rheumatic fever and rheumatic heart disease are poverty, malnutrition, over crowding, poor housing and a shortage of health care resources. Although post effective strategies for the prevention and control of the diseases are available, they remain under utilized in most developing countries ***(World Health Organization, 2004).***

Intelligence quotient or IQ is a number intended to represent a measure of relative intelligence as determined by the subject's responses to a series of test problems. The IQ was originally computed as the ratio of a person's mental age to his or her chronological (physical age, multiplied by 100 ***(Shuttleworth et al., 2004).***

Behavior is the aspect of psychic that's include impulses, motivations, wishes, drives, instincts and cravings as expressed by a person behavior or motor activities ***(Halmi, 2000).***

Aim of the Work

AIM OF THE STUDY

This study aims to assess deterioration of behavior and intelligence quotient in school aged children suffering from bronchial asthma and rheumatic heart disease in comparison to normal sex and age matched healthy controls.

Review of Literature

1. BRONCHIAL ASTHMA

1.1 Definition

Asthma is a disease in which smooth muscle dysfunction and airway inflammation combine to result in airflow obstruction and airways hyperresponsiveness ***(Cavallies et al., 2008).***

A definition for asthma has been developed that recognizes this disorder to be a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role, in particular, mast cells, eosinophils, T lymphocytes, neutrophils and epithelial cells. In susceptible individuals, this inflammation causes recurrent episodes of wheezing, breathlessness, chest tightness, and cough, particularly at night and/or in the early morning. These episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment ***(Lemanske et al., 2003)***.

1.2 Epidemiology

1.2.1 Incidence and prevalence of asthma

Worldwide, 130 million people have asthma. The prevalence is 8-10 times higher in developed countries (e.g., United States, Great Britain, Australia and New Zealand) than in the developing countries. In developed countries, the prevalence is higher in low income groups in

urban areas and inner cities than in other groups ***(Sigari et al., 2007)***.

In the United States: Approximately 17.3 million Americans have asthma. The prevalence of asthma in the general population is 5%, and it has increased 40% in the past decade. Asthma accounts for more school absences and more hospitalizations than other chronic illness. In most children's hospitals in the United State, it is the most common diagnosis at admission ***(Girish, et al., 2005).***

Palestinian children have asthma symptoms rates that are similar to several countries in the Mediterranean region such as Spain and Turkey, but still lower than other Middle East countries such as Saudi Arabia and Israel. ***(El-Sharif, et al., 2003).***

In Egypt, 23.2% of wheezy infants were proved to be real asthmatics. Asthma prevalence among school children aged 5-15 years was found to be 8.2%, half of which are graded as moderate and severe. ***(El Lawindi et al., 2003).***

1.2.2 Asthma risk factors

Asthma cannot be cured, but could be controlled. The strongest risk factors for developing asthma are exposure - especially in infancy – to indoor allergens (such as domestic mites in bedding, carpets, and stuffed furniture,

cats and cockroaches) and a family history of asthma or allergy ***(WHO, 2003).***

Environmentally, asthma can be triggered by exercise, abrupt weather changes, and exposure to allergens, infectious agents, and airway irritants ***(Patricia, et al., 2003).***

In the following few pages various risk factors will be discussed in details :

1.2.2.1 Age:

More than half of all cases of present asthma begin before the age of 3 years, and 80% have symptoms before the age of 5 years. ***(Fousnight et al., 2002).***

Children, in whom wheezing begins early, in conjunction with allergies, are more likely to have wheezing when they are aged 6 to 11 years. Similarly, children in whom wheezing begins after they are aged 6 years often have allergies, and the wheezing is more likely to continue after they are 11 years. ***(Girish, et al., 2005).***

1.2.2.2 Gender:

Before puberty, the prevalence is 3 times higher in boys than girls. The prevalence is equal among males and females during adolescence. Adult-onset asthma is more common in women than in men. ***(Girish, et al., 2005).***

The predominance of male cases early in life may reflect male-female difference in patterns of lung growth and maturity susceptibility to infections among boys, and sex differences in exposure to environmental risk factors.

1.2.2.3 Genetic:

Asthma is what is known as a "complex" heritable disease. This means that there is a number of genes that contribute towards a person's susceptibility to a disease, and in the case of asthma, chromosomes 5, 6, 11, 14, and 12 have all been implicated ***(Liu, et al., 2004).***

The relative roles of these genes in asthma predisposition are not clear, but one of the most promising sites for investigation is on chromosome 5. Although a gene for asthma from this site has not yet been specifically identified, it is known that this region is rich in genes coding for key molecules in the inflammatory response seen in asthma, including cytokines, growth factors, and growth factors receptors ***(American lung association, 2004).***

1.2.2.4 Infections:

Harfi (2001) stated that, very often the first episode of bronchial asthma is attributed to respiratory syncytial virus, parainfluenza, or adenovirus infection. If an infant wheezes with the first episode of viral infection, his or her

chances of developing asthma are about 5% if the family history is negative for atopy. There is evidence that viral infections in early childhood may also act on the immune system to modify the subsequent risk of asthma ***(Gern and Lemanske, 1999).***

1.2.2.5 Allergen Exposure:

The evidence for risk factors with direct role in asthma causation is house dust mites' allergens ***(Peat and Li, 1999).***

Bedding, especially the mattress and pillows are major allergens sources. In Cairo it was found that one gram of bedding dust contains 2000 – 3000 mites.

Cockroach allergen exposure might be more common in suburban middle-class homes of asthmatic children. Moreover, the data suggest that low-level cockroach exposure is a risk factor for cockroach sensitization ***(Matsui et al., 2003).***

Cockroach allergen has been identified as a major trigger for asthma, but ridding the home of cockroach allergen is difficult ***(El-Gamal et al., 1995, Solomon and Platts, 1998).***

Once sensitized, inner-city cockroach-sensitive asthmatic children with continued exposure to high levels of cockroach allergen in their bedrooms are at higher risk

for urgent care visits and hospitalization than inner-city asthmatic children who are not allergen to cockroaches. ***(Atkins and Leung, 2004).***

1.2.2.6 Atopy:

Atopy, defined as the production of abnormal amounts of IgE antibodies in response to contact with environmental allergens, is demonstrated by increased total or specific serum IgE and by a positive response to skin prick test using a battery of standardized allergens, specific to each geographic zone. Atopy appears to be an important host factors that predisposes individuals to developing asthma ***(Leung, 2004).***

Atopy is common, affecting about one in three, with about one in six having symptomatic atopy, and about one in 12 having atopic asthma; the prevalence will be proportionately higher in populations with a higher prevalence of atopy ***(Barnes, 2002).***

1.2.2.7 Region of Residence:

Movement from a rural to an urban area appears to increase substantially the likelihood of developing childhood asthma. These increases suggest that environmental factors have provoked expression of asthma symptoms in susceptible individuals in the new region. ***(British Guideline of Pediatric BA, 2004).***

Asthma is more common among children with low socioeconomic status. The socioeconomic status of families may rather be a measure for life style characteristics. These factors may compromise dietary habits, family size, access to health care, environmental tobacco smoke, allergen exposure, or other yet unknown determinants ***(Von-Mutius, 2000).***

Multiple family characteristics are associated with pediatric asthma onset and outcomes. Behavioral and physiological mechanisms may act independently or may interact to affect asthma manifestations. Families with specific emotional characteristics may be at an elevated risk for proper asthma outcomes ***(Kaugars et al, 2004).***

1.2.2.8 Breast – feeding & diet:

Breastfeeding might delay the onset of asthma or actively protect children less than 24 months of age against asthma. Breastfeeding might reduce the prevalence of asthma in children exposed to environmental tobacco smoke ***(Patricia, et al., 2003).***

Children who eat fish regularly may consume adequate amounts of omega-3 fatty acids, protecting them from bronchial hyper-responsiveness. Low levels of intake of vitamin C, which functions as antioxidant and coenzymes in the biosynthesis of collagen, have furthermore been to relate to increased prevalence and

incidence of asthma and to lower levels of lung function. ***(Von-Mutius, 2000).***

1.2.2.9 Maternal Diet:

There is evidence supporting the concept that allergen sensitization can occur in utero. Sensitization in utero via traces of antigenic proteins that circulate in the maternal circulation cross the placenta and sensitize fetal lymphocytes, yet positive responses do not necessarily indicate allergy, and these activated lymphocytes will be cells involved in tolerance ***(Gern and Lemanske, 1999).***

1.2.2.10 Exercise-Induced Asthma:

Exercise-Induced Asthma (EIA) is very common, and often overlooked. In asthmatic children, significant symptoms (e.g., cough, chest tightness, wheezing, dyspnea are noted following exercise in approximately 90%, although abnormal pulmonary function tests can be found in nearly 100%. In atopic children, the incidence of Exercise-induced asthma has been estimated to be as high as 10% ***(Wilmott, et al., 2002).***

EIA is the term used to describe the transient reduction in lung function that occurs after vigorous exercise ***(Anderson, 2002).***

EIA is a condition of respiratory difficulty that is triggered by aerobic exercise lasting several minutes. This

condition is related to histamine release. A3-10% incidence of EIA is seen in the population. ***(Saglimbeni, 2005).***

1.2.2.11 Environmental tobacco smoke exposure:

There is strong consistent evidence suggesting that environmental tobacco smoke exposure increases the risk of lower respiratory tract illness in infancy and childhood.

Passive smoking is casually associated with an increased risk of lower respiratory tract infections, does dependent reduction in pulmonary function, and with additional episodes and increased severity of symptoms in children with asthma. Furthermore, environmental tobacco smoke was considered to be a risk factor for the inception of new cases of asthma in children not previously displaying symptoms ***(Von-Mutius, 2000).***

1.2.2.12 Maternal cigarettes smoking:

The effects of cigarettes smoking on fetal pulmonary development are multiple, smoking causes lower birth weights and corresponding reduction in lung size, and small lung size has been identified as a risk factor for lower respiratory illnesses in infancy. In addition to decreasing lung size, in utero exposure to tobacco smoke has been shown to reduce newborn lung functions. ***(Gern and Lemanske, 1999)***

1.2.2.13 Birth weight:

Low birth weight is strongly associated with early childhood asthma. The high prevalence of very low birth weight infants among African Americans may contribute to the excess prevalence in this population ***(Mc Bride, 2001).***

1.2.2.14 Irritants:

Tobacco smoke, cold air, chemicals, perfume, paint odors, hair sprays, air pollutants, and ozone can initiate bronchial hyper-responsiveness by inducing inflammation. ***(Girish et al., 2005).***

El Saify et al. (2000), stated that children living in polluted areas were more prone exposed to suffer from recurrent chest infection. Pulmonary function in school age children is affected by the level of air pollution.

1.2.2.15 Seasonal asthma:

In some sensitized individuals, asthma may be exacerbated by seasonal increases in specific aero allergens. Examples include birch pollen and ragweed. Seasonal asthma is usually associated with allergic rhinitis. This type of asthma may occur intermittently, with the patient being entirely asymptomatic between seasons, or it may occur as a seasonal worsening of asthma symptoms in patient with moderate to severe asthma. ***(GINA, 2005).***

1.2.2.16 Drug-Asthmatogenic agent:

- β-blocker.
- Aspirin.
- Zanamivir.

10 – 30% of asthmatics are intolerant to aspirin. Aspirin ingestion in asthmatics leads to sudden onset of bronchospasm, rhinitis and/or urticaria. Those patients are also intolerant to non-steroidal anti-inflammatory drugs ***(Saglimbeni, 2005).***

Table (1): Potential Risk Factors for Asthma

HOST FACTORS
• Genetic predisposition • Atopy • Airway obstruction • Gender • Race/ethnicity
ENVIRONMENTAL FACTORS
Factors that influence the susceptibility to the development of asthma in predisposed individuals
Indoor allergens • Domestic mites • Animal allergens • Cockroach allergen • Fungi, molds, yeasts Outdoor allergens • Pollens • Fungi, molds, yeasts Occupational sanitizers • Tobacco smoke • Passive smoking • Active smoking Air pollution • Outdoor pollutants • Indoor pollutants Respiratory infections • Hygiene prosthesis
Parasitic infections Socioeconomic status Family size Diet and drugs Obesity
Factors that precipitate asthma exacerbations and/or cause symptoms to persist:
Indoor and outdoor allergens Indoor and outdoor air pollutants Respiratory infections Exercise an hyperventilation Weather changes Sulfur dioxide Foods, additives, drugs Extreme emotional expression Tobacco smoke (active and passive) Irritants such as household sprays, paint fumes

(GINA, 2005)

1.3 Morbidity and mortality

In the US, asthma morbidity and mortality are particularly high in African-American children. Asthma hospitalization and death rates are more than three times higher in black versus white Americans. A combination of biologic, environmental, economic, and psychosocial risk factors is believed to increase the likelihood of severe asthma exacerbations for ethnic minority asthmatics living in US "Inner-city" low-income communities ***(Liu et al., 2004).***

1.4 Pathogenesis of bronchial asthma

Various mechanisms interact to produce airway inflammations, these depend on neural, cellular, and humoral factors ***(Holgate and Davies, 2003).***

Airway obstruction causes increased resistance to airflow and decreased expiratory flow rates. These changes lead to a decrease ability to expel air and may cause hyperinflation. The resulting over distension help maintain airway patency, thereby improving expiratory flow; however, it also alter pulmonary mechanics and increase the work of breathing ***(Sharma et al., 2004).***

Early in acute asthma, patients tend to present with respiratory alkalosis from hyperventilation. As airway obstruction progresses, alveolar hypo-ventilation and

respiratory muscle fatigue lead to hypercarbia and respiratory acidosis ***(Barnes, 2002).***

Mediators released from mast cells induce edema, mucous secretions, and bronchospasm. These mediators include histamine, tryptase, heparin, leukotriens, platelet activity factor, cytokines, interleukins and tumor necrosis factors. The other inflammatory cells (i.e. eosinophils, lymphocytes) also release mediators and create a toxic environment to respiratory epithelial cells ***(Chin and Slopper, 2004).***

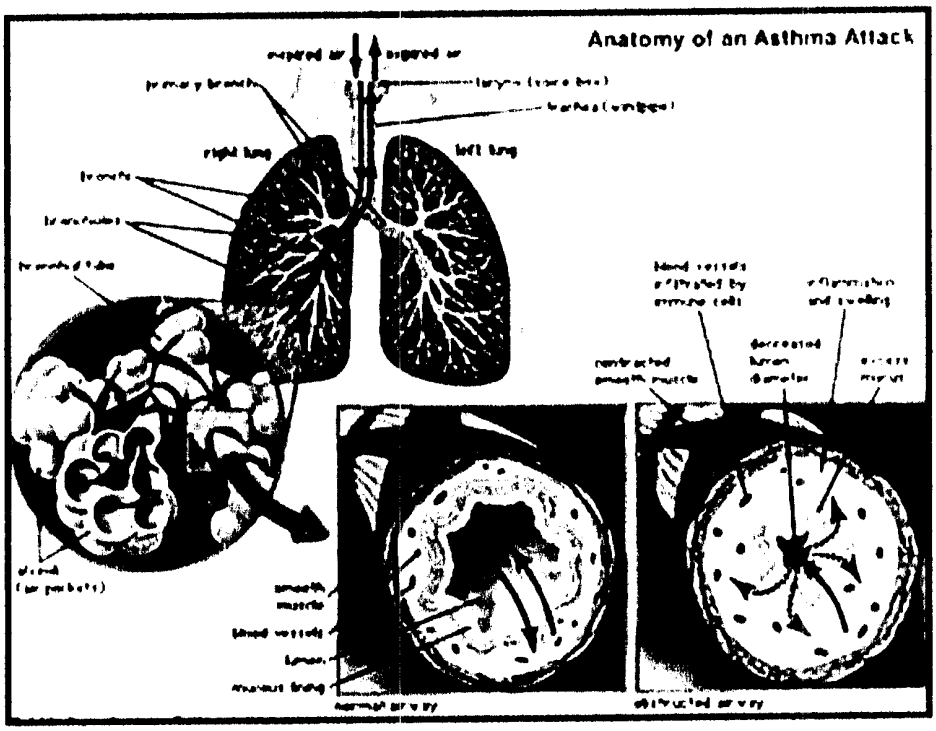

Figure (1): Pathogenesis of asthma

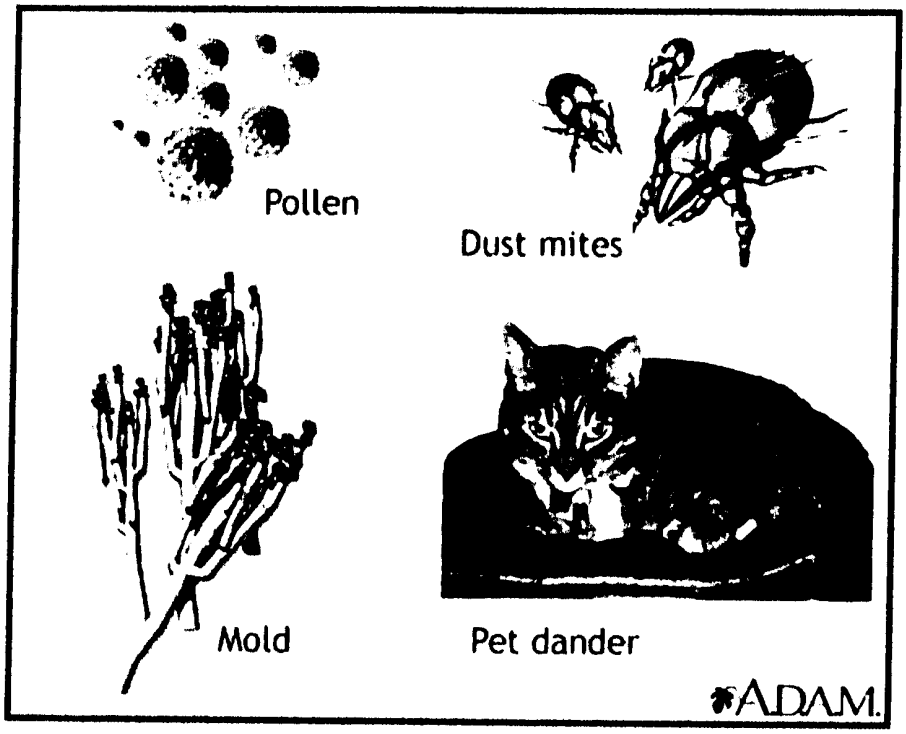

Figure (2): Common asthmatogenic factors.

1.5 Clinical manifestations and diagnosis

The diagnosis of asthma is a clinical one, there is no confirmatory diagnostic blood test, radiographic or histopathological investigation. In some people, the diagnosis can be corrected by suggestive changes in lung functions. The diagnosis of asthma is not always simple ***(British Guidelines of Pediatric Bronchial Asthma, 2004).***

Diagnosis of asthma is established by the following criteria:

(a) Episodic symptoms of airflow obstruction are present,

(b) Airflow obstruction or symptoms are at least partially reversible, and

(c) Alternative diagnosis are excluded ***(Girish, et al., 2005).***

The severity of asthma is classified as intermittent, mild persistent, moderate persistent, and severe persistent, according to the frequency and severity of symptoms, including nocturnal symptoms, characteristics of acute episodes and pulmonary function ***(GINA, 2005).***

These categories do not always work well in children. First lung function is difficult to assess in younger children. Second, asthma that is triggered solely by infection does not fit any category.

Features of the categories include the following: ***(British Guidelines of Pediatric Bronchial Asthma, 2004).***

- Patients with mild persistent disease have symptoms fewer than 2 times a week, and pulmonary function is normal between exacerbations. Exacerbations are brief, lasting from a few hours to a few days. Nighttime symptoms occur fewer than twice a month. The variation in peak expiratory flow (PEF) is less than 20%.

- Patients with moderate persistent asthma have daily symptoms and use inhaled short-acting beta 2-agonists every day. Acute exacerbations in patients with moderate persistent asthma may occur more than 2 times a week and last for days. The exacerbations affect activity. Nocturnal symptoms occur more than once a week. FEV_1 values are 60-80% of the predicted values, and PEF varies by more than 30%.

- Patients with severe persistent asthma have continuous or frequent symptoms, limited physical activity, and frequent nocturnal symptoms. FEV_1 and PEF values are less than 60% of the predicted values, and PEF varies by more than 30% ***(Girish, et al., 2005).***

Classical presentation of recurrent prolonged cough often with breathlessness or wheeze, suggests asthma. A positive family history for allergic diseases or asthma, although not essential, tends to support a suspected diagnosis of asthma ***(Lemanske et al, 2003).***

The main symptoms and signs in asthma are cough, wheeze, tachypnea, dyspnea, and prolonged expiration. Other finding include anxiety, use of accessory muscles, , fatigue, cyanosis, hyperinflation, tachycardia, abdominal pains & vomiting. The symptoms may come up acutely after exposure to aero-allergen or insidiously following viral infections. ***(Lemanske et al, 2003)***.

Table (2): Classification of Asthma ***(GINA, 2005)***

Clinical Features Before Treatment To Classify Severity				Preferred Long-Term Control-Daily Medications	
	Days with symptoms	**Nights with symptoms**	**PEF or FEV1**	**Children 5yr**	**Adults and Children > 5yr**
Step 4 Severe persistent	Continual	Frequent	60%	Inhaled steroid -high dose If needed, add oral steroids	Inhaled steroid high dose plus long-acting inhaled beta2-agonist plus oral steroids
Step 3 Moderate Persistent	Daily	5 month	60-80%	Inhaled steroid - medium dose or once control is established, consider: Inhaled steroid -lower medium dose and theophylline	Inhaled steroid - medium dose or Inhaled steroid – low-to-medium dose plus long- acting inhaled beta2-agonist
Step 2 Mild persistent	3-6/week	3-4/month	80%	Cromolyn (nebulized) or nedocromil or inhaled steroid- low dose	Inhaled steroid- low dose or Cromolyn or nedocromil
Step 1 Mild intermittent	2/week	2/month	80%	No daily medication	No daily medication

FEV1 forced expiratory volume at 1 second;
PEF: Peak expiratory flow rate

1.6 Pediatric Pulmonary Function Testing in Asthma:

Pulmonary function test provide an objective method to evaluate lung disease and follow the response to therapy. The routine of pulmonary function testing in asthmatic patients is analogous to following blood pressure in hypertension or blood glucose levels in diabetes ***(GINA, 2005).***

The values of pulmonary function tests in asthmatic children are:

1- Assessing the degree of airway obstruction.

2- Measuring airway response to allergens and other etiological factors.

3- Quantitating airway hyper reactivity.

4- Determining the acute effect of bronchodilator treatment.

5- Evaluating the treatment and the causes of the disease over a long period of time.

(Liu et al., 2004)

The lung function parameters, which are often measured in asthmatic children are lung volumes, flows, timed volumes and airway hyperactivity. However, pulmonary function reflects not only pathophysiologic but morphologic and ultrastructural changes as well ***(Girish, et al., 2005).***

According to ***American Thoracic Society (1998)*** pulmonary function tests could be classified into static lung volume and dynamic lung volumes measurements.

I. Static Lung Volume in Asthma

Static Lung Volume frequently increases in asthmatic children particularly residual volume and functional residual capacity. This increase is due to hyperinflation and air trapping. The functional residual capacity can detect hyperinflation even before appearance of its radiological evidences ***(Gappa et al., 1993).***

II. Dynamic Lung Volume in Asthma

Dynamic Lung Volume can determine different levels of airways obstruction. Instead of the subjective feeling of dyspnea and wheezes as markers of obstruction, these lung volume can provide an objective testing for obstruction ***(Virant and Shapiro, 1993).***

a. Peak Expiratory Flow Rate:

PEFR reflect the caliber of airways and is used to assess the degree of obstruction in children with asthma. Today, PEFRs are done using hand-held peak meter ***(Smith and Strunk, 1999).***

The PEFR correlates with FEV_1 (forced expiratory volume in 1 second) and can be used to estimate the degree

of value to "personal best" PEFR or standard PEFR charts for values predicted from height, and to follow the progress of treatment ***(Malo, 1996).***

The PEFR is a measure of obstruction in large caliber airways, and is an approximation of FEV_1 ***(Baren and Zoic, 2002).***

b. Spirometry:

Spirometry measures airflow and lung volumes during a forced expiratory maneuver and is considered the gold standered measure of airflow in asthma ***(Liu et al., 2004).***

Spirometry is recommended in the initial assessment of most patients with suspected asthma and periodically in selected patients to confirm home PEF measurements made with a peak flow meter ***(GINA, 2005).***

- **Forced vital capacity:** is the total amount of air exhaled during maximal expiration. ***(Beattie and Champion, 2004).*** FEV_1 is the forced expiratory volume in the 1^{st} second gives a measure of large (and medium size) airway obstruction ***(Gaon, 2002).***

- **$FEF_{25-75\%}$:** Forced expiratory flow between defined vital capacity (25% being 3/4 empty) is a measure of flow at lower lung volumes, is an-

effort-dependent, and is thought to be a reasonable representation of small airways function ***(Beattie and Champion, 2004)***, is the average expired flow over the middle half of the FVC maneuver and is regarded as a more sensitive measure of small airway narrowing than FEV_1. Unfortunately FEF25-75% has a wide range of normality, is reproducible than FEV1 and difficult to interpret if the FVC is reduced or increased.

c. Lung volumes measurements:

Patients with chronic persistent asthma may have hyperinflation, as evidenced by an:

- Increased total lung capacity (TLC) .
- Increased residual volume (RV) and functional residual capacity (FRC) with normal (TLC) suggest air trapping.
- Airway resistance is increased when significant obstruction is present ***(Girish et al., 2005).***

1.7 Differential diagnosis of asthma:

Table (3): Differential diagnosis of asthma

Disease	Comment
1. Infections:	Atopic individuals may have predisposition to wheeze with RSV
- Bronchiolitis (RSV)	Acute febrile illness
- Pneumonia	Braking cough, stridor more than wheezing
- Croup	Compressed bronchi with wheezing
- Tuberculosis	Congenital, acquired 1st or 2nd degree clubbing
- Bronchiectasis	Post-infections process (influenza, adenovirus, measles).
- Bronchiolitis obliterans	Probably asthma
- Bronchitis	
2. Anatomic congenital	
- Cystic fibrosis	Persistent symptoms, clubbing, staphylococcus arueus, pseudomonas aeruginosa, p. Cepacia
- Vascular rings	Associated pharyngeal abnormalities
- Dysmotile cilia syndrome	Chronic, recurrent inections, situs inversus
	Recurrent sinopulmonary infection
- B. Lymphocyte immune defect	Murmur, large left to right shunt
- Congestive heart failure	Stridor, noisy respirations from birth
- Laryngotracheo-malacia	Bronchial obstruction
- Tumor lymphoma	Patients have increased risk of wheezing, possibly asthma
- Repaired tracheoesophageal fistula	Rare, difficult to diagnose, recurrent aspiration pneumonia from birth
- H-type tracheoesophageal fistula	May also exacerbate true asthma
- Gastro-eosophageal reflux	
3. Vasculitis, hypersensitivities	
- Allergic bronchopulmonary aspergillosis	Marked esoinophilia, high serum IgE levels sputum positive for aspergillosis
- Allergic alveolitis hypersensitivity pneumonia	Reaction to foreign antigen (fungi, bird, protein, plants) occupational
-Periarteritis nodosa	Multi system: kidney, lung, nerves eosinophilia
Others:	
- Foreign body aspiration	Sudden cough, gagging, localized wheezing and diminished breath sounds
- Pulmonary thromboembolism	Acute chest pain
- Psychogenic cough	Absent during sleep
- Sarcoidosis	Lymphadenpathy induced bronchial obstruction
- Bronchopulmonary dysplasia	History of prematurity may predispose to asthma

(Sly, 2000)

1.8 Management of bronchial asthma

Goals of asthma therapy

1. Prevention of chronic and troublesome symptoms (e.g., coughing, sleep disturbance, exercise intolerance).
2. Maintenance of (near) normal pulmonary function.
3. Maintenance of normal activity levels appropriate for the patient's age.
4. Minimization of time lost from school, work, and daily activities.
5. Prevention of recurrent exacerbations of asthma and the need for emergency care or hospitalization.
6. Improvement in self image based on a full understanding of the disease and reliance in self management.
7. Provision of optimal asthma control through the use of the fewest medications possible, administered in a manner that permits the most normal lifestyle and that is associated with minimal or no adverse effects.
8. Improvement in the quality of life of the patient and family.
9. Acceptance of asthma management plan by patient and family ***(Gan and Gruchalla, 2000)***.

1.8.1 Avoidance of triggering factors

To improve the control of asthma and reduce medication needs, children should avoid exposure to risk factors (allergens and irritants that make asthma worse) as shown in table (4).

Table (4): Common asthma risk factors and actions to reduce exposure.

Risk factor	Actions
Domestic dust mite allergens (so small they are not visible to the naked eye)	Wash bed linens and blankets weekly in hot water and dry in a hot dryer or the sun. Encase pillows and mattresses in air tight covers. Replace carpets with linoleum or wood flooring, especially in sleeping rooms. Use vinyl, leather, or plain wooden furniture instead of fabric upholstered furniture if possible, use vacuum cleaner with filters.
Tobacco smoke (whether the patient smokes or breathes in the smoke from others)	Stay away from tobacco smoke. Children and their families should not smoke
Allergens from animals with fur	Remove animals from the home or at least from the sleeping area.
Cockroach allergen	Clean the home thoroughly and often. Use pesticide spray but make sure the child is not at home when spraying occurs.
Outdoor pollens and mold	Close windows and doors and remain indoors when pollen and mold counts are highest
Indoor mold	Reduce dampness in the home clean any damps areas frequently
Physical activity	Do not avoid physical activity. Exercise symptoms can be prevented or diminished by taking a rapid acting inhaled β2-agonist, or cromone, before strenuous exercise. Furthermore, continuous treatment with inhaled glucocorticosteroids markedly reduces the occurrence of exercise induced asthma.
Drugs	Do not take beta blocker or aspirin or NSAIDs if these medicines cause asthma symptoms

(National Heart, Lung and Blood Institute, 2003)

1.8.2 Pharmacological therapy

Guidelines developed by the ***National Heart, Lung, and Blood Institute (2003)***, divided medications help control asthma into two types:

- Controller medications: that keep symptoms and attacks from starting, shown in table (5).
- Reliever medications: That work quickly to treat attacks or relieve symptoms, shown in table (6).

Inhaled medications are preferred because of their high therapeutic ratio, high concentrations of low doses of drug are delivered directly to the airways with potent therapeutic effects and few systemic side effects.

Table (5): Controller medications

Name and also known as	Usual doses	Side effects	Comments
Glucocorticosteroids - Adrenocorticoids - Corticosteoids - Glucocorticoids **Inhaled:** - Beclomethasone - Budesonide - Flunisolide - Fluticasone - Mometasone furoate - Triamcionolone **Tablets or syrups** - Hydrocortisone - Methylprednisolone - Prednisolone - Prednisone	**Inhaled:** Beginning dose dependent on asthma severity, then titrated down over 2-3 months to lowest effective dose once control is achieved. **Tablets or syrups** For daily control use lowest effective dose 5-40 mg of prednisone equivalent in a.m.or qod. For acute attacks 40-60 mg daily in 1 or 2 divided doses for adolescents or 1-2 mg/kg daily in children	**Inhaled:** High daily doses may be associated with skin thinning and bruises, and rarely adrenal suppression. Local side effects are hoarseness and oropharyngeal candidiasis. Medium and high doses have produced minor growth delay or suppression (avg) 1 cm in children. Attainment of predicted adult height dose not appear to be affected **Tablets or syrups:** Long term, may lead to osteoporosis, hypertension, diabetes, cataracts, adrenal suppression, growth suppression, obesity, skin thinning or muscle weakness	**Inhaled:** Potential but small risk of side effects is well balanced by efficacy. Spacer devices with MDIs and mouth washing with DPIs after inhalation decrease oral candidasis. Preparation not equivalent on per puff or µg basis. **Tablet or syrup:** Long term use. Alternate day a m dosing produces less toxciicity. Short term, 3-10 days bursts are effective for gaining prompt control.

		Consider coexisting conditions that could be worsened by oral glucocorticosteroids, e g , herpes virus infections, varicella, tuberculosis, hypertension.	
Sodium cromoglycate - Cromolyn - Cromones	MDI2 mg or 5 mg 2-4 inhalations 3-4 times daily. Nebuliser 20 mg 3-4 times daily	Minimal side effects. Cough may occur upon inhalation	May take 4-6 weeks to determine maximum effects. Frequent daily dosing required
Nedocromil Cromones	MDI2 mg/puff 2-4 inhalations 2-4 times daily	Cough may occur upon inhalation	Some children unable to tolerate the taste
Long acting β2-agonists - Beta-adrenergis sympathomimetics **Inhaled:** - Formoterol (F) - Salmeterol (Sm) **Sustained release tablets** - Salbutamol (S) - Terbutaline (T)	**Inhaled:** DPI-F: 1 inhalation (12 µg) bid MDI-F: 2 puffs bid. DPI-Sm: 1 inhalation (50 µg) bid. MDI-Sm: 2 puffs bid. **Tablets:** Adolescents: S: 4 mg q 12h Children: 3-6 mg/kg/day w/max 8 mg/day T: Adolescnets: 10 mg q 12 h	**Inhaled:** Fewer, and less significant, side effects than tablets **Tablets:** may cause tachycardia, anxiety, skeletal muscle tremor, headache, hypokalemia	Inhaled: always use as adjunt to anti-inflammatory therapy. Combined with low medium doses of inhaled-glucocorticosteroid is more effective than increasing the dose of inhaled-glucocorticosteroids. Tablets: As effective as sustained release theophylline. No data for use as adjunctive therapy with inhaled glucocorticosteroids.
Sustained release theophylline - Aminophylline - Methylxanthine	Starting dose 10 mg/kg/day with usual 800 mg maximum in 1-2 divided doses	Nausea and vomiting are most common. Serious effects occurring at higher serum concentrations include seizures, tachycardia, and arrhythmias	Theophylline level monitoring is often required. Absorption and metabolism may be affected by many factors, including febrile illness
Antileukotrienes Leukotriene modifiers - Montelukast (M) - Pranlukast (P) - Zafirlukast (Z) - Zileuton (Zi)	Adolescents: M 10 mg qhs P 450 mg bid Z 20 mg bid Zi 600 mg bid Children M 5 mg qhs (6-14 y) M 4 mg qhs (2-5y) Z 10 mg bid (7-11y)	Data are limited; no specific adverse effects to date at recommended doses. Elevation of liver enzymes with Z and Zi and limited case reports of reversible hepatitis and hyperbilirubinemia with Zi	The position of antileukotrienes in asthma therapy is not fully established. They provide additive benefit when added to inhaled glcucorticosteorids though not as effective as inhaled long acting β2-agonists.

MDI: metered dose inhaler **DPI:** Dry powder inhaler **Bid:** two times a day

(National Heart, Lung, and Blood Institute, 2003)

Table (6): Reliever medications

Name and also known as	Usual doses	Side effects	Comments
Short acting β2-agonists Adrenergics β2-stimulants sympathomimetics - Albuterol - Bitolterol - Fenoterol - Isoetharine - Metaproterenol - Pirbuterol - Salbutamol - Terbutaline	Differences in potency exist but all products are essentially comparable con a per puff basis. For prn symptomatic use and pretreatment before exercise 2- puffs MDI or 1 inhalation Dpi For asthma attacks 4-8 puffs q2-1h. may administer q20 min X 3 with medical supervision or the equivalent of 5 mg salbutamol by nebulizer	**Inhaled:** Tachycardia skeletal muscle tremor, headache, and irritability. At very high dose hyperglycemia, hypokalemia Systemic administration as tablets or syrup increases the risk of these side effects	Drug of choice for acute bronchospasm. inhaled route has faster onset and more effective than tablet or syrup. Increasing use, lack of expected effect, or use of > 1 canister a month indicate poor asthma control; adjust long term therapy accordingly. Use of > 2 canisters per month is associated with an increased risk of a severe, life threatening asthma attack.
Anticholinergics - Ipratropium bromide (IB) - Oxitropium bromide	IB- 4-6 puffs q6h or q20 min X 3 in the emergency department. Neublizer 500 µg q20 min X 3 then q2-4 hrs for adolescents and 250 µg for children	Minimal mouth dryness or bad taste in the mouth	May provide additive effects to β2 agonist but has slower onset of action. Is an alternative for patients with intolerance for β2-agonists.
Short acting theophylline - Aminophylline	7 mg/kg loading dose over 20 mi followed by 0.4 mg/kg/hr continous infusion	Nausea, vomiting, headache At higher serum concentrations seizures, tachycardia, and arrythmias	Theophylline level monitoring is required. Obtain serum levels 12 and 24hours into infusion. Maintain between 10-15 mcg/ml.
Epinephrine/ adrenaline injection	1:1000 solution (1 mg/ml) 0.01 mg/kg up to 0.3-0.5 mg, can give q 20 min X3	Similar, but more significant effects than selective β2-agonist. In addition hypertension, fever, vomiting, in children and hallucinations	In general, not recommended for treating asthma attacks if selective β2-agonist are avialble.

(National Heart, Lung, and Blood Institute, 2003)

1.8.3 Long term management of asthma:

Inhaled glucocorticoids are the most potent and effective medications available for improving airway obstruction and hyperresponsiveness and in inhibiting late phase response ***(Cupta et al., 2004).***

Inhaled cortiosteroids should be used as primary therapy for patients with moderate and severe persistent asthma and in the mild persistent cases that are unresponsive to initial treatment with cromolyn or needocromil ***(Balis et al., 1998; Barnes et al., 1998).***

Stepwise approach presents general guidelines to assist clinical decision making, it is not intended to be a specific prescription. Asthma is highly variable; clinicians should tailor specific medication plans to the needs and circumstances of individual patients ***(Liu et al., 2004).***

In all levels: In addition to regular daily controller therapy, rapid acting inhaled β2-agonist should be taken as needed to relieve symptoms, but should not be taken more than 3-4 times a day. Patient education is essential at every step.

At all steps: once control of asthma is achieved and maintained at least 3 months, a gradual reduction of maintenance therapy should be tried to identify the

minimum therapy required to maintain control ***(National Heart, Lung, and Blood Institute, 2003).***

Table (7): Stepwise approach to long term management of asthma in children younger than 5 years of age

Level of severity	Daily controller medications	Other treatment options
Step 1 Intermittent	None necessary	
Step 2 Mild Persistent	Low dose inhaled Glucocorticoid	Sustained release theophylline or Cromone or leukotriene modifier
Step 3 Moderate Persistent	Medium dose inhaled glucocorticoid	Medium dose inhaled glucocorticoid plus sustained release theophylline, or - Medium dose inhaled glucocorticoid plus long acting inhaled β2-agonist, or - High dose inhaled glucocorticoid or - Medium dose glucocorticoids plus leukotriene modifier
Step 4 Severe Persistent	High dose inhaled glucocortiosteoid plus one or more of the following, if needed: - Sustained release theophylline - Long acting inhaled β2-agonist - Leukotriene modifier - oral glucocorticosteroid	

* Other options for reliever medications are (in increasing order of cost): short acting theophylline, inhaled anticholinergic, and short acting oral β2-agonist.

* Other treatment options listed in order of increasing cost. Relative medication costs may vary from country to country.

* Patients with intermittent asthma but severe exacerbation should be treated as moderate persistent as.

(National Heart, Lung, and Blood Institute, 2003)

Table (8): Stepwise approach to long term management of asthma in children older than 5 years of age

Level of severity	Daily controller medications	Other treatment options
Step 1 Intermittent	None necessary	
Step 2 Mild persistent	Low dose inhaled glucocorticosteroids	Sustained release theophylline or Cromone or Leukotriene modifier
Step 3 Moderate Persistent	Low to medium dose glucocorticosteroid plus long acting inhaled β2-agonist	Medium dose inhaled glucocorticosteroid plus sustained release theophylline or Medium dose inhaled glucocorticosteorid plus long acting oral β2-agonist, or - High dose inhaled glucocorticosteroid or - Medium dose inhaled glucocorticosteroids plus leukotriene modifier
Step 4 Severe Persistent	High dose inhaled glucocorticosteroid plus one or more of the following, if needed: - Sustained release theophylline - Long acting inhaled β2-agonist - Leukotriene modifier - Oral glucocorticosteroid	

(National Heart, Lung, and Blood Institute, 2003)

1.8.4 Management of acute attacks:

Exacerbation of asthma usually reflect rather a failure of long term management or exposure to an exacerbating factor or trigger ***(Gan and Gruchalla, 2000)***. Classification of severity of asthma exacerbation and their management are shown in table 9 and 10.

Table (9): Classification of severity of acute asthma exacerbation

Parameter	Mild	Moderate	Severe	Respiratory arrest imminent
Breathless	Walking can be down			
Talk in alertness	Sentences may be agitated	Phrases usually agitated	Words usually agitated	Drowsy or confused
Respiratory	Increased	Increased	Often 30/ min	Paradoxical
Guide to rates of breathing associated with respiratory distress in a wake children Age Normal rate < 2 months < 60 /min 2-12 months 50 /min 1-5 years < 40/min 6-8 years 30/min				
Accessory muscles and suprasternal reactions	Usually	Usually	Usually	Paradoxical thoraco-abdominal movement
Wheeze	Moderate, often only end expiratory	Loud	Usually loud	Absence of wheeze
Pulse /min	< 100	100-120	120	Bradycardia
Guide to limits of normal pulse rate in children Infants 2-12 months - Normal rate < 160/min Preschool 1-2 years - Normal rate < 120 /min School age 2-8 years - Normal rate < 110 /min				
PEF after initial bronchodilator % predicted or % personal best	Over 80%	Approximately 60-80%	< 60% predicted or personal best (100 L/min adults) or response lasts < 2 hours	
PaO2 (on air) and or PaCO2	Normal test not usually necessary < 45 mmHg	< 60 mmHg < 45 mmHg	< 60 mmHg possible cyanosis > 45 mmHg possible respiratory failure	
SaO2 % (on air)	> 95%	91-95%	< 90%	

* The presence of several parameters, but not necessary all, indicate the general classification on the attack.

* Hypercapnia (hypoventilation) develops more readily in young children than in adults and adolescents

(National Heart, Lung, and Blood Institute, 2003)

Table (10): Management of an asthma attack; home treatment

Assess severity
Cough, breathlessness, wheeze, chest tightness, use of accessory muscles, superasternal retractions, and sleep disturbance. PEF less than 80 percent of personal best or predicted.

Initial treatment
Inhaled rapid-acting β2-agonist up to three treatments in 1 hour.
Families should contact the physician promptly after initial treatment, especially if the child has had a recent hospitalization for asthma.

Response to initial treatment is…..

Good if	Incomplete if	Poor if
Symptoms subside after initial β2 agonist and relief is sustained for 4 hours. PEF is greater than 80% predicted or personal best.	Symptoms decrease but return in less than 3 hours after initial β2-agonist treatment. PEF is 60-80% predicted or personal best.	Symptoms persist or worsen despite initial β2-agonist treatment. PEF is less than 60% predicted or personal best.
Actions	**Actions**	**Actions**
May continue β2-agonist every 3-4 hours for 1-2 days. Contact physician or nurse for follow up instructions	Add oral glucocorticosteroid Add inhaled anticholinergic Continue β2-agonist Consult clinician urgently for instructions	Add oral glucocorticoid Repeat β2 agonist immediately Add inhaled anticholinergic Immediately transport to hospital emergency department.

(National Heart, Lung, and Blood Institute, 2003)

2. ACUTE RHEUMATIC FEVER (ARF)

2.1 Historical background:

Guillaumode Baillou (1538-1616) distinguished ARF from other causes of rheumatism, using the term acute articular rheumatism. *Thomas Sydenham* (1624-1689) in England distinguished it from gout ***(Cotran et al., 1999).***

Giovanni Morgagni (1682-1771) first described cardiac valvular lesions, and they later were found to be present in autopsies of patients with acute articualr rhuematims. After Laennec's invention of the stethoscope in 1819, the clinical description of rheumatic heart disease was possible. In 1836, *Jean Baptiste Bouillaud (1796-1881)* established a law of coincidence between the occurrence of heart disease and acute articular rheumatism. *Cheadle in 1886* described what we now recognize as the full ARF syndrome, including arthritis, carditis, chorea, erythema marginatum, and subcutaneous nodules ***(Homer and Shulman, 1991).***

Although a connection between ARF and a previous sore throat had been suspected, this was not well established until the bacteriologic and epidemiologic studies of *Collis* in England and *Coburn* in the US in 1931. *Rebeccca Lancefield's* establishement of a serologic grouping scheme for β streptococci around 1930 led to Todd's development of the antistreptolysin O (ASO) test.

ASO studies solidly established the uequivocal relationship between group A streptococcal pharyngitis and ARF ***(Cotran et al., 1999).***

This was further strengthened when Coburn and Moore in 1939 showed that continuous antistreptococcal therapy could prevent ARF recurrences and when *Masell* and *Wannamaker,* demonstrated that first attacks of ARF were prevented by therapy of acute streptococcal pharyngitis ***(Homer and Shulman, 1991).***

2.2 Definition of ARF:

ARF is a multisystemic inflammatory disease that arises as a complication after pharyngeal infection with group A. β hematolytic streptococci (GABHS) ***(Rulan and Sigal, 2001).***

Rheumatic fever (RF) is a systemic illness that may occur following group A beta hemolytic streptococcal (GABHS) pharyngitis in children. RF and its most serious complication, rheumatic heart disease (RHD), are believed to result from an autoimmune response; however, the exact pathogenesis remains unclear. Studies in the 1950s during an epidemic on a military base demonstrated 3% incidence of RF in adults with streptococcal pharyngitis not treated with antibiotics. Studies in children during the same period demonstrated an incidence of only 0.3%. Cardiac involvement is reported to occur in 30-70% of patients with

their first attack of RF and in 73-90% of patients when all attacks are counted ***(Ayoub, 2001)***.

2.3 Epidemiology:

2.3.1 Frequency:

- **In the US:** RF is now uncommon among children in the US. Incidence of RF and RHD has decreased in the US and other industrialized countries during the past 80 years. Prevalence of RHD in the US is now less than 0.05 per 1000 population. Decreased incidence of RF has been attributed to the introduction of penicillin or a change in the virulence of the streptococci.

- **Internationally:** In contrast to trends in the US, RF and RHD have not decreased in developing countries. Retrospective studies in developing countries demonstrate the highest figures for cardiac involvement and the highest recurrence rates of RF. Worldwide, an estimated 5-30 million children and young adults have chronic RHD, and 90,000 patients die from this disease each year ***(Pickering, 2000)***.

2.3.2 Race:

Native Hawaiians and Maori (both of Polynesian descent) have a higher incidence of RF. Incidence of RF in these patients is 13.4 per 100,000 hospitalized children per year, even with antibiotic prophylaxis of streptococcal

pharyngitis. Otherwise, race (when controlled for socioeconomic variables) has not been documented to influence the disease incidence ***(Pickering, 2000)***.

2.3.3 Sex:

RF occurs in equal numbers in males and females. Females with RF fare worse than males and have a slightly higher incidence of chorea.

2.3.4 Age:

RF is principally a disease of childhood, with a median age of 10 years; however, RF also occurs in adults (20% of cases) ***(Carapetis, 2005)***.

2.4 Mortality/Morbidity:

RHD is the major cause of morbidity from RF, and it is the major cause of mitral insufficiency and stenosis in the United States and the world. Variables that correlate with severity of valve disease are the number of previous attacks of RF, the length of time between the onset of disease and start of therapy, and sex (the prognosis for females is worse than for males). Insufficiency from acute rheumatic valve disease resolves in 70-80% of patients if they adhere to antibiotic prophylaxis ***(Carapetis et al., 2005)***.

2.5 Pathogenesis:

RF is believed to result from an autoimmune response; however, the exact pathogenesis remains unclear ***(Gerber, 2004).***

RF develops in children and adolescents following pharyngitis with GABHS (ie, *Streptococcus pyogenes*). The organisms attach to the epithelial cells of the upper respiratory tract and produce a battery of enzymes, which allows them to damage and invade human tissues. After an incubation period of 2-4 days, the invading organisms elicit an acute inflammatory response, with 3-5 days of sore throat, fever, malaise, headache, and elevated leukocyte count. In a small percent of patients, infection leads to RF several weeks after the sore throat has resolved. Only infections of the pharynx initiate or reactivate RF ***(Chin, 2003)***.

Direct contact with oral or respiratory secretions transmits the organism, and crowding enhances transmission. Patients remain infected for weeks after symptomatic resolution of pharyngitis and may serve as a reservoir for infecting others. Penicillin treatment shortens the clinical course of streptococcal pharyngitis and more importantly prevents the major sequelae ***(Ayoub, 2001)***.

GABHS organisms are gram-positive cocci, which frequently colonize the skin and oropharynx. These

organisms may cause suppurative diseases (eg, pharyngitis, impetigo, cellulitis, myositis, pneumonia, puerperal sepsis). GABHS organisms also may be associated with nonsuppurative diseases (eg, RF, acute poststreptococcal glomerulonephritis). Group A streptococci (GAS) elaborate the cytolytic toxins, streptolysins S and O. Of these 2 toxins, streptolysin O induces persistently high antibody titers that provide a useful marker of GAS infection and its nonsuppurative complications ***(Cunningham, 2000)***.

Acute RHD often produces a pancarditis, characterized by endocarditis, myocarditis, and pericarditis. Endocarditis is manifested as mitral and aortic valve insufficiency. Severe scarring of the valves develops during a period of months to years after an episode of acute RF, and recurrent episodes may cause progressive damage to the valves. The mitral valve is affected most commonly and severely (65-70% of patients); the aortic valve is affected second most commonly (25%). The tricuspid valve is deformed in only 10% of patients, almost always in association with mitral and aortic lesions, and the pulmonary valve rarely is affected. Severe valve insufficiency during the acute phase may result in congestive heart failure (CHF) and even death (1% of patients) ***(Ayoub, 2001)***.

Chronic manifestations occur in adults with previous RHD from residual and progressive valve deformity. RHD

is responsible for 99% of mitral valve stenosis in adults, and it may be associated with atrial fibrillation from chronic mitral valve disease and atrial enlargement ***(Cunningham, 2000)***.

2.6 Clinical picture:

2.6.1 History:

Acute RF is a systemic disease. Thus, patients may present with a large variety of symptoms and complaints.

- History of an antecedent sore throat 1-5 weeks prior to onset is present in 70% of older children and young adults. Only 20% of younger children can recall an antecedent sore throat.
- Other symptoms on presentation may include fever, rash, headache, weight loss, epistaxis, fatigue, malaise, diaphoresis, and pallor.
- Patients also may have chest pain with orthopnea or abdominal pain and vomiting.
- Finally, history may reveal symptoms more specific to RF.
    - Migratory joint pain
    - Nodules under the skin
    - Increased irritability and shortened attention span with personality changes, such as pediatric autoimmune neuropsychiatric disorder associated with streptococcal infections

- Motor dysfunction
- History of previous RF

- Patients with previous RF are at a high risk of recurrence.
  - Highest risk of recurrence within 5 years of the initial episode
  - Greater risk of recurrence with younger age at the time of the initial episode
  - Generally, recurrent attacks similar to the initial attack (however, risk of carditis and severity of valve damage increase with each attack)

(American Heart Association, 1992)

2.6.2 Physical examination:

The modified Jones criteria provide guidelines for making the diagnosis of RF. The Jones criteria require the presence of 2 major or 1 major and 2 minor criteria for the diagnosis of RF. Having evidence of previous GAS pharyngitis is also necessary. These criteria are not absolute, and the diagnosis of RF can be made in patients with only confirmed streptococcal pharyngitis and chorea.

- Major diagnostic criteria
  - Carditis
  - Polyarthritis

- Chorea
- Subcutaneous nodules
- Erythema marginatum

- Minor diagnostic criteria
  - Fever
  - Arthralgia
  - Prolonged PR interval on electrocardiogram
  - Elevated acute-phase reactants (APRs), which are erythrocyte sedimentation rate and C-reactive protein

- Three notable exceptions to strict adherence to the Jones criteria
  - Chorea: It may occur late and be the only manifestation of RF.
  - Carditis: Patients presenting late to medical attention months after the onset of RF may have insufficient support to fulfill the criteria.
  - Newly ill patients with a history of RF, especially RHD, who have supporting evidence of a recent GAS infection and who manifest either a single major or several minor criteria: Distinguishing recurrent carditis from preexisting significant RHD may be impossible.

- Evidence of previous GAS pharyngitis (One of the following must be present):
    - Positive throat culture or rapid streptococcal antigen test
    - Elevated or rising streptococcal antibody titer

(Mohammed, 2005)

In the following pages major clinical manifestations will be discussed in details

i-Arthritis: Polyarthritis is the most common symptom and frequently is the earliest manifestation of acute RF (70-75%). Characteristically, the arthritis begins in the large joints of the lower extremities (ie, knees, ankles) and migrates to other large joints in the lower or upper extremities (ie, elbows, wrists). Affected joints are painful, swollen, warm, erythematous, and limited in their range of motion. The pain is out of proportion to clinical findings. The arthritis reaches maximum severity in 12-24 hours and persists for 2-6 days (rarely more than 4 wk, but has been reported to persist 44 d) at each site and is migratory but not additive. The arthritis responds rapidly to aspirin, which decreases symptoms in affected joints and prevents further migration of the arthritis. Polyarthritis is more common and more severe in teenagers and young adults than in younger children. Patients suffering multiple attacks may exhibit destructive arthritis (Jaccoud arthritis) ***(Hilario and Terreri, 2002)***.

ii-Carditis: Pancarditis is the most serious complication and the second most common complication of RF (50%). In advanced cases, patients may experience of dyspnea, mild-to-moderate chest discomfort, pleuritic chest pain, edema, cough, or orthopnea. On physical examination, carditis is most commonly revealed by a new murmur and tachycardia that is out of proportion to the fever. New or changing murmurs traditionally have been considered necessary for a diagnosis of rheumatic valvulitis. The murmurs of acute RF are from valve regurgitation, and the murmurs of chronic RF are from valve stenosis. CHF may develop secondary to severe valve insufficiency or myocarditis. Physical findings associated with heart failure include tachypnea, orthopnea, jugular venous distention, rales, hepatomegaly, a gallop rhythm, and peripheral swelling and edema. A pericardial friction rub indicates that pericarditis is present. Increased cardiac dullness to percussion, muffled heart sounds, and a paradoxical pulse are consistent with pericardial effusion and impending pericardial tamponade ***(Mohammed, 2005)***.

iii-Chorea :A long latency period exists between streptococcal pharyngitis (1-6 mo) and the onset of chorea, and a history of an antecedent sore throat frequently is not obtained. Patients with chorea often do not demonstrate other Jones criteria. Chorea is slightly more common in females than males. Chorea also is known as rheumatic chorea, Sydenham chorea, chorea

minor, and St Vitus dance. Daily handwriting samples can be used as an indicator of progression or resolution of disease. Complete resolution of the symptoms typically occurs, with improvement in 1-2 weeks and full recovery in 2-3 months; however, incidents have been reported in which symptoms wax and wane for several years ***(Rullan and Sigal, 2001)***.

iv-Erythema marginatum: This characteristic rash, also known as erythema annulare, occurs in 5-13% of patients with acute RF. Erythema marginatum begins as 1- to 3-cm diameter, pink-to-red nonpruritic macules or papules located on the trunk and proximal limbs but never on the face. The lesions spread outward to form a ring with erythematous raised margins and central clearing. The rash may fade and reappear within hours and is exacerbated by heat. Thus, if the lesions are not observed easily, they can be accentuated by the application of warm towels, a hot bath, or the use of tangential lighting. The rash occurs early in the course of the disease and remains long past the resolution of other symptoms. Erythema marginatum has also been reported in association with sepsis, drug reactions, and glomerulonephritis ***(American Heart Association, 1992).***

v-Subcutaneous nodules: Subcutaneous nodules are now an infrequent manifestation of RF. The frequency

has declined during the past several years to 0-8% of patients with RF. When present, the nodules appear over the extensor surfaces of the elbows, knees, ankles, scalp, and spinous processes of the lumbar and thoracic vertebrae (attached to the tendon sheath). The nodules are firm, non tender, and free from attachments to the overlying skin, and they range from a few millimeters to 1-2 cm. Subcutaneous nodules generally occur several weeks into the disease and resolve within a month. They are strongly associated with severe rheumatic carditis ***(Rullan and Sigal, 2001)***.

vi-Other clinical manifestations:

a- Abdominal pain: Abdominal pain usually occurs at the onset of acute RF, resembles other conditions with acute microvascular mesenteric inflammation, and may mimic acute appendicitis.

b- Arthralgias: Patients may report arthralgias upon presentation. In the history, determining if the patient has taken aspirin or nonsteroidal anti-inflammatory drugs (NSAIDs) is important because these may suppress the full manifestations of the disease. Arthralgia cannot be considered a minor manifestation if arthritis is present.

c- Epistaxis: Epistaxis may be associated with severe rheumatic carditis.

d- Fever: Fevers greater than 39°C with no characteristic pattern are present initially in almost every patient

with acute RF. The fever may be low grade (38.0-38.5°C) in children with mild carditis. The fever decreases without antipyretic therapy in approximately 1 week.

e- Rheumatic pneumonia: Patients present with the same signs as an infectious pneumonia.

(Mohammed, 2005)

2.7 Differential diagnosis of ARF

- Acute Poststreptococcal Glomerulonephritis
- Valvar Aortic Stenosis,
- Aortic Valve Insufficiency
- Bicuspid Aortic Valve
- Septic Arthritis
- Dilated Cardiomyopathy
- Bacterial Endocarditis
- Gonorrhea
- Congestive Heart Failure
- Kawasaki Disease
- Lyme Disease
- Mitral Valve Insufficiency
- Mitral Valve Prolapse
- Nonviral Myocarditis
- Viral Myocarditis
- Malignant Pericardial Effusion
- Bacterial Pericarditis
- Viral Pericarditis

- Sarcoidosis
- Serum Sickness
- Sickle Cell Anemia
- Splenomegaly
- Takayasu Arteritis
- Tuberculosis
- Wilson Disease

(Ayoub, 2001)

2.8 Differential diagnosis of Other Problems:

2.8.1 Arthritis and/or arthralgias

- Rheumatoid arthritis
- Reactive arthritis
- Dermatomyositis
- Erythema nodosum
- Henoch-Schönlein purpura
- Lupus erythematosus in infants and children
- Poststreptococcal syndrome *(Ayoub , 2001)*

2.8.2 Chorea

- Drug reaction (eg, oral contraceptive pills, phenytoin, haloperidol, amitriptyline, metoclopramide, fluphenazine)
- Huntington chorea
- Chorea gravidum
- Periarteritis nodosa

2.8.3 Erythema marginatum

- Drug reactions

(Stollerman, 2001)

2.9 Laboratory investigations

No single laboratory test can confirm the diagnosis of RF. However, some tests help to characterize the inflammatory process and provide evidence of a preceding streptococcal infection.

2.9.1 Complete blood count: eucocytosis with neutrophilia and mild to moderate anemia are found. Acute phase reactants are always elevated at the onset of acute RF. The erythrocyte sedimentation rate (ESR) is elevated in the first weeks of the disease, the higher levels are found among patients with cardiac involvement. C-reactive protein (CRP) is elevated at the onset of the acute phase and tends to disappear at the end of the second or third week. Both ESR and CRP are affected by anti-inflammatory medications. Acid alpha-I-glycoprotein and alpha-2 globulin are elevated in the acute phase of the disease and remain elevated for a prolonged time. Their levels are not influenced by anti-inflammatory medications and they have been used to monitor RF activity ***(Report of a WHO expert Consultation, 2001).***

2.9.2 Detection of streptococcal infection

- Group A streptococcus is isolated by culture of throat swab in only 15 to 20% of patients and this may be due to both the latency period between infection and the onset of RF symptoms and the prior use of antibiotics. ***(Roddey et al., 1995).***

- Elevated titers of anti-streptolysin O (ASO) confirm invasive streptococcal infection, but approximately 20% of patients with RF may not have this antibody. In these cases determination of anti-hyaluronidase, anti-deoxyribonuclease B (anti-Dnase B) and/or anti-sterptokinase antibodies may be essential for the diagnosis of recent infection.

2.10 Radiology

2.10.1 Chest X-ray and electrocardiograph (ECG)

The chest X-ray and ECG may be abnormal in only 30% of patients with carditis. The chest X-ray usually shows cardiomegaly only in patients with myocarditis or moderate to severe pericardial effusion ***(Swanson et al., 1997)***. Sinus tachycardia most frequently accompanies acute rheumatic heart disease. Alternatively, some children develop sinus bradycardia from increased vagal tone ***(Rullan and Sigal, 2001).***

2.10.2 Doppler echocardiography

Doppler echocardiography is useful in evaluating cardiac performance and myocardial function over time, and in diagnosing valvular disease and pericarditis. Colour Doppler permits a more accurate assessment of intracardiac blood flow ***(Wilson and Neutze, 1995).*** If Doppler echocardiography is normal and the clinical diagnosis of RF is likely, it should be repeated in two to three weeks ***(Williamson et al., 2000).***

2.11 Treatment

2.11.1 Medical Care:

- Direct medical therapy toward eliminating the GAS pharyngitis (if still present), suppressing inflammation from the autoimmune response, and providing supportive treatment of CHF. Oral penicillin V remains the drug of choice for treatment of GAS pharyngitis. For patients who are allergic to penicillin, administer erythromycin or a first-generation cephalosporin. Other options include clarithromycin for 10 days, azithromycin for 5 days. For recurrent GAS pharyngitis, a second 10-day course of the same antibiotic may be repeated.

(Dajani et al., 1995)

- Treatment of the acute inflammatory manifestations of acute RF consists of salicylates and steroids.

Aspirin in anti-inflammatory doses effectively reduces all manifestations of the disease except chorea, and the response typically is dramatic.

(Karademir et al., 2003)

- If moderate-to-severe carditis is present as indicated by cardiomegaly, CHF, or third-degree heart block, add oral prednisone to salicylate therapy.
- Include digoxin and diuretics, afterload reduction, supplemental oxygen, bed rest, and sodium and fluid restriction as additional treatment for patients with acute RF and CHF. The diuretics most commonly used in conjunction with digoxin for children with CHF include furosemide and spironolactone.
- Afterload reduction (ie, using ACE inhibitor captopril) may be effective in improving cardiac output, particularly in the presence of mitral and aortic insufficiency. Start these agents judiciously. Use a small, initial test dose (some patients have an abnormally large response to these agents), and administer only after correcting hypovolemia.
- When heart failure persists or worsens during the acute phase after aggressive medical therapy, surgery is indicated to decrease valve insufficiency.

(Thatai and Turi, 1999)

- Preventive and prophylactic therapy is indicated after RF and RHD to prevent further damage to valves. Primary prophylaxis (initial course of antibiotics administered to eradicate the streptococcal infection) also serves as the first course of secondary prophylaxis (prevention of recurrent RF and RHD).
    - An injection of 0.6-1.2 million units of benzathine penicillin G intramuscularly every 4 weeks is the recommended regimen for secondary prophylaxis for most US patients. Administer the same dosage every 3 weeks in areas where RF is endemic, in patients with residual carditis, and in high-risk patients.

(Thomas et al., 2006)

    - The duration of antibiotic prophylaxis is controversial. Continue antibiotic prophylaxis indefinitely for patients at high risk (eg, health care workers, teachers, daycare workers) for recurrent GAS infection. Ideally, continue prophylaxis indefinitely, because recurrent GAS infection and RF can occur at any age; however, the American Heart Association currently recommends that patients with RF without carditis receive prophylactic antibiotics for 5 years or until aged 21 years, whichever is longer. Patients with RF with carditis but no

valve disease should receive prophylactic antibiotics for 10 years or well into adulthood, whichever is longer. Finally, patients with RF with carditis and valve disease should receive antibiotics at least 10 years or until aged 40 years ***(Thomas et al., 2006)***

2.11.2 Surgical Care:

When heart failure persists or worsens after aggressive medical therapy for acute RHD, surgery to decrease valve insufficiency may be lifesaving. Approximately 40% of patients with acute RF subsequently develop mitral stenosis as adults. Mitral valvulotomy, percutaneous balloon valvuloplasty, or mitral valve replacement may be indicated in patients with critical stenosis. Valve replacement appears to be the preferred surgical option for patients with high rates of recurrent symptoms after annuloplasty or other repair procedures.

(Ayoub, 2001)

2.11.3 Diet:

Advise nutritious diet without restrictions except in patients with CHF, who should follow a fluid-restricted and sodium-restricted diet. Potassium supplementation may be necessary because of the mineralocorticoid effect of corticosteroid and the diuretics, if used. ***(Gerber , 2004)***

2.11.4 Activity:

Initially, place patients on bed rest, followed by a period of indoor activity before they are permitted to return to school. Do not allow full activity until the APRs have returned to normal. Patients with chorea may require a wheelchair and should be on homebound instruction until the abnormal movements resolve ***(Thomas et al., 2006)***.

2.11.5 Patient Education:

- Emphasize measures that minimize further damage to the valves of the heart.
    - Timely evaluation and treatment of pharyngitis in children help prevent RF.
    - Secondary prophylaxis of patients with previous RF and valve involvement with penicillin injections every 3-4 weeks decrease the recurrence of RHD.
    - Additional prophylactic antibiotics prior to dental and surgical procedures decrease the likelihood of bacterial endocarditis.

(Thomas et al., 2006)

2.12 Complications:

- Potential complications include CHF from valve insufficiency (acute RF) or stenosis (chronic RF).

- Associated cardiac complications include atrial arrhythmias, pulmonary edema, recurrent pulmonary emboli, infective endocarditis, thrombus formation, and systemic emboli.

(Chin, 2003)

2.13 Prognosis:

- The manifestations of acute RF resolve during a period of 12 weeks in 80% of patients and may extend as long as 15 weeks in the remaining 20% of patients.
- The development of penicillin also has affected the likelihood of developing chronic valvular disease after an episode of acute RF. Prior to penicillin, 60-70% of patients developed valve disease; since the introduction of penicillin, 9-39% of patients develop valve disease.
- In patients who developed murmurs from valve insufficiency from acute RF, the incidence of residual RHD at 10 years was 34% in patients without recurrences but was 60% in patients with recurrent RF.

(Kamat, 2000)

3. CHRONIC ILLNESSES AND CHILD'S PSYCHOLOGICAL ADJUSTMENT

During childhood, any potentially life threatening condition has some psychological impact ***(Isaacs and Sewell, 2003)***, and chronic physical illness confers an increased risk of emotional and behavioral disorders ***(Gledhill et al., 2000).***

3.1 Definition:

A chronic condition refers to any condition lasting 3 months or more is a condition classified as chronic regardless of its time of onset such as diabetes mellitus. The chronic illness of childhood are of relatively low incidence in the order of 1.5 per 1000 ***(National Health Interview Survey, 2002).***

Psychiatric disorder in children was defined as an abnormality of the emotions, behavior or relationship which causes suffering and handicap to the child and his family ***(Garralda et al., 1995)***. ***Cadman et al. (1987)*** stated that, children with chronic illness are at great risk for decreased psychological adjustment is typically manifested as increased behavior problems and less resilience in meeting social challenges ***(Drotar and Bush, 1999).***

Some investigations stated that it was impossible to examine pathological tissues without life history

information and emphasized that psychological processes and variables rarely demonstrated organic pathology. They become interested in psychopathology and considered this tissue to a faulty reaction of a psychopathological organism (mind and body) that can be understood only through a careful and chronological analysis of the individual history and through the acquisition of new reactions (habits). Other childhood disorders and contributed many articles about mental abnormalities in children, and the importance of studying these children in families, school and the community ***(Abd El Rahman, 1998).***

3.2 Prevalence of chronic illness

It is estimated that up to 20% of the school age population has a chronic medical illness or disabling condition, putting the number of children under age eighteen with chronic conditions in U.S, at twelve million ***(Kliewer, 1997).***

3.3 Response to chronic illness

3.3.1 The initial reaction to chronic illness

Initial psychological dysfunction in chronically ill children is best conceptualized as crisis occurring in the course of normal development ***(Glazer, 1991).***

The term crisis is first introduced by ***Moos et al, (1987)***he stated that initial reactions to a chronic diagnosis

can best be understood in terms of crisis. Initially, people seem to experience a stage of disequilibrium in which the person experiences a host of unpleasant emotions and normal responses to situations are disorganized. Following this initial reaction, there are typically some important tasks that the person is faced with, that require adaptation, such as dealing with symptoms, with pain, and treatment regimen.

3.3.2 Psychosocial adjustments to chronic illness

- **Emotional adjustment:** One problem that may arise is that this initial state turns into longer term depression. ***(Turner and Noh, 1988).***

- **Social adjustment:**One of the most distressing aspects of chronic illness to many people is the impact it has on other people as family. As a result, the person may withdraw from social interaction due to physical effects of disease like disability ***(Siarkowski, 1999).*** Likewise, friends and family may withdraw from that person. Even if relationships remain intact, considerable stress may be still experienced by the group ***(Reidpath et al, 2001)***. For instance, long term treatment may place a burden on other family members in terms of finances and emotional investment ***(Gwatkin et al., 1999).***

3.3.3 Outcome of children adjustment to chronic illness

Chronic illness affects the lives of children through the limitations they impose on schooling and recreation ***(Siarkowski, 1999)***. And so, children with chronic illness may be at risk for poor psychological adjustment***(Witt et al,2003).***The illness, itself, may negatively affect the physical, cognitive, or emotional health of the child ***(Melnyk et al., 2001)***.The severity and the course of the illness, and the direct threat to life influence psychological concerns and outcome, and those at greater risk are children with more severe physical disorder, and perhaps those with illnesses carrying a greater degree of life threat ***(Kliewer, 1997)***.

For those children, warning signs of distress include problems at school or in social relationships; low self esteem, manifested as self blame, helplessness or hoplessness; and denial, with poor compliance to treatment. Psychological problems manifest as anxiety, depression, oppositional behavior, suicidal tendency or disorders of eating, conduct or sleep ***(Isaacs and Sewell, 2003).***

On the other hand, a child's view of his or her quality of life may differ according to duration of illness. Children born with chronic conditions may be more accepting of limitations ***(Doyle and Casalaz, 2001)***, even while recognizing their difference from other children, and they often adjust better ***(Schneider et al., 2001)***.

Despite the detail that is provided on the potential negative outcomes of children and families who have

chronic illnesses, most of these families show admirable resilience and most children adjust to their illnesses within 1 year, also this challenge of adjusting to a chronic illness can provide an excellent opportunity for a child or adolescent to master crucial skills, such as emotion regulation and problem solving ***(Le Blanc et al., 2003).***

Mastery of these skills can engender strong self esteem and confidence, and so, positive behavioral outcomes ***(Vitulano, 2003).***

4. INTELLIGENCE QUOTIENT (I.Q)

4.1 Introduction :

Intelligence is an umberella term used to describe a property of the mind that encompasses many related abilities such as the capicities to reason to plan to resolve problems, to think abstractly, to comprehend ideas , to use language, and to learn. There are several ways to define intelligence. In some cases, intelligence may include traits such as creativity, personality, character, knowledge or wisdom ***(Lubinski, 2004).***

4.2 Definition:

The intelligence quotient (often designated as *I Q*) is the ratio of mental age to chronological age ***(Gale, 2007).***

An estimate of intelligence level; an index determined by dividing the mental age in months by the chronologic age in months and multiplying the result by 100. Thus, the IQ of a child of 100 months with a mental age of 110 months would be 110 ***(Hunt, 2001)***.

4.3 Measures and Units:

The usual measure of intelligence, now assessed by standardized tests that supposedly measure the innate, untrainable intelligence of an individual in a fully objective way. There is continuing doubt about IQ tests, and their

objectivity, the innateness of what they measure, and their correlation with meaningful mental ability ***(Gale, 2007)***.

An **intelligence quotient** or **IQ** is a score derived from one of several different standardized tests attempting to measure intelligence. IQ tests are used as predictors of educational achievement. People with low IQ scores are sometimes placed in special-needs education ***(Gale, 2007)***.

4.4 History

In 1905 the French psychologist Alfred Binet published the first modern intelligence test, the Binet-Simon intelligence scale. His principal goal was to identify students who needed special help in coping with the school curriculum. Along with his collaborator Theodore Simon, Binet published revisions of his intelligence scale in 1908 and 1911.

In 1912, the abbreviation of "intelligence quotient" or I.Q., a translation of the German *Intelligenz-Quotient*, was coined by the German psychologist William Stern. A further refinement of the Binet-Simon scale was published in 1916 by Lewis M. Terman, from Stanford University, who incorporated Stern's proposal that an individual's intelligence level be measured as an intelligence quotient (I.Q.). Terman's test, which he named the Stanford-Binet Intelligence Scale formed the basis for one of the modern intelligence tests still commonly used today ***(Hunt, 2001)***.

In *1939 David Wechsler* published the first intelligence test explicitly designed for an adult population, the Wechsler Adult Intelligence Scale, or WAIS. Since publication of the WAIS, Wechsler extended his scale downward to create the Wechsler Intelligence Scale for Children, or WISC. The third edition of the WAIS (WAIS-III) is the most widely used psychological test in the world, and the fourth edition of the WISC (WISC-IV) is the most widely used intelligence test for children. The Wechsler scales contained separate subscores for verbal and performance IQ, thus being less dependent on overall verbal ability than early versions of the Stanford-Binet scale, and was the first intelligence scale to base scores on a standardized normal distribution rather than an age-based quotient ***(Shuttleworth, 2004)***.

4.5 IQ test structure

IQ tests come in many forms, and some tests use a single type of item or question, while others use several different subtests. Most tests yield both an overall score and individual subtest scores.

A typical IQ test requires the test subject to solve a fair number of problems in a set time under supervision. Most IQ tests include items from various domains, such as short-term memory, verbal knowledge, spatial visualization, and perceptual speed. Some tests have a total time limit, others have a time limit for each group of

problems, and there are a few untimed, unsupervised tests, typically geared to measuring high intelligence.

When standardizing an IQ test, a representative sample of the population is tested using each test question. IQ tests are calibrated in such a way as to yield a normal distribution, or "bell curve" ***(Gottfredson, 1997)***.

4.6 IQ and general intelligence factor

Modern IQ tests produce scores for different areas (e.g., language fluency, three-dimensional thinking), with the summary score calculated from subtest scores. The average score, according to the bell curve, is 100. Individual subtest scores tend to correlate with one another, even when seemingly disparate in content ***(Earl, 2006)***.

4.7 Heritability

The role of genes and environment in determining IQ is reviewed. Heritability was mostly studied in children. Various studies find the heritability of IQ between 0.4 and 0.8 in the United States; that is, depending on the study, a little less than half to substantially more than half of the variation in IQ among the children studied was due to variation in their genes. The remainder was thus due to environmental variation and measurement error. A heritability in the range of 0.4 to 0.8 implies that IQ is "substantially" heritable ***(Devlin et al., 1997)***.

4.8 Environment

Environmental factors play a role in determining IQ. Proper childhood nutrition appears critical for cognitive development; malnutrition can lower IQ. Other research indicates environmental factors such as prenatal exposure to toxins, duration of breastfeeding, and micronutrient deficiency can affect IQ.

It is well known that it is possible to increase one's IQ score by training, for example by regularly playing puzzle games, or strategy games like Chess. Musical training in childhood also increases IQ. Recent studies have shown that training in using one's working memory may increase IQ ***(Olness, 2003)***.

4.9 Sex and IQ:

Most studies claim that despite sometimes significant differences in subtest scores, men and women have quite similar average IQ. Some studies claim that men outperform women on average by 3-4 IQ points. Some studies claim that women perform better on tests of memory and verbal proficiency, for example, while men perform better on tests of mathematical and spatial ability. Male scores display a higher variance: there are more men than women identified with both very high and very low IQs ***(Stumpf and Jackson, 1994).***

4.10 Positive correlations with IQ

4.10.1 School performance

Wherever it has been studied, children with high scores on tests of intelligence tend to learn more of what is taught in school than their lower-scoring peers. Successful school learning depends on many personal characteristics other than intelligence, such as memory, persistence, interest in school, and willingness to study.

Correlations between IQ scores and total years of education are about .55, implying that differences in psychometric intelligence account for about 30% of the outcome variance. Many occupations can only be entered through professional schools which base their admissions at least partly on test scores ***(Ian et al., 2007).***

4.10.2 Job performance

IQ is related to the "academic tasks" (auditory and linguistic measures, memory tasks, academic achievement levels) and much less related to tasks where even precise hand work ("motor functions") are required ***(Schmidt and Hunter, 1998).***

5. BEHAVIORAL AND EMOTIONAL PROBLEMS OF YOUNG CHILDREN

5.1 Introduction:

Behavior is the aspect of psychic that includes impulses, motivations, wishes, drives, instincts and cravings as expressed by a person behavior or motor activities ***(Halmi, 2000).***

Over the past several decades there has been increased interest in the social and emotional development of children. However, it has become increasingly clear that many children who exhibit emotional and behavior problems in their early childhood years will continue to have such problems over time and perhaps throughout their adolescent and even adult years ***(National Institute of Mental Health, 2008).***

5.2 Classification

Behavior disorders are classified into externaling problems, internalizing problems and others. In the following pages these are discussed in details.

Table (11): Classification of emotional and behavioral disorders:

Externalizing problems 1.Attention deficit/ hyperactivity disorder - Predominantly inattentive type - Predominantly hyperactive impulsive type - Combined type 2.Oppositional defiant disorder 3.Conduct disorder
Internalizing problems 1. Separation anxiety disorder 2. Social phobia 3. Obssessive compulsive disorder 4. Specific phobia 5. Panic disorder 6. Major depressive disorder
Other problems 1. Selective mutism 2. Enuresis 3. Encopresis 4. Feeding disorder of infancy or early childhood 5. Pica 6.Rumination 7.Sleep problems 8. Disorders linked to abuse and neglect 9.Post traumatic stress disorder 10.Reactive attachment disorders 11.Pervasive developmental disorders -Autism -Asperger's disorder - Rett's disorder - Childhood disintegrative disorder

(World Health Organization, 2003).

5.2.1 Externalizing problems:

5.2.1.1 Attention deficit hyperactivity disorder:

A group of disorders characterized by an early onset (usually in the first five years of life), lack of persistence in activities that require cognitive involvement, and a tendency to move from one activity to another without completing any one, together with disorganized, ill regulated, and excessive activity. Several other abnormalities may be associated. Those children are often reckless and impulsive, prone to accidents, and find themselves in disciplinary trouble because of unthinking breaches of rules rather than deliberate defiance. Their relationships with adults are often socially disinherited, with a lack of normal caution and reserve. They are unpopular with other children and may become isolated. Impairment of cognitive functions is common, and specific delays in motor and language development are disproportionately frequent. Secondary complications include dissocial behavior and low self esteem ***(World Health Organization, 2003).***

Clinical findings:

The most important diagnostic information comes from a description of behavior in the classroom. If problems with attention or hyperactivity are not evident at school, it is very unlikely that the child has ADHD. Many children with ADHD also show other behavior or learning

problems. The most common behavior problem is aggressive or oppositional defiant disorder. Children with attention deficit or disorder are runlet described as having been active, colicky infants, and parents typically report distractibility and hyperactivity in the preschool period. however, ADHD is usually first recognized as a problem after a child enters school. The diagnosis can sometimes be made with great confidence in preschool children, but the children's behaviors reflect a lack of adequate parental management or the presence of active disturbance ***(Barker, 2004).***

5.2.1.2 Oppositional defiant disorder:

Disruptive behavior that does not include delinquent acts or the more extreme forms of aggressive or dissocial behavior. The disorder requires that the overall criteria be met; even severely mischievous or naughty behavior is not in itself sufficient for diagnosis. ***(World Health Organization, 2003).***

Clinical findings :

Behaviors included in the definition are the following: losing one's temper , arguing with adults , actively defying requests , refusing to follow rules , deliberately annoying other people , blaming others for one's own mistakes or misbehavior , being touchy , easily

annoyed or angered , resentful , spiteful or vindictive . ***(World Health Organization, 2003).***

5.2.1.3 Conduct disorder

Disorders of conduct affect approximately 9% of males and 2% of females under the age of 18 years. This is a very heterogenous population, and there is overlap with learning and other neuropsychiatric disorder, mood disorders, and family dysfunction. Many of these individuals have difficult temperaments and come from broken homes where domestic violence, child abuse, drug abuse, shifting parental figures, and poverty are environmental risk factors. Harsh parental discipline with physical punishment appears to lead to more aggressive behavior in children and adolescents. While social learning partly explains this correlation, the genetic heritability of aggressive conduct and antisocial behaviors is currently under investigation ***(Barker, 2004).***

Clinical picture

Disorders characterized by a repetitive and persistent pattern of dissocial, aggressive, or defiant conduct. Such behavior should amount to major violations of age appropriate social expectations; it should therefore be more severe than ordinary childish mischief or adolescent rebelliousness and should imply an enduring pattern of behavior (six months or longer). Features of conduct disorder can also be symptomatic of other psychiatric

conditions, in which case the underlying diagnosis should be preferred.

Examples of the behaviors on which the diagnosis is based include excessive levels of fighting or bullying, cruelty to other people or animals, severe destructiveness to property, fire setting, stealing, repeated lying, truancy from school and running away from home, unusually frequent and sever temper tantrums, and disobedience. Any one of these behaviors, if marked, is sufficient for the diagnosis ***(World Health Organization, 2003).***

5.2.2 Internalizing problems:

5.2.2.1 Anxiety disorder

Community based studies of school age children and adolescents suggest that nearly 10% of children have some type of anxiety disorder. The child's family and school environment should be evaluated for marital discord, family violence, harsh or inappropriate disciplinary methods and emotional over stimulation. The child's experience of anxiety and its relationship to life events are explored, and the child is taught specific cognitive and behavioral techniques needed to confront the anxiety. Finally, when severe separation or panic anxiety appears to play a prominent role or when the child has persistent obsessive compulsive disorder, psychopharmacologic agents may be helpful. Selective serotonin reuptake

inhibitors may be helpful across a broad spectrum of anxiety symptoms ***(National Institute of Mental Health, 2008).***

Clinical findings of anxiety

Children who have been psychologically traumatized show persistent evidence of fear an anxiety and are hyper-vigilant to the possibility of repetition. They regress of developmentally and experience fears of strangers, of the dark, and of being alone, and avoid reminders of the traumatic event ***(Merlin and Mohr, 2002)***.

Children also frequently re-experience elements of the events in dreams and flashbacks. In their symbolic play, one can often notice a monotonous repetition of some aspect of the traumatic event ***(Barker, 2004).***

5.2.2.2 Mood disorders

The incidence of depression in children increase with age, from 1-3% before puberty to 3-6% of adolescents. The incidence of depression in children is higher when other family members have been affected by depressive disorders. The sex incidence is equal ***(Jeffery et al., 2005).***

In typical mild, moderate or severe depressive episodes, the patient suffers from lowering of mood, reduction of energy, and decrease in activity. Capacity for enjoyment, interest, and concentration is reduced, and

marked tiredness after even minimum effort is common. Sleep is usually disturbed and appetite diminished. Self esteem and self confidence are almost always reduced and even in the mild form, some idea of guilt or worthlessness are often present. The lowered mood varies little from day to day, is unresponsive to circumstances and may be accompanied by so called somatic symptoms, such as loss of interest and pleasurable feelings, waking in the morning several hours before the usual time, depression worst in the morning, marked psychomotor retardation, agitation, loss of appetite, weight loss, and loss of libido. Depending upon the number and severity of the symptoms, a depressive episode may be specified as mild, moderate or severe ***(World Health Organization, 2003)***.

Clinical findings

Clinical depression can be defined as a persistent state of unhappiness or misery that interferes with pleasure or productivity. The dysphoria of depression in children and adolescents is as likely to be an irritable mood state as it is to be a down mood ***(Ollendick and Carolyn, 2003)***.

Typically, a child or adolescent with depression begins to look unhappy and may make comments such a, "I have no friends ..... life is boring.... There is nothing I can do to make things better... I wish I were dead. There is usually a change in behavior patterns that includes social isolation, deterioration in school work, loss of interest in

usual activities, and flashes of anger and irritability. Sleep and appetite patterns frequently change, and the child may complain of tiredness and nonspecific pain such as headaches or stomachaches ***(Barker, 2004).***

5.2.3 Other problems:

5.2.3.1 Enuresis:

A disorder characterized by involuntary voiding of urine, by day and by night, which is abnormal in relation to the individual's mental age, and which is not a consequence of a lack of bladder control due to any neurological disorder, to epileptic attacks, or to any structural abnormality of the urinary tract. The enuresis may have been present from birth or it may have arisen following a period of acquired bladder control. The enuresis may or may not be associated with a more widespread emotional or behavioral disorder ***(World Health Organization, 2003).***

Clinical findings:

Primary nocturnal enuresis is common. The incidence is three times higher in boys than in girls. Most children with enuresis become continent by adolescence or earlier ***(Bectold and Clark, 2005).***

5.2.3.2 Encorpresis:

Is the passage of feces in inappropriate places , it is less common than eneuresis . The child must be at least 4 years to receive a diagnosis of encorpresis, and the inappropriate soiling must occur on a regular places . ***(Rappaport and Schonwald , 2004).***

5.2.3.3 Selective mutism:

Selective mutism involves a persistent failure to speak in specific social situations (e.g., school , with playmates)where speaking is expected , despite speaking in other situations ***.(Gretchen and Melissa , 2003)***

5.2.3.4 Feeding disorders:

Feeding disorders include pica (eating nonfood items) and ruminations (regurgitation and rechewing of food)

(Gretchen and Melissa, 2003)

5.2.3.5 Sleep problems:

Are also commonly reported by parents of young children .It is estimated that at least 25% of preschool-age children have sleep problems, and many of these children continue to have problems for a number of years. In fact, having sleep problems as a child may predict the presence of sleep problems in adulthood. Common sleep problems in young

children include nighttime walkings and problems initiating sleep . ***(Rappaport and Schonwald, 2004).***

5.2.3.6 Pervasive developmental disorders:

Other disorders that often are first diagnosed in the preschool years are the pervasive developmental disorders, including Autism, Asperger's disorder, childhood disintegrative disorder and Rett's disorder. These disorders involve delays and impairments across a number of developmental areas such as social interactions, communications and behavior.

Autism is the best known and most researched of the pervasive developmental disorders. Children must have impairments in social interactions and communication and exhibit restricted / stereotyped behaviors and interests. Difficulties engaging in:

- Age-appropriate play
- Social imitation and responsive behaviors in relation to emotions and social cues of others
- Nonverbal social behaviors.

(Gretchen and Melissa, 2003)

Subjects and Methods

SUBJECTS AND METHODS

Subjects

The present study is a case control study, it was carried out in the period from August 2006 till August 2008, it has been conducted on 150 subjects selected from Chest and Cardiac Outpatient Clinic of Children Hospital, Ain Shams University. They were 83 females and 67 males. Their ages ranged from 6 to 12 years. They were classified as follows:

1. **Study group:** including 100 children subdivided into:
   - 50 cases with bronchial asthma (Group A).
   - 50 cases with rheumatic heart disease (Group B).
2. **Control group:** Including 50 age and sex matched children (group C)

Inclusion criteria

- All children included in the study range from 6-12 years.
- The bronchial asthma children classified according to GINA (global intiative of asthma) guidelines 2005 into intermittent, mild persistent, moderate persistent and severe persistent, with history of asthma more than 6 months.

- Rheumatic heart cases diagnosed according to NYHA (New York Heart Association) with history of the disease not less than 6 months.

Exclusion criteria

- Age less than 6 years and more than 12 years.
- Any child has other chronic disease or both bronchial asthma and rheumatic heart disease together is excluded.
- Any child with known mental retardation or any mental illness is excluded.

Methods

All cases were subjected to:

I. Careful history taking including

- Age
- Sex
- Motor development
- Vaccination
- Past history of previous illness
- History of allergy
- History of chronic disease.
- Family history of same medical condition.

- Socioeconomic status using the socioeconomic standard scoring system of ***Ibrahim and Abdel Ghaffar (1990)*** (Appendix 2). This was determined by applying a questionnaire to parents of the child asking about:

1. Education of the mother.
2. Occupation and education of the father.
3. Family size.
4. Family income.
5. Crowdness of the house and relation of the family members to the number of rooms in the house.

This questionnaire was scored 3, 2, 1 for each question and subjects were divided into three socioeconomic levels.

1. High socioeconomic standard, those with scores from 12-15.
2. Middle socioeconomic standard, those with scores from 9-12.
3. Low socioeconomic standard those, with scores less than 9.

II. Thorough clinical examination including:

a) General examination e.g., temperature, respiratory rate, heart rate, blood pressure.

b) Systemic examination of chest and cardiovascular examination.

III. Behavioral evaluation using the *"Quay and Paterson Revised Child Behavior Checklist (2001) the Arabic Version"* which consists of 89 questions asked to the parents to screen and diagnose behavioral and emotional status in children.

According to their system, emotional/behavioral disorders are divided into six classifications. These six categories are used in describing cases that have emotional/behavioral disorders. The classification of typical behaviors are as follows:

1. **Conduct disorder (CD):** Antisocial, acting out, disruptive, temper tantrums, uncooperative, negative, argumentative, blames others, selfish, cruel.

2. **Socialized aggression (SA):** Also called socialized delinquents; associates with bad companions, may belong to a gang, steals, cheats, lies, truant, runs away from home, thinks highly of others who break laws or violate moral codes.

3. **Attention problems immaturity (AP):** Short attention span, distractible, impulsive inattentive, acts younger than they are, has trouble following directions.

4. **Anxiety-withdrawal (AW):** Anxious, avoids, self conscious, sensitive, depressed, fearful, believes they will always fail, difficulty making decisions, complains of feeling sick.

5. **Psychotic behavior (PB):** Difficulty differentiating between reality and fantasy, hallucinations, delusional thinking; e.g., childhood schizophrenia.

6. **Motor Excess (ME):** Hyperactive, difficulty sitting still, fidgety, appears nervous, jumpy.

The questionnaire was formed of 89 items, for each item, the parent has to choose between never (= 0), sometimes (=1), almost (=2). Cut off for each behavioral disorder was as follows: CD (23), SA (17), AP (16), AW (10), PB (6), ME (5).

IV. Good enough test of Harris:

It can be briefly described according to ***Terman (1928)*** as follows:

1. It utilizes nothing but the child's single drawing a man.

2. It is accordingly non verbal.

3. It requires no more than 10 minutes for testing an entire class or group of children plus 2 minutes per child for scoring.

4. It is useful chiefly with children from chronological age 4 to 12 years.

5. It's reliability for a single unselected age group in this range lies between 80 to 90.

Terman (1928) stated that it appears that the scores earned on the good enough scale are not easily influenced by the ordinary school instruction in drawing and that the results of the specific coaching are not very persistent.

Test procedure: each child is provided with a pencil and a test blank.

The following instructions are then given: "On this paper I want you to make a picture of a man, make the very best picture that you can. Take your time and work very carefully. Try very hard and see what good pictures you can make.

Score is given for inclusions of individual body parts, clothing details, a total of 51 scorable items in man scale are selected on the basis of age differentiation, relation to total scores of the test and relation to group intelligence test

scores. This test gives an idea about the level of mental maturity of the child which depends on:

a) Perception of similarities and differences.

b) Abstraction

c) Generalization

The raw scores were calculated according to the rules of scoring of this test then the tables of norms found by ***(Mohammed Metwally Ghounema, 1976)***, were used to find the IQ according to age and sex.

Consequently IQ is then evaluated according to the following grades of IQ.

- Profound MR below 20 or 25.
- Severe MR 20-25 to 35-40.
- Moderate MR 35-40 to 50-55.
- Mild MR 50-55 to about 70.
- Border line 70-79.
- Dull average 80-90
- Average 90-110
- Bright normal 110-120
- Superior 120-130
- Very superior 130 and above.

The intelligence quotient is determined by the following equation:

$$IQ = \frac{\text{Mental age}}{\text{Chronological age}} \times 100$$

V- Statistical Analysis:

This study is a case control study, the collected data is introduced to a PC where statistical analysis was performed using SPSS 10th edition (statistical Package of Social Science) (V 15.2, Echosoft Corp. USA, 2006).

Data were expressed as mean±SD for quantitative measures and both number and percentage for categorized data.

The following tests were done for analysis:

1. Comparison between two independent mean groups for parametric data using student t test.

2. Chi-square test to study the association between each 2 variables or comparison between 2 independent groups as regards the categorized data. The probability of error at 0.05 was considered significant, while at 0.01 and 0.001 are highly significant.

3. Calculated relative risk assessments (relative risk ratio or RRR) that measure how many times the risk was present among diseased individuals as that among non

diseased ones. They were calculated as absolute figures (for sample level study) and as a standard error of estimate (95 percentile confidence interval) (for population level study).

Limitations of the study:

There were many routine obstacles that prevented me to achieve this work inside the hospital department and I was forced to work only in the outpatient clinic with limited number of cases and this affected the timing also to end my work .

Results

RESULTS

As previously mentioned, the subjects of this study were 150 in number, 50 bronchial asthma cases (group A), 50 rheumatic heart cases (group B), 50 control (group C).

Group A (asthmatic group) were further classified according to GINA asthma guidelines into: intermittent, mild persistent, moderate persistent and severe persistent.

The results of the study will be presented as follows:

Table (12): Comparison between groups as regards age

	Age			
	Min	**Max**	**Mean**	**SD**
Group A	6	10	8.21	0.67
Group B	6	12	8.94	0.89
Group C	6	12	8.16	1.52

The above table shows representation of the age in all studied groups.

Table (13): Sex distribution among studied children

	Sex				Total	
	Males	**% within group**	**Females**	**% within group**	**N**	**%**
GroupA	26	52%	24	48%	50	100%
Group B	22	44%	28	56%	50	100%
Group C	19	38%	31	62%	50	100%
Total	67	45%	83	55%	150	100%

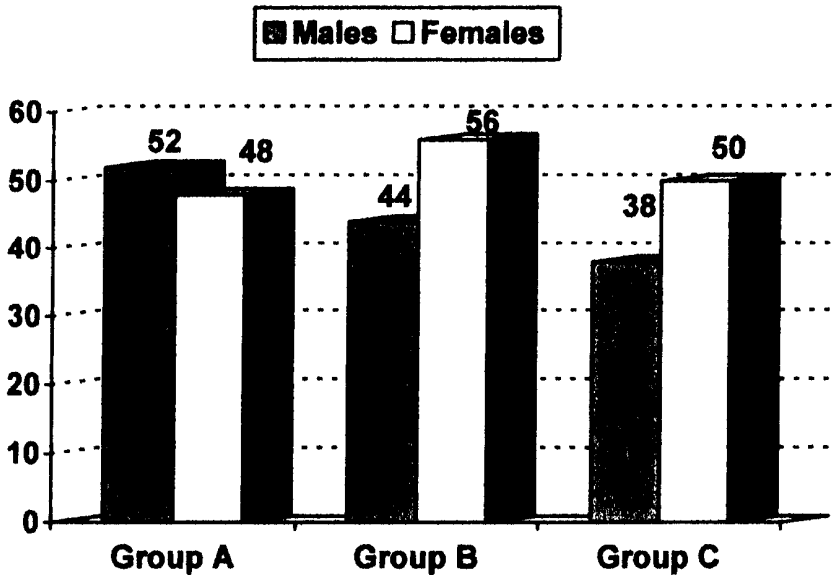

Figure (3): Sex distribution among studied groups

The above table and figure shows representation of males and females by percentage among all studied groups.

Table (14): Socioeconomic level among studied groups (according to Ibrahim and Abd El Ghaffar scoring system)

	Low		Middle		High		Total	
	n	% within group	n	% within group	n	% within group	n	% within group
Group A	41	82%	9	18%	0	0%	50	100%
Group B	40	80%	10	20%	0	0%	50	100%
Group C	41	82%	9	18%	0	0%	50	100%
Total	122	81%	28	19%	0	0%	150	100%
Chi	0.957							
P	0.05 N.S.							

The above table shows representation of socioeconomic level according to ***Ibrahim and Abdel Ghaffar*** scoring system, where most of the studied subjects are of the low socioeconomic class.

Table (15): Distribution of asthmatic group (group A) according to GINA asthma classification

	N	%
Intermittent	9	18%
Mild persistent	7	14%
Moderate persistent	34	68%
Severe persistent	0	0%
Total	50	100%

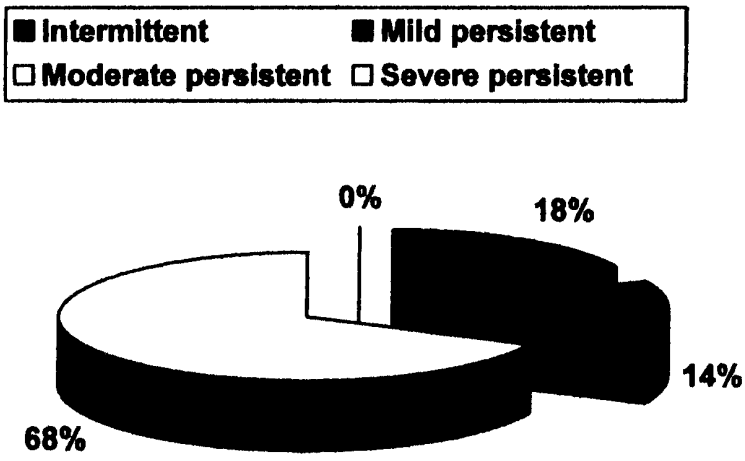

Figure (4): Distribution of asthmatic group according to GINA asthma classification

Table (16): Descriptive data of IQ among groups

	IQ level	
	Mean	**SD**
Group A	90.21	11.05
Group B	90.82	9.41
Group C	91.1	8.6

Table (17): Student t test for IQ

	t	p	Significance
Difference between group A and B	-1.56	0.12	> 0.05 NS
Difference between group B & C	-0.16	0.88	> 0.05 NS
Difference between group A and C	-1.75	0.08	> 0.05 NS

The above tables shows representation of IQ scores reported by Draw a man test in all studied groups where the mean score in the asthmatic group was the lowest of all groups.

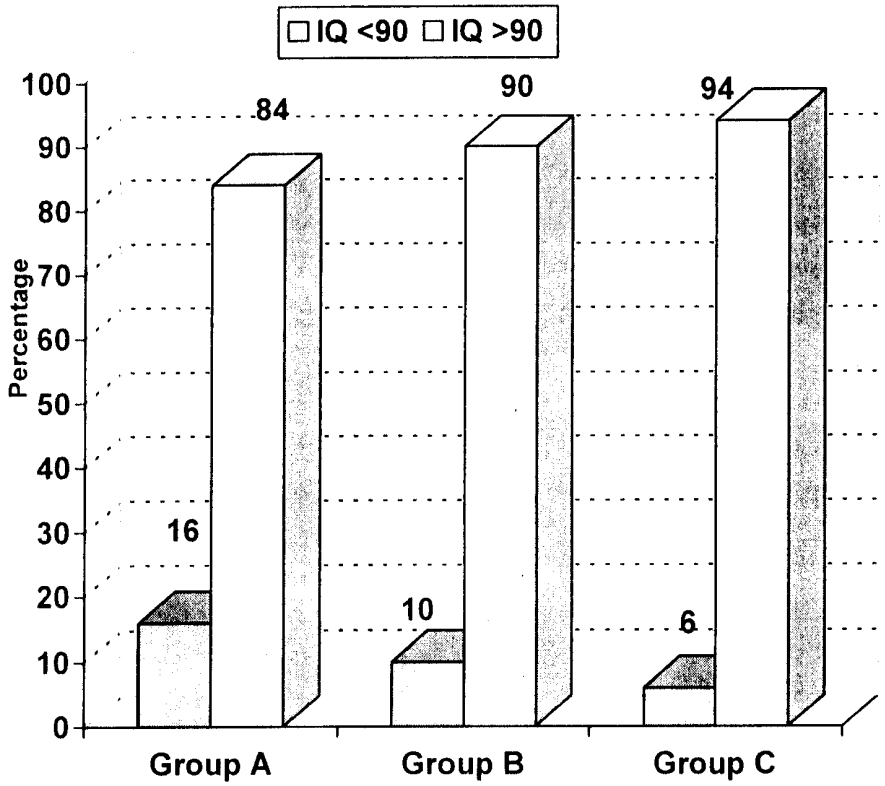

Figure (5): Comparison between all studied groups as regards IQ

The above figure shows representation of IQ scores among all studied groups reported by draw a man test.

Table (18): Comparison between groups as regard IQ Scores

	IQ				Total	
	IQ (≥ 90)	% within group	IQ (<90)	% within group	n	%
GroupA	42	84%	8	16%	50	100%
GroupB	45	90%	5	10%	50	100%
GroupC	47	94%	3	6%	50	100%
Total	134	89%	16	11%	150	100%

Table (19): Chi square test for IQ Scores

	Value	p	Significance
Difference between group A and B	0.796	0.372	> 0.05 NS
Difference between group B & C	0.543	0.461	> 0.05 NS
Difference between group A and C	2.554	0.110	> 0.05 NS

The above tables show comparison between all studied groups in IQ scores reported by draw a man test where 16% of group A shows IQ scores less than 90 while only 10% in group B had IQ scores less than 90.

Table (20): Comparison between groups as regards conduct disorder

	Conduct disorder				Total	
	Positive	% within group	Negative	% within group	n	%
GroupA	5	10%	45	90%	50	100%
Group B	6	12%	44	88%	50	100%
Group C	3	6%	47	92%	50	100%
Total	14	9%	136	91%	150	100%

Table (21): Chi square test for conduct disorder

	Value	p	Significance
Difference between group A and B	0.102	0.749	> 0.05 NS
Difference between group B & C	1.099	0.295	> 0.05 NS
Difference between group A and C	0.543	0.461	> 0.05 NS

The above tables show representation of conduct disorders found among all studied groups where group B had the highest percentage of conduct disorder.

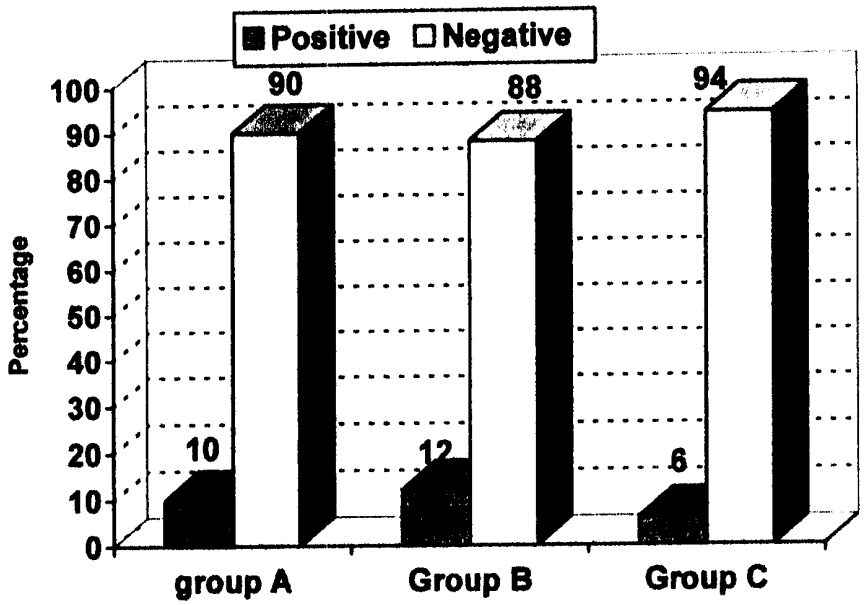

Figure (6): Comparison between all studied groups as regards conduct disorder

The above figure shows representation of conduct disorder found among all studied groups reported by Child behavior checklist.

Table (20): Comparison between groups as regards socialized aggression

	Social aggression				Total	
	Positive	% within group	Negative	% within group	n	%
GroupA	6	12%	44	88%	50	100%
Group B	4	8%	46	92%	50	100%
Group C	4	8%	46	92%	50	100%
Total	14	9%	136	91%	150	100%

Table (21): Chi square test for socialized aggression

	Value	p	Significance
Difference between group A and B	0.444	0.505	> 0.05 NS
Difference between group B & C	0.000	1.000	> 0.05 NS
Difference between group A and C	0.444	0.505	> 0.05 NS

The above tables show representation of socialized aggression found among all studied groups where the most affected group is the asthmatic group.

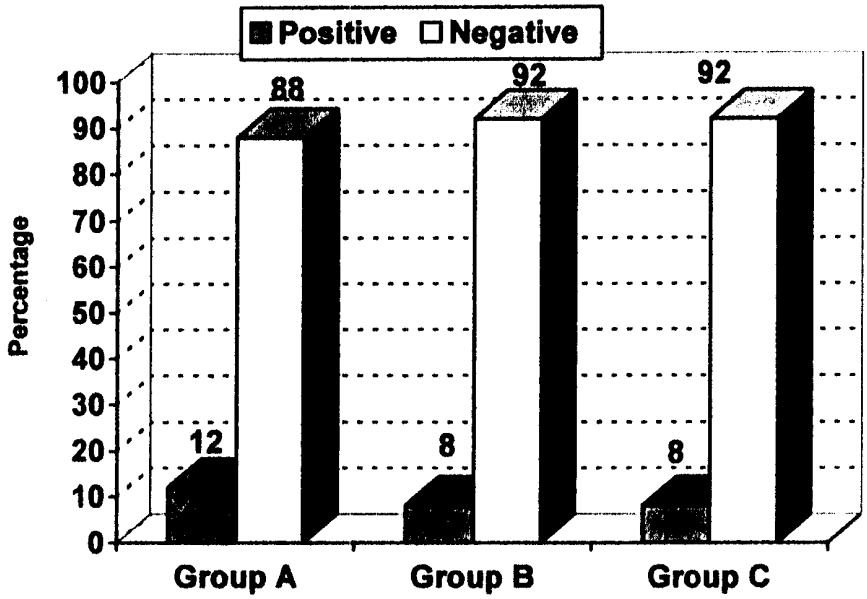

Figure (7): Comparison between all studied groups as regards socialized aggression

The above figure shows representation of socialized aggression disorder found among all studied groups reported by Child behavior checklist.

Table (22): Comparison between groups as regards motor excess.

	Motor excess				Total	
	Positive	% within group	Negative	% within group	n	%
GroupA	10	20%	40	80%	50	100%
Group B	10	20%	40	80%	50	100%
Group C	9	18%	41	82%	50	100%
Total	29	19%	121	81%	150	100%

Table (23): Chi square test for motor excess

	Value	p	Significance
Difference between group A and B	0.000	1.000	> 0.05 NS
Difference between group B & C	0.065	0.799	> 0.05 NS
Difference between group A and C	0.065	0.799	> 0.05 NS

The above tables show representation of motor excess found among all studied groups where groups A & B are equally affected by motor excess.

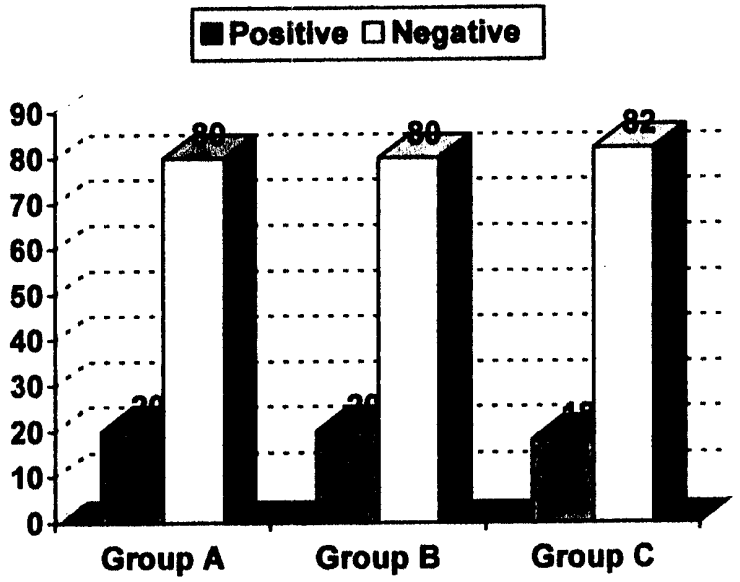

Figure (8): Comparison between all studied groups as regards motor excess

The above figure shows representation of motor excess found among all studied groups reported by Child behavior checklist.

Table (24): Comparison between studied groups as regards anxiety

	Anxiety				Total	
	Positive	% within group	Negative	% within group	n	%
GroupA	7	14%	43	86%	50	100%
Group B	9	18%	41	82%	50	100%
Group C	5	10%	45	90%	50	100%
Total	21	14%	129	86%	150	100%

Table (25): Chi square test for anexity

	Value	p	Significance
Difference between group A and B	0.298	0.585	> 0.05 NS
Difference between group B & C	1.329	0.249	> 0.05 NS
Difference between group A and C	0.379	0.538	> 0.05 NS

The above tables show representation of anxiety disorders found among all studied groups where group B is the most affected group.

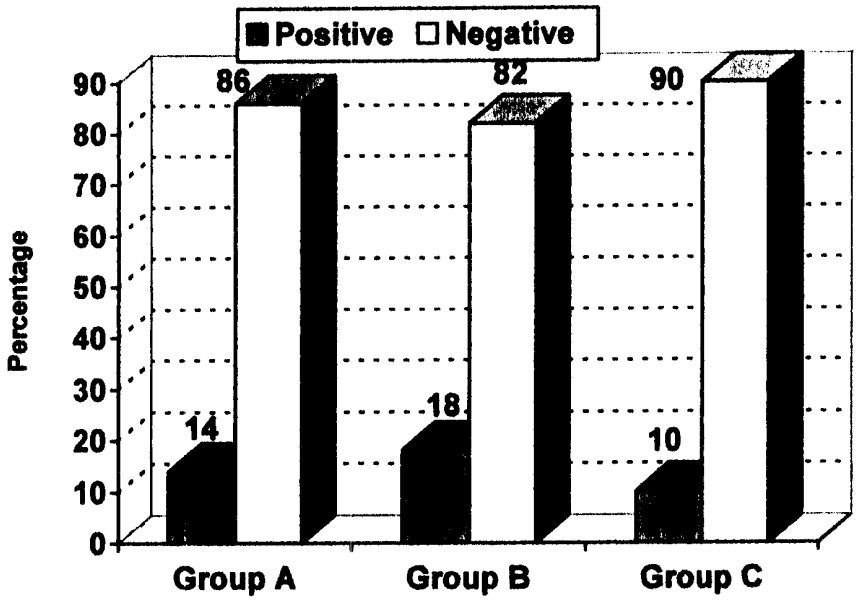

Figure (9): Comparison between all studied groups as regards anxiety

The above figure shows representation of anxiety disorder found among all studied groups reported by Child behavior checklist.

Table (26): Comparison between studied groups as regards psychotic behavior

	Psychotic behavior				Total	
	Positive	% within group	Negative	% within group	n	%
GroupA	4	8%	46	92%	50	100%
Group B	5	10%	45	90%	50	100%
Group C	4	8%	46	92%	50	100%
Total	13	9%	137	91%	150	100%

Table (27): Chi square test for psychotic behavior

	Value	p	Significance
Difference between group A and B	0.122	0.727	> 0.05 NS
Difference between group B & C	0.122	0.727	> 0.05 NS
Difference between group A and C	0.000	1.000	> 0.05 NS

The above tables show representation of psychotic behavior found among all studied groups where group B is the most affected group.

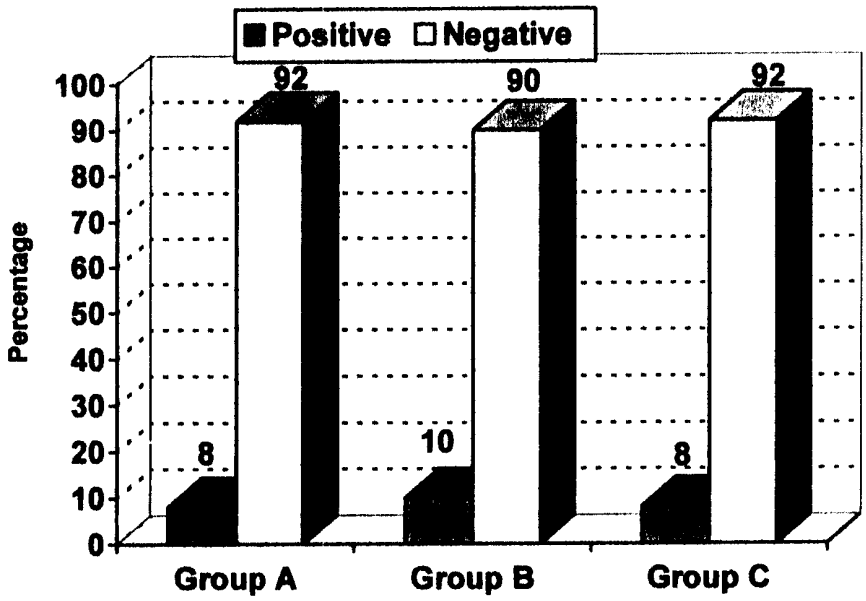

Figure (10): Comparison between all studied groups as regards psychotic behavior

The above figure shows representation of psychotic behavior found among all studied groups reported by Child behavior checklist.

Table (30): Comparison between studied groups as regards attention problems

	Attention disorder				Total	
	Positive	% within group	Negative	% within group	n	%
GroupA	11	22%	39	78%	50	100%
Group B	8	16%	42	84%	50	100%
Group C	10	20%	40	10%	50	100%
Total	29	19%	121	81%	150	100%

Table (28): Chi square test for attention problems

	Value	p	Significance
Difference between group A and B	0.585	0.444	> 0.05 NS
Difference between group B & C	0.271	0.603	> 0.05 NS
Difference between group A and C	0.060	0.806	> 0.05 NS

The above tables show representation of attention problems found among all studied groups .The asthmatic group is the most affected where 22 % of them had attention disorder.

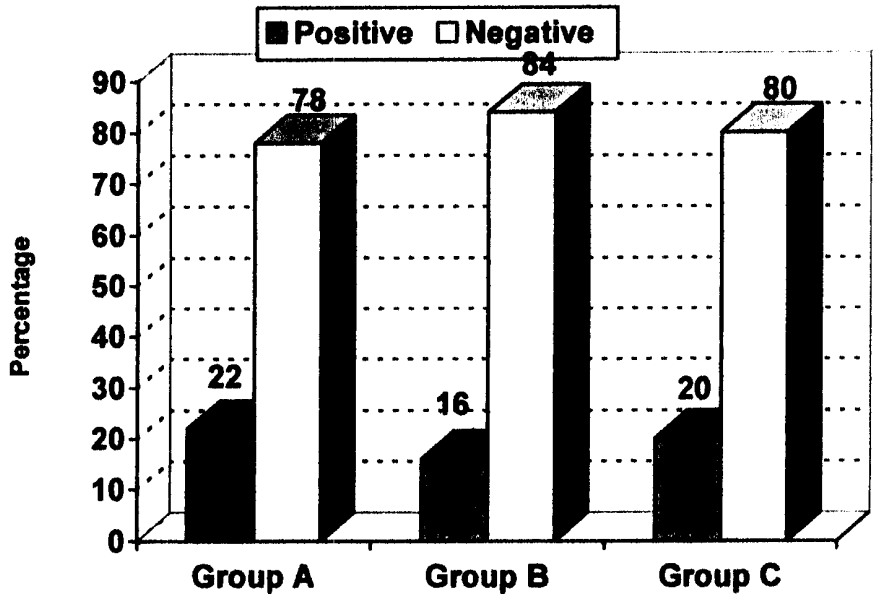

Figure (11): Comparison between all studied groups as regards attention problems

The above figure shows representation of attention problems found among all studied groups reported by Child behavior checklist.

Table (29): Association between bronchial asthma and different behavioral disorders

Behavioral disorder	Odd's ratio	RRR
Social aggression	1.278	0.638
Attention problems	1.231	0.675
Motor excess	1.000	1.000
Conduct disorder	0.906	1.227
Psychotic anxiety behavior	0.890	1.278
Anxiety	0.868	1.348

RRR = Relative risk ratio

Table (30): Association between rheumatic heart disease and different behavioral disorders

Behavioral disorder	Odd's ratio	RRR
Conduct disorder	1.549	0.468
Anxiety	1.465	0.506
Psychotic behavior	1.137	0.783
Motor excess	1.069	0.878
Social aggression	1.000	1.000
Attention problems	0.878	1.313

RRR = Relative risk ratio

Discussion

DISCUSSION

Asthma is a chronic inflammation of the lungs in which the bronchi are reversibly narrowed. Asthma affects about 300 million person world wide. During attacks breathing becomes difficult. Attacks can be prevented by avoiding triggering factors and by drugs ***(Tippets and Guilbert, 2009)***.

In addition ,rheumatic fever used to be a common disease among children in developing countries. It was a major cause of death in children until 1960 and common cause of chronic heart disease ***(Cilliers, 2006).***

This is a case control study ,it was conducted on 150 children selected from Chest and Cardiac outpatient clinic of children Hospital , Ain Shams university. 67of them were males and 83 were females , their age ranged from 6-12 years (primary school age).

The subjects of the study were classified into study group which is further divided into two groups asthmatic (50 children) and rheumatic (50 children) and control group of 50 children age and sex matched.

All the groups were subjected to careful history taking , physical examination and were examined for IQ and behavioral problems .

The study was held in two years interval extending from August 2006 till August 2008.

The sample had an advantage of being done on a homogenous sample regarding the age (primary school age) as well as cultural and Socioeconomic background where all the subjects fell in the low and middle socioeconomic level according to ***Ibrahim and Abdel Ghaffar (1990)***though our short coming lies in the relatively small sample size.

The age and sex of all groups were matching in this study (table 12 & 13).

On comparing sex between patient groups and control groups , in group B (rheumatic fever group) females percentage (56%) are slightly higher than males (44%) (table 13 and figure 3). This coincides with the fact that in Egypt, females in low socioeconomic class spend more time in doors under bad housing conditions with greater liability to repeated streptococcal infections, thus leading to a higher incidence of rheumatic fever ***(Kassem et al., 1982).***

As regards the socioeconomic factors in both study groups (asthmatic and rheumatic fever groups) were of low and middle socioeconomic level (table 14). This came in agreement with ***(Kaplan, 1992)*** who said that increased number of cases occur in socially and economically low groups, this may be due to deficiency in seeking medical services .

The results found in this study that the distribution of asthmatic group (group A) according to GINA asthma classification was as follows: intermittent asthma 18% of total patients, mild persistent 14%, moderate persistent 68% and there were no patients suffering from severe asthma (table 15 & figure 4).

The results of this study are near to those reported by ***El-Defrawi et al. (2000)*** where they found that out of 52 patients with bronchial asthma 17.3% were intermittent 13.1% were mild persistent, 59.6% were moderate persistent and 10% were severe.

I- IQ assessment:

Good enough draw – a man test which was used in the present study is one of the performance individual tests. It is suitable for this study as it covers the age range included in it (from 6 to 12 years). Besides, it is reliable standardized test.

Good enough draw a man test was used for research work in bronchial asthma and rheumatic fever by ***(Gil et al., 1993)*** in Brazil, ***(El-Defrawi et al., 2000)*** in Port Said, Egypt and ***(Schliper, 1991)*** USA.

Regarding IQ in this study was divided into IQ scores (≥90) or subnormal (<90). This is the same division used by ***(El-Defrawi et al., 2000)*** in his study.

Regarding the percentage of IQ scores (<90) in group A (asthmatic) it was 16% of total number, this percentage is higher than that found in control group (6%), yet, this difference is not statistically significant (p=0.11)(tables 18 & 19, figure 5).

The lower IQ scores in those patients may be due to repeated absence from the school.

These results are close to results identified by ***(El-Defrawi et al., 2000)***in Port Said , who reported 13% of 40 patients suffering from bronchial asthma had subnormal IQ (<90) in relation to his control group this percentage was statistically insignificant. The same findings were observed by ***(Schlieper, 1991 and Gil et al., 1993)***

The present study revealed that IQ scores in group B (rheumatic fever group) were less than 90 in 10% of the 50 cases in comparison to 6% in control group (groupC)

(Tables 18&19 ,fig.5) this difference is not statistically significant(p=0.461) .

This was in agreement with ***(Fardous, 1994)*** who found in her study on Egyptian rheumatic cardiac children that there was statistical insignificance between patients with subnormal IQ scores (18%) in comparison to control subnormal IQ scores (8%).

Another Egyptian study ***(Fadia, 1997)*** reported in her results non significant difference between IQ scores in 50 rheumatic fever patients and their control.

II- Prevalence and description of behavioral and emotional problems

The large variability in the prevalence of emotional and behavioral problems in primary school age shown among different studies including the present study is supported by the systemic review conducted by ***Macdonnell and Gold (2003)*** on 52 studies published on the prevalence of child's psychopathology. The child behavior check list was the most frequently used instrument in these studies.

The child behavior check list contains items which cover the child's membership in groups, its participation and skill in sports, school functioning and peer relationship.

It is used as screening instruments and diagnostic tools of behavioral and emotional status in children with mental and development disturbances ***(Kronenberg et al., 1988)***.

Regarding the prevalence of conduct disorder among asthmatic group (group A) it was found that the prevalence is higher (10%), than prevalence in control group (group C) which is about 6% although this difference is not statistically significant(p=0.461) (tables 20 & 21, figure 6).

This result fall within the published range of conduct disorder in asthmatic patients. This is supported by ***McQuaid et al., (2001)*** in his study conducted on 5000 children with asthma, the prevalence of conduct disorder is 8%. Results did not show statistical difference on comparing groups (healthy control versus asthmatics) .

These findings are also reported by ***Maclean et al., (1995)*** in his study on 81 asthmatic children using CBCL , and he found no statistical difference between asthmatic and control groups as regards conduct disorder .

These results are also reported by ***Rajesh et al. (2008)*** in their study in India where 13% of the asthmatic group had conduct symptoms .

Regarding the prevalence of conduct disorder in rheumatic fever group (group B) the present study showed

that it is about 12% which is higher than the control group (group C) 6 %. This difference has no statistical significance (p=0.295) (tables 20 & 21, figure 6).

This result is also similar to the range recorded by ***Fadia (1997) and Richman et al. (1982)*** which is (5-10%).

As regard socialized aggression this study reported its prevalence in asthmatic group (group A) 12%, it is higher than control group (group C) which is 8%, yet this difference is not significant statistically (p=0.505) (tables 22 & 23, figure7).

This is coincident with results reported by ***Bruzzese et al. (2009)*** in his study on 765 asthmatic patients, where he found that those patients were more likely have current symptoms of social aggression.

On the other hand, ***Perrin et al. (1995)*** found the children at all levels of asthma severity may demonstrate increased social aggression.

In another study by ***Roder et al. (2003)***in Netherland conducted on 79 children with asthma , he reported that children with asthma had higher levels of use of aggression when coping with problems.

It is clear from (tables 22 ,23 &figure7)that rheumatic fever group (group B) showed the same percentage of socialized aggression 8% as control group (group C) .

And this is in disagreement with ***Omar (1990)*** who reported that social aggression in El-Sharkeya governorate was 12% & In El-Menoufia governorate 16% of rheumatic cardiac children has social aggression .This may be due to the larger sample size as he examined 500 children.

The result of the current study reported 10% of asthmatic group having motor excess in comparison to 9% in control group (group C) this difference is statistically insignificant (p=0.799) (tables 24 & 25, figure 8).

This result goes with the results reported by ***Gil et al. (1993),*** who reported motor excess in asthmatic patients higher than the control group . ***Schliper (1991)*** also reported similar results .

As regards the motor excess prevalence in rheumatic fever group (group B), it was (10%) and the control group was 9 % (p=0.799)(Table 24& 25, figure 8).

These results are in agreement with ***Marcos et al. (2000)*** in their study in Sao Paulo, Brazil on 42 rheumatic patients where they found frequency of motor excess is 10%.

It is clear from tables 26,27 & figure 9 that the prevalence of Anxiety in asthmatic group (group A) was 14% compared to 10% only in the control group (group C) but this difference is not statistically significant (p=0.538)

This is in concordance with ***Katon et al. (2007).*** In their study on 781 asthmatic patient they found that 16.3% of patients with asthma compared with 8.7% without asthma met DSM-IV criteria for anxiety.

Szabo et al. (2007) found in their study in Hungaria on 108 asthmatic patient that anxiety is present in 9.3% of cases.

In another study ***McCauley et al. (2007)*** reported that from 767 asthmatic youth 16% met DMS-IV criteria for anxiety.

Espinosa et al. (2006) and his colleges in Spain , found that 18% of asthmatic patients had anxiety

As regard the anxiety prevalence in the present study it was found that 18% of rheumatic fever, (group B) had anxiety in comparison to 10% in control group (group C) (table 26& 27, figure 9) this difference has no significance statistically (p=0.249).

Marcos et al. (2000) in their study found that out of 62 rheumatic patients 16% had anxiety, this result is in concordance with the results of the present study.

As regards psychotic behavior in asthmatic group (group A), it was found that 8% had psychotic behavior, in comparison to 8% in control group (group C) (table 28 &29, figure10) i.e. there is no difference between the 2 groups (p=1.000).

Gil et al. (1993) reported that the final evaluation of asthmatic patients showed no changes in the psychological tests for psychotic behavior, this is in concordance with our results.

In the rheumatic fever group (group B), the prevalence of psychotic behavior was 10% in comparison to control group, it was 8% the difference is statistically insignificant (p=0.727) (table 28 & 29, figure10).

This data is in concordance with the data published by ***Marcos et al. (2000)*** in their study in USA, where they found 12.5% of rheumatic fever patients had psychotic behavior.

Regarding attention problems ,the results of the present study revealed that the prevalence of attention disorder in asthmatic group (group A) is 22% which is higher than the percentage found in the control group

(group C) where it is 20% this difference is statistically non significant (p=0.806)(tables 30 & 31, figure 11).

Attention problems may be common in asthmatic patients because of the bronchodilators drugs which have a side effect of decreased attention span .

In bronchial asthma patients ***Biederman et al. (1994)*** reported that the percentage of ADHD in those patients was 12%. They conducted their study on 140 asthmatic subject 6-17 years old and 120 controls from their first degree relatives.

The observation of ADHD symptoms in an asthmatic child should not be dismissed as being a consequence of asthma since many asthmatic ADHD children may actually have ADHD.

Similarly, ***McGee et al. (1993)*** reported that attention deficit symptoms were not related to the level of asthmatic responsiveness.

In another study ***Roth et al. (1991)***, found that in their research in Germany there is no relation between asthma and attention deficit.

As regard the attention problems in the rheumatic fever group (group B), the present study revealed that it is present in 16% and in the control group (group C) it is

reported 20%, this difference is of no statistical significance (p=0.603) (table 30 & 31, figure 11).

The results of the present study are supported by results of ***Fadia (1997)*** in her study, she found that 15% of rheumatic fever cases had ADHD.

Marco's et al. (2000) in their study on 62 patients of rheumatic fever found that 23.8% if them had ADHD.

It was observed from the table 32 that the Odd's Ratio of behavioral disorders in association with bronchial asthma (group A) was as follows: the commonest association is social aggression, followed by attention problems, the least association is with anxiety behavior.

The same findings were observed by ***Reichenberg and Broberg (2004)*** who conducted his study on 304 asthmatic patients and found that the most common association was the attention disorders.

In another study in USA ***Bussing et al. (1995)*** found that cases of severe asthma has 2.9 odd's ratio in comparison to 1.2 odd's ratio for mild asthma association with attention deficit.

In Egypt ***El Dafrawi et al. (2000)*** reported that bronchial asthma patients are affected most commonly with ADHD and least by anxiety, this is near to our results.

Similarly, ***Sameh (1994)*** stated that most common behavioral disorder in primary school children is ADHD.

In the present study the odd's ratio for behavioral disorders in rheumatic fever group (group B) was as follows: the most common associated behavior disorder was conduct disorder followed by anxiety disorder and the least associated is attention problem (table 33).

This result is in disagreement with ***Hoda (1986)*** who found that the most common associated behavioral disorder in these patients is attention deficit.

The little difference in concordance between our study and the others might be due to the difference in methodology (statistical tests used, their cut off points) and sample characteristics since our sample was done in one hospital with the same socioeconomic standard.

Summary

SUMMARY

Asthma is one of the commonest of all chronic diseases of children. Its prevalence has increased in the past few years.

Rheumatic fever is one of the most important causes of physical disability. It may influence the child's behavior and may be associated with lower intelligence scores than healthy children probably due to increased absenteeism from school and lower social class of these children.

The present study is a case control study and was conducted on 150 children 83 of them were females and 67 are males.

Their ages ranged from 6-12 years. They were classified into 2 groups study groups and control group.

The study groups were subdivided into 2 groups: bronchial asthma cases (group A) they were 50 in number and rheumatic fever group (group B) they were 50 cases also.

The control (Group C) are age and sex matched children .

The study was held in chest and cardiac outpatient clinic of children hospital, Ain Shams University in the period from August 2006 till August 2008.

All cases were subjected to careful history taking, thorough clinical examination, socioeconomic standard scoring system of ***Ibrahim and Abdel Ghaffar (1990)*** according to which subjects are classified into high, middle or low social class.

All cases of the study are also subjected to ***Quay and Paterson revised child behavior Checklist (2001)*** the Arabic version, according to which the subjects are diagnosed for presence of conduct disorder, socialized aggression, attention problems, anxiety, psychotic behavior or motor excess. Determination of IQ using good enough test of Harries also is done and scores are calculated by specialized psychologist.

Statistical analysis of the obtained data showed that all the subjects are of low (81%) or middle (19%) socioeconomic level.

18% of asthmatic patients were having intermittent asthma, 14% mild persistent, and 68% are moderate asthma.

Percentage of children having bronchial asthma and IQ scores (<90) is 16% compared to 6% for control group (p=0.11).

Percentage of children having rheumatic fever and IQ scores less than 90 is 10% compared to 6% for control group (p=0.461) .

Percentage of conduct disorder in asthmatic group is 10% compared to 6% in control group (p=0.461).

Percentage of conduct disorder in rheumatic group is 12% compared to 6% in the control group (p=0.295).

Percentage of socialized aggression in asthmatic group was 12% compared to 8% in control group (p=0.505).

Regarding rheumatic group, percentage of socialized aggression is 8% compared to 8% in control group.

Percentage of motor excess in asthmatic group is 20% compared to 18% in control group(p=0.799).

Regarding rheumatic group, percentage of motor excess is 20% compared to 18 % in control group (p=0.799).

Percentage of anxiety in asthmatic group is 14% compared to 10% in control group (p=0.538).

Percentage of anxiety in rheumatic group is 18% compared to 10% in control group (p=0.249)

8% of the asthmatic patients had psychotic behavior, this was the same percentage in control group (p=1.000). 10% of rheumatic fever group had psychotic behavior compared to 8% in control group (p=0.727)

22% of asthmatic group had attention problems in comparison to 20% in control group(p=0.806). 16% of rheumatic group had attention problems in comparison to 20% in control group(p=0.603)

Although the asthmatic group showed prevalence of conduct disorder 10 %, socialized aggression 12% , motor excess 20% , anxiety 14% , psychotic behavior 8% and attention problems 22% , these differences are not statistically significant .

In the rheumatic group the prevalence of conduct disorder was 12 % , socialized aggression 8% , motor excess 20%, anxiety 18% , psychotic behavior 10% and attention problems 16% but these differences are not statistically significant .

Conclusion

CONCLUSION

In this study there was no deterioration in intelligence in children with bronchial asthma and rheumatic fever at primary school age . Behavioral problems as regards conduct disorder ,anxiety , psychotic problems , socialized aggression , motor excess and attention problems were not related to bronchial asthma and rheumatic fever .

Recommendations

RECOMMENDATIONS

1- Further studies in the field of chronic diseases are recommended also to understand psychological variables in addition to intelligence. Cooperation between researchers in different branches dealing with asthmatic and rheumatic fever patients is also needed.

2- Specialized supporting groups for both parents and patients, for counseling.

3- Addition of behavioral treatment program to the usual medical treatment schedule to asthmatic and rheumatic fever patients.

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Appendix

APPENDIX I

Sheet

Personal history:

- Name:
- Age:
- Sex:
- Residence:
- Nationality:

Complaint:

Present history:

Past history:

- Motor development (school achievement)
- Vaccination
- Previous illness
- Allergy
- Chronic disease
- Operations
- Trauma

Family history

- Siblings
- Same medical condition

EXAMINATION

General Examination

- Observation
- Consciousness
- Appearance
- Respiratory distress
- Measurements
    1. Length
    2. Weight
- Vital signs
    1. Temperature
    2. Respiratory rate
    3. Heart rate
    4. Blood pressure

Regional examination:

- Head and neck
- Face
- Eyes
- Mouth and throat
- Neck
- Upper and lower limbs
- Skin

Systemic Examination

Cardiovascular examination

1. Extracardiac examination
   - Cyanosis
   - Abnormal pulsations
2. Cardiac examination
   - Cardiac enlargement
   - Cardiac murmur
   - Abnormal heart sounds
   - Pericardial rub

Chest examination

Abnormal respiratory sounds:

- Cough:
- Noisy respiratory sounds

Upper respiratory system

- Nose
- Ear
- Throat

Chest examination

Inspection

- Respiratory distress
- Unilateral bulge or retraction

Palpation

- Mediastinal shift
- Palpable rhonchi

Percussion

- Dullness
- Hyperresonance

Auscultation

1. Diminished air entry
2. Abnormal breath sounds:
   - Harsh, vesicular
   - Bronchial breathing
   - Bronchophony
3. Adventitious sounds
   - Crepitation
   - Rhonchi
   - Wheezes

APPENDIX 2

Socioeconomic standard scoring system of *Ibrahim and Abd El Ghaffar (1990)*

A- Education of mother. This was scored as follows:

1. University graduate or more	= score 3
2. Secondary school and its level	= score 2
3. Did not complete primary education	=score 1 or illiterate

B- Occupation and education of the father:

1. Government employees or university graduate	= score 3
2. Skilled laborers or secondary school	= score 2
3. Manual workers or did not complete primary education	=score 1

C- Family size: This was scored as follows:

1. A child or two children	= score 3
2. Three or four children	= score 2
3. Five or more children	=score 1

D- Family income: this was classified as follows

1. More than 400 Egyptian pounds per month = score 3
2. More than 200 Egyptian pounds = score 2
3. One hundred Egyptian pounds or less =score 1

E- Crowdness of house and the relation of the family members to the number of rooms in the house

1. One or two members per a room = score 3
2. Three or four members per room = score 2
3. More than four members per room =score 1

The socio-economic level was determined by using the five parameters mentioned before.

Scores of all parameters were added and the subjects were divided into three socio economic levels.

1. High socioeconomic standard, those with scores from 12-15.

2. Middle socioeconomic standard, those with scores from 9-12.

3. Low socioeconomic standard, those with scores less than 9.

APPENDIX 3

Revised Child Behavior Checklist of Quay & Paterson (2001) Arabic Version

الرقم	السلوك		لا توجد	احيانا	كثيرا
			صفر	١	٢
١	غير مستقر لا يستطيع الجلوس ساكناً	M E			
٢	يسعى لشد الإنتباه. يتباهى ويتفاخر	C D			
٣	يسهر خارج المنزل لساعة متأخرة فى الليل	Ag			
٤	سهل الإحراج (يتحرج بسهولة)	A			
٥	فوضوى ومزعج للآخرين	CD			
٦	عنده شعور بالنقص	A/D			
٧	يسرق حاجات مع شلته	Ag			
٨	يسرح كثيراً ومشغول بنفسه (مشغول بعالمه الخاص)	D			
٩	خجول	A/D			
١٠	منطوى ويفضل النشاط الفردى – لا يلعب مع الأخرين	D			
١١	ينتمى إلى عصابة (شله)	Ag			
١٢	يعيد ويزيد نفس الكلام	P B			
١٣	ضعيف الإنتباه والتركيز	AP/D			
١٤	ضعيف الثقة بالنفس	A/D			
١٥	لا ينتبه لما يقوله الأخرون	A/P			
١٦	يتحدث كلاماً غير مترابط وغير مفهوم	P B			
١٧	مشاكس ومشاغب	C D			

الرقم	السلوك		صفر	١	٢
١٨	ينتمى لأصدقاء السوء المنحرفين	Ag			
١٩	يثور ويتهج عند الغضب	CD			
٢٠	يزوغ من المدرسة مع مجموعة من زملائه	Ag			
٢١	تتأذى مشاعره وأحسايسه بسهولة	A/D			
٢٢	خائف وقلق أغلب الوقت	A			
٢٣	لا يعتمد عليه	AP			
٢٤	صديق لأصدقاء السوء ويحدث مشاكل	Ag			
٢٥	مشدود – لا يستطيع الإسترخاء	ME			
٢٦	يعصى الأوامر	CD			
٢٧	دائم الحزن	D			
٢٨	لا يتعاون فى النشاطات الجماعية	CD			
٢٩	سلبى وسهل التأثير عليه (إمعه)	AP			
٣٠	دائم الحركة وذو نشاط مفرط	ME			
٣١	يمكن شد انتباهه بسهولة عن النشاط الذى يؤديه	AP			
٣٢	يكسر حاجاته وحاجات الأخرين	Ag			
٣٣	عنيد ويفعل عكس ما يطلب منه	CD			
٣٤	بيجح	CD			
٣٥	كسول وبطئ الحركة	AP/D			
٣٦	نائم على نفسه	AP/D			
٣٧	عصبى ويترفز وينهض بسهولة ويقفز كثيراً	ME			

الرقم	السلوك		صفر	١	٢
٣٨	سهل الإستثارة وسريع الغضب	CD			
٣٩	يتحدث عن أفكار غريبة	PB			
٤٠	يجادل ويعارك	CD			
٤١	يتجهم ويبوز	CD			
٤٢	لحوح وزنان	CD			
٤٣	لا ينظر فى عين من يتحدث إليه				
٤٤	يجاوب تلقائياً بدون تفكير	AP			
٤٥	يحتاج إلى المساعدة المستمرة فى أى نشاط يقوم به	AP			
٤٦	يتعاطى المخدرات مع أصدقائه	Ag			
٤٧	مندفع ولا يفكر قبل أن يبدأ أى نشاط	AP			
٤٨	يمضغ أشياء غريبة لا يؤكل (ورق- حصى)				
٤٩	يحاول السيطرة على الآخرين- يهددهم ويرعبهم	CD			
٥٠	لايعرف كيف يصاحب الآخرين رغم رغبته فى ذلك مثلاً يزعجهم – يغيب عليهم - يغيظهم	CD			
٥١	يسرق خارج المنزل	A g			
٥٢	لديه معتقدات خاطئة تماماً (ضلالات)	PB			
٥٣	يقول أن محدش بيحبه	A/D			
٥٤	يتحدى الأخلاق والقيم والقوانين	Ag			
٥٥	يتفاخر ويتباهى	CD			
٥٦	بطئ وغير دقيق فى أنشطته	AP			
٥٧	يبدى عدم الإكتراث فى الأشياء التى حوله				
٥٨	غير دؤوب – يزهق ولا ينهى عملاً بدأه	AP			

الرقم	السلوك		صفر	١	٢
٥٩	ينتمى لجماعة رافضة للنشاطات المدرسية	Ag			
٦٠	غشاش	Ag			
٦١	يفضل مصاحبة من هم أكبر منه عمراً	Ag			
٦٢	يدرك ما يدور حوله ولكن لا يبدى أى اهتمام	D			
٦٣	يفضل الإلتصاق بوالدته أو والده ويرفض البعد عنهم	D			
٦٤	عنده صعوبة فى الإختيار				
٦٥	يغيظ الآخرين	AD			
٦٦	ينسى بسهولة أبسط الأشياء	CD			
٦٧	يتصرف بطريقة أصغر من عمره	AP			
٦٨	عنده مشاكل فى متابعة التعليمات والإرشادات	Ag			
٦٩	يكذب ليحمى أصدقائه	Ag			
٧٠	لا يحب أن يجرب أشياء جديدة خوفاً من الفشل	A/D			
٧١	أنانى – لا يحب أن يشاركه أحد فى شئ وطماع	CD			
٧٢	يشرب الخمر مع أصدقاءه	A g			
٧٣	يتسم نشاطه الدراسى بالفوضى والإهمال	AP			
٧٤	لا يجدى معه مدح الكبار				
٧٥	منعزل بسبب نشاطه العدوانى – يكرهه الأخرون	CD			
٧٦	لا يتسخدم الكلام للتحدث مع الأخرين				
٧٧	لا يستطيع الإنتظار – يريد كل شئ بسرعة فى الحال	CD			
٧٨	يرفض التوجيه والإرشاد	CD			
٧٩	يلوم الأخرين وينكر أخطاءه	CD			

الرقم	السلوك		صفر	١	٢
٨٠	يميل لأصدقاء ثقيلى الظل وغير مريحين	CD			
٨١	لا يستجيب للعقاب	SA			
٨٢	يتملل ومبيبطلش حركة	ME			
٨٣	يتعمد القسوة على الآخرين	CD			
٨٤	يحس انه مش ممكن يقدر ينجح	AN			
٨٥	يتحدث عن خيالاته كأنها واقع حدث بالفعل	PB			
٨٦	متبلد العواطف – لا يحضن ولا يقبل أفراد اسرته				
٨٧	يهرب من المنزل	SA			
٨٨	يتقبل ويثير إعجابه بالخارجون على القانون	SA			
٨٩	يشبه الببغاء فى حديثه – يكرر ما يقال له	PB			

APPENDIX 4

GOOD ENOUGH TEST OF HARRIS

أختبار رسم الرجل والمرأة كمؤشر لقياس درجة الذكاء

اســـــم التلميـــــذ :

تـــــاريخ المـــــيلاد :

تـــــاريخ الإختبـــــار :

اســـــم المدرســـــة :

درجـــــة الإختبـــــار :

العمـــــر العقلـــــى :

العمـــــر الزمنـــــى :

نســـــبة الـــــذكاء :

اختبار رسم الرجل (جود إيناف هاريس)
معايير التصحيح

الرقم	الاجـــزاء التـــى تحســـب عنهـــا الدرجـــات
١	الرأس
٢	الساقين
٣	الذارعين
٤	طول الجذع أطول من العرض
٥	الكتفين
٦	اتصال الزراعين والساقين بالجذع
٧	أن تكون فى مكانها الطبيعى
٨	وجود الرقبة
٩	أن تكون الركبة متصلة بالرجل او الجذع
١٠	وجود العينان
١١	الأنف
١٢	الفم
١٣	الأنف والفم من بعدين والشفتان ظاهرتان
١٤	وجود تجاويف الأنف
١٥	الشعر موجود
١٦	الشعر موجود على أكثر من جانب من الرأس
١٧	الملابس
١٨	قطعتان من الملابس غير الشفاف
١٩	عدم شفافية الملابس – أكمام او بنطلون
٢٠	اربع قطع من الملابس
٢١	ملابس كاملة بدون تناقض
٢٢	الأصابع
٢٣	عدد الأصابع
٢٤	وجود الأصابع مبعدين وطولها أكبر من عرضها

تابع اختبار رسم الرجل (جود إيناف هاريس)
معايير التصحيح

الرقم	الاجزاء التى تحسب عنها الدرجات
٢٥	صحة رسم الإبهام
٢٦	راحة اليد
٢٧	مفاصل الساقين، الركبة او الفخذ او كلاهما
٢٨	تناسب اليد
٢٩	تناسب الذراعين
٣٠	تناسب الساقين
٣١	الذراعين والساقين من بعدين
٣٢	تناسب القدمين
٣٣	الكعب
٣٤	تآذر حركى
٣٥	الخطوط واضحة وقوية
٣٦	خطوط متصلة اتصال واضح
٣٧	أن يكون الرأس بدون إنتظام مقصود
٣٨	ان يكون الجذع بدون انتظام مقصود
٣٩	أن يكون الذراعين والساقين من بعدين
٤٠	تقاطيع الوجه متناسبة من بعدين متشابهين
٤١	الأذن
٤٢	تفاصيل الأذن وفى مكانها الصحيح وتنسيقها
٤٣	تفاصيل العين والحاجب والرموش
٤٤	إنسان العين
٤٥	شكل العين وتنسيقها وتناسبها
٤٦	فى البروفيل العام تنظر للأمام
٤٧	الذقن والجبهه
٤٨	تفاصيل الذقن والجبهه
٤٩	الذقن البارزة
٥٠	بروفيل بخطأ واحد
٥١	بروفيل بدون أخطاء

معايير الذكاء الغير اللفظى

الدرجة	العمر العقلى المقابل		العمر العقلى بالأشهر	الدرجة	العمر العقلى المقابل		العمر العقلى بالأشهر
٧	٣	٣	٣٨	٣٥	--	١٤	١٦٨
٨	٦	٣	٤٢	٣٦	٦	١٤	١٧٤
٩	٩	٣	٤٥	٣٧	١١	١٤	١٧٩
١٠	--	٤	٤٨	٣٨	٤	١٥	١٨٤
١١	٤	٤	٥٢	٣٩	١٠	١٥	١٩٠
١٢	٨	٤	٥٦	٤٠	٣	١٦	١٩٥
١٣	--	٥	٦٠	٤١	٨	١٦	٢٠٠
١٤	٤	٥	٦٤	٤٢	١	١٧	٢٠٥
١٥	٨	٥	٦٨	٤٣	٦	١٧	٢١٠
١٦	--	٦	٧٢	٤٤	--	١٨	٢١٦
١٧	٣	٦	٧٥	٤٥	٥	١٨	٢٢١
١٨	٧	٦	٧٩	٤٦	١٠	١٨	٢٢٦
١٩	١١	٦	٨٣	٤٧	٤	١٩	٢٣٢
٢٠	٤	٧	٨٨	٤٨	٩	١٩	٢٣٧
٢١	٩	٧	٩٣	٤٩	٢	٢٠	٢٤٢
٢٢	٢	٨	٩٨	٥٠	٨	٢٠	٢٤٨
٢٣	٧	٨	١٠٣	٥١	١	٢١	٢٥٣
٢٤	--	٩	١٠٨	٥٢	٧	٢١	٢٥٩
٢٥	٥	٩	١١٣	٥٣	١١	٢١	٢٦٠
٢٦	١١	٩	١١٩	٥٤	٥	٢٢	٢٦٩
٢٧	٥	١٠	١٢٥	٥٥	٤	٢٢	٢٧٥
٢٨	١٠	١٠	١٣٠	٥٦	١٠	٢٣	٢٨٠
٢٩	٤	١١	١٣٦	٥٧	٤	٢٣	٢٨٦
٣٠	٩	١١	١٤١	٥٨	١	٢٤	٢٨٩
٣١	٢	١٢	١٤٦	٥٩	٨	٢٤	٢٩٦
٣٢	٨	١٢	١٥٢	٦٠	--	٢٥	٣٠٠
٣٣	١	١٣	١٥٧				
٣٤	٧	١٢	١٦٣				

Arabic Summary

الملخص العربى

المقدمـــة:

إن تعداد الأطفال الذين يترددون على مراكز الرعاية الصحية فى ازدياد سريع. وجد أن نسبة الأمراض المزمنة فى هؤلاء الأطفال تتراوح بين ٤٤- ٨٢ %.

بالرغم من تعدد وتنوع الأبحاث والدراسات التى أجريت فى مجال الأمراض المزمنة إلا أنه من الملاحظ أنها لم تتطرق إلى الجوانب المعرفية والسلوكية وهذا ما أأمل أن أتم دراسته من خلال البحث فى بعض الامراض المزمنة.

يعتبر مرض الربو الشعبى واحداً من الأمراض المزمنة التى ترتفع نسبة حدوثها فى الأطفال حيث يصيب ٣٥% من الأطفال بالمقارنة إلى ١٠% من الكبار.

فى حالات الربو الشعبى البسيط والمتوسط لا تتأثر الجوانب المعرفية ولا السلوكية لدى الأطفال ولكن الأمر يختلف فى الحالات المرضية الشديدة حيث تظهر مشاكل الاكتئاب، الانسحاب الاجتماعى، صعوبة التعلم والمشاكل اللغوية.

بالرغم من التغلب على الحمى الروماتيزمية فى الدول المتقدمة اقتصادياً إلا أنها تشكل من ٢٥ إلى ٤٠% من أمراض القلب حول العالم.

تعتبر الحمى الروماتيزمية من أهم أسباب الأمراض القلبية فى الأطفال وهى تمثل خطرا على الصحة العامة.

أن الأسباب الرئيسية التى تساعد فى انتشار الحمى الروماتيزمية هى الفقر، سوء التغذية، الزحام وقلة الرعاية الصحية.

بالرغم من أهميتها إلا أن الجوانب المعرفية فى أغلب الأحيان لا تؤخذ فى الحسبان فى الدراسات التى تتم على مرضى القلب.

أن تحديد التأثيرات على الجواب المعرفية فى مرضى القلب والتغلب عليه سوف يكون واحدا من الأسباب المساعدة فى إنجاح خطة العلاج بحيث تقل الآثار الجانبية للمرض.

فى هذه الدراسة يشار إلى الربو الشعبى والحمى الروماتيزمية على أنهم مرضان من الأمراض المزمنة حيث يقوم لبحث بدراسة الجوانب المعرفية ممثلة فى اختبار الذكاء والجوانب السلوكية لدى هؤلاء الأطفال.

الهدف من البحث:

أن هدف هذا البحث هو تحديد ما إذا كانت الجوانب المعرفية والسلوكية متأثرة فى حالات الربو الشعبى والحمى الروماتيزمية فى الأطفال فن سن المدرسة.

فرضية الدراسة:

تفترض الدراسة أن هناك تأثير سلبى على الجوانب المعرفية والسلوكية فى الأطفال المصابين ببعض الأمراض المزمنة بدون تأثير من الجنس على هذه الوظائف.

المرضى وطرق البحث:

المرضى:

أن هذه الدراسة سوف تتوفى عيادات الصدر والقلب الخارجية فى مستشفى الأطفال الجامعى بكلية طب عين شمس والمركز الطبى للمقاولون العرب.

سوف تتضمن هذه الدراسة ١٥٠ طفلا مقسمين بالشكل الآتى:

المجموعة الأولى:

مجموعة المرضى المصابين بالربو الشعبى (٥٠حالة) (مجموعة أ) والحمى الروماتيزمية (٥٠حالة) (مجموعة ب) فى المرحلة العمرية بين ٦-١٢ سنة.

المجموعة الثانية:

تتضمن ٥٠ طفلا من الأطفال الأصحاء كمجموعة ضابطة.

مواصفات الانضمام إلى العينة:

- الأطفال المصابين بالربو الشعبى لأكثر من ٦ أشهر.
- الأطفال المصابين بالحمى الروماتيزمية لأكثر من ٦ أشهر.

مواصفات الاستبعاد من العينة:

- الأطفال أكبر من ١٢ سنة أو أصغر من ٦ سنوات.
- الأطفال المصابين بأى مرض مزمن.
- الأطفال المصابين بالربو الشعبى والحمى الروماتيزمية معا.
- الأطفال المصابين بأى مرض نفسى.

طرق البحث:

جميع الأطفال سوف يخضعون إلى:

١- تاريخ مرضى مفصل يتضمن العمر والجنس والحالة الاقتصادية باستخدام قائمة إبراهيم وعبد الغفار ١٩٩٠.

٢- الكشف الإكلينيكى الشامل.

٣- تقييم الجانب السلوكى لدى الأطفال باستخدام قائمة وصف سلوك الطفل والمراهق ٢٠٠١ (النسخة العربية).

٤- تقييم الجانب المعرفى لدى الأطفال باستخدام اختبار جودانف (رسم الشخص).

نتائج البحث:

أظهرت النتائج أن الأطفال المصابين بالربو الشعبى والحمى الروماتيزمية كان أفقر سلوكيا ومعرفيا من أداء الأطفال الأصحاء حيث أن نسبة الخلل فى الأداء السلوكى تراوحت بين ٦% إلى ٢٢% فى الحالات الربو الشعبى.

أما بالنسبة للأطفال المصابين بالحمى الروماتيزمية، فقد كانت نسبة الخلل فى الأداء السلوكى تتراوح بين من ١٢% إلى ١٦%.

كما أظهروا فقراً وقلة فى محصلة الأداء المعرفى فى اختبار رسم الرجل حيث أن الأطفال المصابين بالربو الشعبى سجلوا ١٦% من الحالات بنسبة ذكاء أقل من ٩٠، أما حالات الحمى الروماتيزمية فقد كانت نسبة الحالات التى سجلت نسبة ذكاء أقل من ٩٠ هى ١٠%.

توصيات البحث:

١- ضرورة تكاتف التخصصات المختلفة المعنية بالربو الشعبى والحمى الروماتيزمية لتنسيق البحث العلمى فيما بينهم ووضع خطط عمل مشتركة.

٢- توصى الدراسة بعمل أبحاث أكثر تقدماً فى هذا المجال.

٣- عمل بعض الأشخاص على معاونة الآباء والأطفال المصابين بالربو الشعبى والحمى الروماتيزمية.

٤- إضافة برنامج سلوكى للأطفال المصابين بالربو الشعبى والحمى الروماتيزمية.

المستخلـص

الربو الشعبى والحمى الروماتيزمية من أكثر الامـراض المزمنـة انتشاراً بين الأطفال ومن المحتمل تأثيرهم على نسبة الذكاء وعلى سـلوك الأطفال.

الهدف من البحث:

تحديد بعض الخلل السلوكى أو المعرفى لدى الأطفـال المصـابين بالربو الشعبى أو الحمى الروماتيزمية.

الطريقة المستخدمة:

دراسة تحليلية تشمل مجموعة تجريبية ومجموعة ضابطة تمت فـى الفترة من أغسطس ٢٠٠٦ إلى أغسطس ٢٠٠٨ وشملت ٥٠ طفلاً مصابين بالربو الشعبى و ٥٠ طفلاً مصاباً بالحمى الروماتيزمية و ٥٠ طفل كمجموعة ضابطة وقد تم استخدام اختبار رسم الرجل لتقييم الجانب المعرفى وقائمـة وصف سلوك الطفل والمراهق ٢٠٠١ النسخة العربية لتقييم سلوك الأطفال.

نتائج البحث:

أظهرت النتائج أن الأطفال المصـابين بـالربو الشـعبى والحمـى الروماتيزمية كان أفقر سلوكيا ومعرفيا من أداء الأطفال الأصحاء حيث أن نسبة الخلل فى الأداء السلوكى تراوحت بين ٦% إلى ٢٢% فى الحـالات الربو الشعبى.

أما بالنسبة للأطفال المصابين بالحمى الروماتيزمية، فقد كانت نسبة الخلل فى الأداء السلوكى تتراوح بين من ١٢% إلى ١٦%.

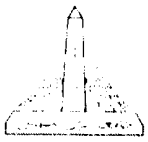
كما أظهروا فقراً وقلة فى محصلة الأداء المعرفى فى اختبار رسم الرجل حيث أن الأطفال المصابين بالربو الشعبى سجلوا ١٦% من الحالات بنسبة ذكاء أقل من ٩٠، أما حالات الحمى الروماتيزمية فقد كانت نسبة الحالات التى سجلت نسبة ذكاء أقل من ٩٠ هى ١٠%.

توصيات البحث:

أوصى البحث بأهمية وضع خطط عمل مشتركة بين أطباء الأطفال والصحة النفسية لمساندة هؤلاء الأطفال وذويهم وإضافة برنامج لتعديل السلوك مع العلاج المتكرر لهؤلاء الأطفال.

الكلمات المفتاحية:

الربو الشعبى – الحمى الروماتيزمية – الخلل السلوكى – نسبة الذكاء.



معهد الدراسات العليا للطفولة

قسم الدراسات الطبية

شكر

أشكر السادة الأساتذة الذين قاموا بالإشراف و هم :

١- **أ.د. مجدى كرم الدين على** – أستاذ الصحة العامة و رئيس قسم الدراسات الطبية - معهد الدراسات العليا للطفولة

٢- **أ.د. فادية يوسف عبد المجيد** – أستاذ صحة الطفل – كلية التربية – جامعة حلوان .

٣- **أ.د. إيهاب محمد عيد** – أستاذ الصحة العامة – معهد الدراسات العليا للطفولة .

٤- **أ.د. رحاب عبد القادر محمود** – أستاذ طب الأطفال - معهد الدراسات العليا للطفولة .

ثم الاشخاص الذين تعاونوا معى فى البحث و هم :

١- **أ.د. ملك شاهين** – أستاذ طب الأطفال – جامعة عين شمس

٢- **د. كريمة عثمان** – مركز رعاية ذوى الاحتياجات الخاصة –جامعة عين شمس

صفحة العنوان

اسم الطبيبة: رحاب محمد سامى محمد

الدرجة العلمية: دكتوراة

القسم التابع له: الدراسات الطبية

أسم المعهد: معهد الدراسات العليا للطفولة

الجامعة: عين شمس

سنة التخرج: ٢٠٠٩

سنة المنح: ٢٠٠٩

معهد الدراسات العليا للطفولة

قسم الدراسات الطبية

اسم الطالب : رحاب محمد سامى محمد محمد

عنوان الرسالة : دراسة معدل الذكاء و التأثير فى سلوك الأطفال المصابين ببعض الأمراض المزمنة فى سن الدراسة الابتدائية

اسم الدرجة : دكتوراه

لجنة المناقشة و الحكم:

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تاريخ البحث : ٢٠/٨/ ٢٠٠٦ م

الدراسات العليا:

ختم الاجازة

/ /

اجيزت الرسالة بتاريخ

١٦ / ٩/ ٢٠٠٩ م

موافقة مجلس المعهد

١٧/ ١١/ ٢٠٠٩ م

موافقة مجلس الجامعة

/ /

معهد الدراسات العليا للطفولة

قسم الدرسات الطبية

دراسة معدل الذكاء والتأثير في سلوك الأطفال المصابين ببعض الأمراض المزمنة في سن الدراسة الابتدائية

رسالة مقدمة

للحصول على درجة دكتوراه الفلسفة

في درسات الطفولة الطبية

مقدمة من

الطبيبة/ رحاب محمد سامى محمد

ماجستير طب الاطفال

تحت إشراف

أ.د/ مجدى كرم الدين على
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بمعهد الدراسات العليا للطفولة

٢٠٠٩