INTRODUCTION

Bronchial asthma is a disease that is becoming a major health issue in many developing countries ***(Ramos et al., 2006)***.

Bronchial asthma is a chronic disease of respiratory tract constituting a serious public health problem all over the world. It is estimated that the number of patients with asthma is close to 300 million people. In a population of children and adolescents, bronchial asthma occurs with frequency of 5-10% ***(Świątowa et al., 2007).***

Many factors may have contributed to the rise of the problem of bronchial asthma. Increasing air pollution, fast modernization, and widespread construction work are some of the reasons for asthma to thrive. The situation is complicated by poor access to medical services, high price of effective drugs, and poor health education among the affected population ***(Ramos et al., 2006)***.

In spite of these laudable efforts to improve asthma care over the past decade, a majority of patients have not benefited from advances in asthma treatment and many lack even the rudiments of care partly due to the disease entity or patients' compliance, and partly due to physicians' knowledge and

disposition in terms of treatment ***(British Guidelines on the Management of Asthma, 2003).***

The number of asthmatic children in any population is far greater than what can be managed by trained persons. Therefore, a vast majority of these children are managed by general or family physicians all over the world. The undergraduate teaching of bronchial asthma is usually confined to one or two lectures and an occasional case-discussion during the clinical case teaching. The general physicians are, therefore, often handicapped in dealing with patients with bronchial asthma. As a result, asthma continues to be underdiagnosed and undertreated ***(Legorreta et al., 1998).***

Updated guidelines on bronchial asthma have been recently issued by two major international bodies, namely, GINA (Global Initiative for Asthma) and NAEPP (National Asthma Education and Prevention Program). Both have not addressed the problems related to developing countries ***(Bateman et al., 2008).***

AIM OF THE WORK

This work is aimed at assessment of the current situation as regard clinician attitude towards national and international guidelines and their adherence to its recommendations. This will be achieved through written questionnaire.

EPIDEMIOLOGY OF CHILDHOOD BRONCHIAL ASTHMA

Asthma is a disease with many clinical phenotypes, the main characteristics of which are reversible airflow obstruction and hyperresponsiveness of the airways to various stimuli. Intermittent airflow obstruction leads to one of the main clinical symptoms of asthma: attacks of breathlessness; cough, excessive mucus secretion, and wheeze are some others. Distinct morphological changes are visible in the asthmatic bronchial mucosa. Infiltration of inflammatory cells increases, especially eosinophils and T-lymphocytes in the submucosa and the epithelium. Thickening of the epithelial basement membrane (BM) occurs even in mild asthma. Epithelial integrity is lost due to epithelial shedding, and the number of mucus-secreting goblet cells rises. Edema results from leakage of plasma from the microvasculature. Airway remodeling is also an important characteristic of asthma ***(Bateman et al., 2008).***

Asthma may have its onset at any age, 30% of patients are symptomatic by age of one year, whereas 80-90 % of asthmatic children have their first symptoms before 4-5 years of age ***(Sly, 2000)***.

Epidemiology:

Despite hundreds of reports on the prevalence of asthma in widely differing populations, the lack of a precise and universally accepted definition of asthma makes reliable comparison of reported prevalence from different parts of the world problematic. Nonetheless, based on the application of standardized methods to measure the prevalence of asthma and wheezing illness in children and adults, it appears that the global prevalence of asthma ranges from 1% to 18% of the population in different countries **(Figure 1)** ***(Beasley, 2004)***.

There are insufficient data to determine the likely causes of the described variations in prevalence within and between populations ***(Beasley, 2004).***

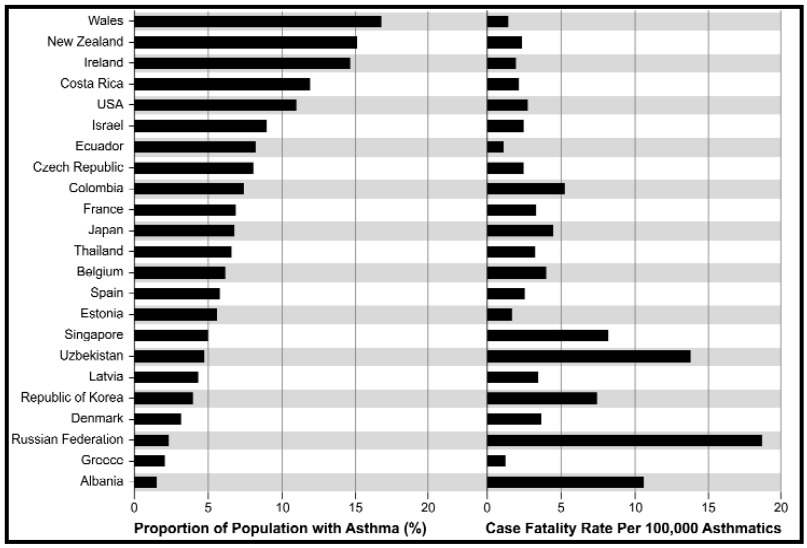

Figure (1): Asthma Prevalence and Mortality ***(Beasley, 2004).***

Prevalence of pediatric asthma in Egypt and some Arabic countries:

In Egypt, a prevalence of 8.2% among school children aged 5-15 years old was reported ***(El-Hefney et al., 1994).***

Abdel Latif (2000) studied the prevalence of asthma among 2321 secondary school students (13-15) years old in four randomly selected districts (Heliopolis, Helwan, Shoubra and Abbassia) and he reported a prevalence of pediatric asthma of 5.6%. Also, ***El-Shafy (2006)*** studied the prevalence of asthma in Cairo metropolitan and he reported a prevalence of asthma of 16.8%.

Khaldi et al. (2005) studied the prevalence of asthma in 13-14 years old children living in ″Grand Tunis″ (Ariana, Ben Arous, Manouba and Tunis) and showed that 13.2% of children had wheezed. ***Bouayad et al. (2006)*** studied the prevalence of asthma in four countries Morocco-Casablanca, Marrakesh, Ben Slimane and Boulmane and reported a prevalence of asthma 6.4%-16.2%. ***Behbehani et al. (2000)*** studied the prevalence of asthma and allergic diseases in Kuwait, and the prevalence rate of chest wheeze was 16.1%. Also, ***Al-Thamiri et al. (2005)*** studied asthma prevalence and severity among primary school children in Baghdad, and he reported that the prevalence of wheeze was 25%.

Factors influencing the development and expression of asthma:

Factors that influence the risk of asthma can be divided into those that cause the development of asthma and those that trigger

asthma symptoms; some do both. The former include host factors (which are primarily genetic) and the latter are usually environmental factors **(Table 1)** ***(Busse and Lemanske, 2001).***

However, the mechanisms whereby they influence the development and expression of asthma are complex and interactive. For example, genes likely interact both with other genes and with environmental factors to determine asthma susceptibility ***(Ober, 2005).***

Table (1): Factors Influencing the Development and Expression of Asthma

HOST FACTORS
Genetic, e.g.,
• Genes pre-disposing to atopy
• Genes pre-disposing to airway hyperresponsiveness
Obesity
Sex
ENVIRONMENTAL FACTORS
Allergens
• Indoor: Domestic mites, furred animals (dogs, cats, mice), cockroach allergen, fungi, molds, yeasts
• Outdoor: Pollens, fungi, molds, yeasts infections (predominantly viral)
Occupational sensitizers
Tobacco smoke
• Passive smoking
• Active smoking
Outdoor/Indoor Air Pollution
Diet

(Busse and Lemanske, 2001)

Host Factors:

Genetic factor:

Although environmental factors are clearly important determinants of asthma, numerous studies have revealed that asthma has a strong genetic component but does not follow monogenic patterns of inheritance ***(Bleecker et al., 1997).***

For a long time, asthma has been known to cluster in families, and family studies were the first to suggest that the disease was genetically inherited. More recent family studies found, for example, a 60 percent increased risk of atopy when both parents were affected ***(Aberg, 1993)***, and the odds of asthma in a child increased from 3 when one parent was affected to 6 when both were ***(Litonjua et al.,1998).***

Family studies and case-control association analysis have identified a number of chromosomal regions associated with asthma susceptibility. For example, a tendency to produce an elevated level of total serum IgE is co-inherited with airway hyperresponsiveness, and a gene (or genes) governing airway hyperresponsiveness is located near a major locus that regulates serum IgE levels on chromosome 5q ***(Postma et al.,1995).***

Four sets of data have emerged recently: a clear-cut genetic component of 125 genes related to the causation and progression of asthma symptoms, IL13 over expression

(Kuperman et al., 2002), IL12 deficient expression ***(Morahan et al., 2002)***, and Th1 phenotype down regulation due to reduced expression of T-bet (Th1 transcription factor) while GATA-3 is over expressed ***(Laitinen et al., 1993)***, which is implicated in the Th2 development ***(Nakamura et al., 1999).***

However, the search for a specific gene (or genes) involved in susceptibility to atopy or asthma continues, as results to date have been inconsistent ***(Wiesch et al., 1999)***.

In addition to genes that predispose to asthma there are genes that are associated with the response to asthma treatments. These genetic markers will likely become important not only as risk factors in the pathogenesis of asthma but also as determinants of responsiveness to treatment ***(Tattersfield and Hall, 2004).***

Consanguinity and asthma:

It is generally believed that bronchial asthma is caused by the interaction between genetic susceptibility and environmental exposure ***(Meurer et al., 2006).*** Recent research on the genetics of asthma indicated that there was an association between maternal asthma and increased total IgE levels. Further genetic studies have identified genes associated with asthma, and some other studies provided evidence of a

major susceptibility locus located on chromosome 2p ***(Kuiper et al., 2006).***

Theoretically, consanguineous marriages should carry a high risk for the development of diseases that have a genetic basis, either completely or partially ***(Koury et al., 1987).*** As a result, consanguinity is commonly blamed as one of the causes of genetically related conditions without proper evaluation ***(Freire-Maia, 1989).***

Obesity:

Obesity and overweight have been associated with an increased risk of asthma in children as well as adults ***(Shore and Johnston, 2006).***

The association between obesity and atopy is less clear. Many cross-sectional studies have suggested that obesity is a risk factor for asthma ***(Cassol et al., 2006).***

Most prospective studies show that obesity is a risk factor for the de novo diagnosis of asthma, with the risk increasing between 1.1-fold and 3-fold ***(Nystad et al., 2004).***

Pediatric studies do not show a consistent relationship between obesity and atopy. In the children participating in the *National Health and Nutrition Examination Study III* (NHANES III), a significant relationship was only found between BMI (Body Mass Index) and asthma, but not with

atopy, defined as the presence of atopic disease and positive skin tests ***(Von Mutius et al., 2001).***

Sex:

Epidemiological studies, of both incidence and prevalence, have reported a male predominance of asthma and atopic conditions before puberty and a female predominance after puberty ***(Zannolli and Morgese, 1997).***

Similar findings have been reported for the prevalence of wheeze and asthma, with higher rates in women through the reproductive years ***(Venn et al., 1998)***

In asthma cases followed prospectively from childhood, severity decreased during adolescence only among males ***(Kjellman and Gustafsson, 2000)***. Cross sectional studies also show that females are more likely to develop late onset and persistent wheeze**,** this gender difference becomes more noticeable with time ***(Withers et al, 1998).***

Environmental Factors

Allergens:

Sensitization to inhalants is rare in very early infancy, but clearly prevalent from 3 years onward **(Fig. 2)** ***(Bardare et al., 1992)***.

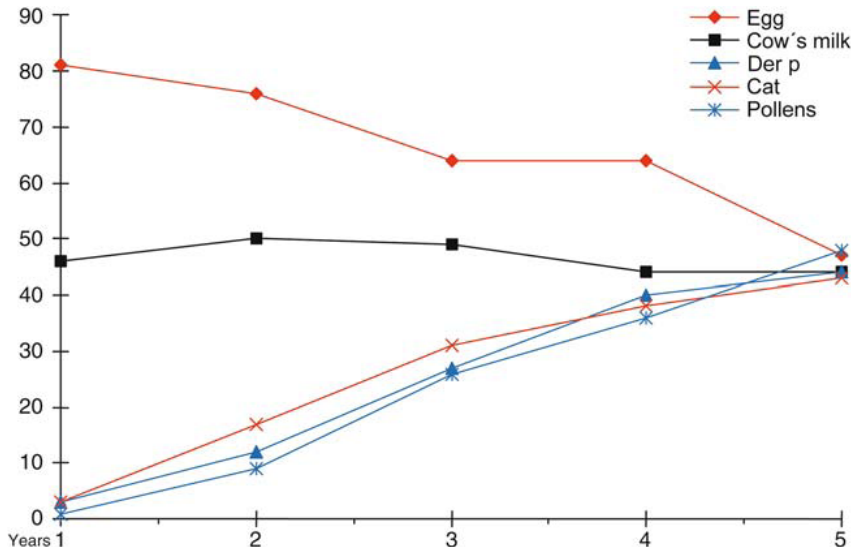

Figure (2): Natural history of food and respiratory allergy in 92 children with allergy to foods and aeroallergens started in the first years of life ***(Bardare et al., 1992).***

Mast cells transport allergens to subepithelium where they facilitate allergen access to lymphoid tissues, then interacting with allergen-specific T cells or with IgE B lymphocytes, finally reaching the airways via blood vessels and causing BHR (Bronchial Hyper-Responsiveness) and asthma ***(Rosenwasser, 1992).***

Even in children less than 2 years of age**,** it is not infrequent that children react positively to food provocation testing manifesting wheezing ***(Novembre et al., 1988)***.

Most children with allergic disease are sensitized to house dust mite and this allergen has been implicated as the

most important allergen for both the development and exacerbation of asthma, however, sensitization to cat, grass, or moulds may be a more important cause of disease ***(Custovic and Simpson, 2006).***

For some allergens, such as those derived from house dust mites and cockroaches, the prevalence of sensitization appears to be directly correlated with exposure (***Huss et al., 2001).*** Cockroach infestation has been shown to be an important cause of allergic sensitization, particularly in inner-city homes ***(Rosenstreich et al., 1997).*** However, although some data suggest that exposure to house dust mite allergens may be a causal factor in the development of asthma (***Sears et al., 2003)***; other studies have questioned this interpretation ***(Sporik et al., 1995).***

In a farming environment, children exposed to stables in the first year of life had reduced risk of asthma compared with children who had such exposure after 1 year of age ***(Braun-Fahrlander, 2001).***

In the case of dogs and cats, some epidemiologic studies have found that early exposure to these animals may protect a child against allergic sensitization or the development of asthma ***(Gern et al., 2004)*** but others suggest that such exposure may increase the risk of allergic sensitization ***(Almqvist et al., 2003)***.

Children exposed to cats in the first 2 years of life were sensitized to cat by the age of 4 years and were at increased risk of severe asthma in the presence of secondhand tobacco smoke ***(Melen et al., 2001).***

This issue remains unresolved. The prevalence of asthma is reduced in children raised in a rural setting, which may be linked to the presence of endotoxin in these environments ***(Braun-Fahrlander., 2003).***

Infections:

Respiratory viral infections are the single most frequent asthma trigger in childhood. They are the only trigger of wheeze and cough in many children and can exacerbate atopic asthma ***(Murray et al., 2006).*** During infancy, a number of viruses have been associated with the inception of the asthmatic phenotype ***(Gern and Busse, 2002).***

Human rhinoviruses are responsible for the majority of asthma exacerbations ***(Illi et al., 2001)*** and respiratory syncytial virus is a common cause of severe respiratory symptoms in infants ***(Heymann et al., 2004).*** A number of long-term prospective studies of children admitted to the hospital with documented RSV have shown that approximately 40% will continue to wheeze or have asthma into later childhood ***(Sigurs et al., 2000).***

Some studies suggest that exposure to certain viruses (e.g. hepatitis A, measles), mycobacteria or parasites, may reduce the incidence of allergy and/or asthma ***(Schaub et al., 2006)***, and that recurrent mild infections may protect against asthma ***(Illi et al., 2001).*** Others suggest that microbes may initiate asthma ***(Sigurs et al., 2005).***

The data do not allow specific conclusions to be drawn. Parasite infections do not in general protect against asthma, but infection with hookworm may reduce the risk ***(Leonardi-Bee et al., 2006).***

Young children with older siblings and those who attend day care are at increased risk of infections, but enjoy protection against the development of allergic diseases, including asthma later in life ***(De Meer et al., 2005).***

Occupational sensitizers:

Over 300 substances have been associated with occupational asthma ***(Brus and Bodenheimer, 1996).***

Occupational asthma arises predominantly in adults ***(Bury et al., 1994)*** and occupational sensitizers are estimated to cause about 1 in 10 cases of asthma among adults of working age ***(Businco and Cantani, 1990).***