

**Inattention and Hyperactivity Symptoms  
In Children with  
Bronchial Asthma**

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**Summary:**

Asthma is a chronic inflammatory disorder that may influence children's behavioral health negatively.

**Aim:**

To assess the symptoms of inattention and hyperactivity in asthmatic children and to detect correlation between these symptoms and asthma treatment protocol.

**Methods:**

125 children having bronchial asthma with age range between 3 to 12 years, who attended outpatient clinic of Abassia Chest Hospital in Cairo and fulfilled the inclusion criteria, in the period from 1st January 2009 till 31st March 2009, were subjected to full history taking and thorough clinical examination. Parents of children completed 49 items questionnaire of attention deficit and hyperactivity symptoms (ADHD-SC4) to identify inattention and hyperactivity symptoms among asthmatic children. An informed consent was taken from the parents.

**Results:**

Mean age was  $(6.37 \pm 3.073)$  years (87 male, 38 female). Results showed high frequency of both inattention and hyperactivity symptoms in asthmatic children. There was a highly statistically significant correlation between inattention and hyperactivity symptoms and severity and control of bronchial asthma ( $p=0.000$ ) as well as with type of asthma treatment protocol ( $p=0.002$ ). On the other hand there was no statistically significant correlation between duration of asthma and inattention or hyperactivity symptoms ( $p=0.819$  and  $0.561$ ).

**Conclusion:**

Asthmatic children were found to have increased frequency of inattention and hyperactivity symptoms which might be due to the nature of bronchial asthma disease or the medications used in its treatment. Therefore, asthmatic children with

signs of inattention and hyperactivity need to be farther evaluated for ADHD and appropriate support should be initiated in selected cases.

**Keywords:**

Inattention, hyperactivity, bronchial asthma, children.

**Introduction:**

Bronchial asthma is the most common chronic disease of childhood, it is prevalent worldwide especially in developed countries where its prevalence is increased to epidemic proportions (Reeves et al., 2006).

Bronchial asthma is a respiratory disorder characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person (WHO, 2009).

Recently, it has been proposed that children with asthma were found to have higher rates of inattention and hyperactivity symptoms, depression, behavioral disorders, learning disabilities and missed school days (Blackman et al., 2007; Yuksel et al., 2008).

Also, asthma medications cause restlessness, sleep disturbance, emotional and mood lability and symptoms of inattention and hyperactivity (Pretorius, 2004; Stuart et al., 2005)

Inattention is a problem characterized primarily by easy distractibility, disorganization, forgetfulness, and lethargy (Quinn, 1994). While, hyperactivity is a term for cluster of complaints such as restlessness, impulsiveness, fidgetiness and disruptiveness (Biederman et al., 2005)

**Aim Of The Study:**

- ▣ To assess the symptoms of inattention and hyperactivity in asthmatic children.
- ▣ To detect correlation between inattention and hyperactivity symptoms and asthma treatment protocol.

**Subjects And Methods:**

The study was conducted on 125 children (87 Male, 38 Female) having bronchial asthma with age range between 3 to 12 years who attended outpatient clinic of Abassia Chest Hospital in Cairo, in the period from 1st January 2009 till 31st March 2009 and fulfilled the inclusion criteria.

All studied children were subjected to:

1. Detailed history: taken from parents of children.
2. Thorough clinical examination including physical and psychiatric examination.
3. Classification of bronchial asthma according to Gina classification (Gina, 2008).
4. Assessment of socio-economic status for Egyptian families prepared by (Youssef, 1980).
5. Assessment of inattention and hyperactivity symptoms by: Questionnaire of Attention Deficit and Hyperactivity Symptoms Check list 4 (ADHD-SC4) prepared by (Gadow& Sprafkin, 1997) and translated into Arabic version by (Youssif& Hessen, 2002). It is a 49 items screening tool answered by parents of children that measure 5 groups of psychiatric symptoms: inattention, hyperactivity, oppositional defiant, conduct, and stimulants side affects.
6. Assessment of IQ by: non verbal intelligence test of Goodenough -Harris Draw- a- man Test prepared by (Harris, 1963) and standardized into Arabic version by (Farghaly et al., 2004).

**Statistical Analysis:**

Statistical analysis was performed by using SPSS (statistical package of social science) version 15 (SPSS, 2006). The collected data were organized, revised, coded, tabulated then edited on the computer. Chi-square ( $\chi^2$ ) tests were used to determine the statistical significance and the difference in results is significant if probability (p) <0.05 and insignificant if (p) >0.05.

**Results:**

1. The children included in the study were 125 children. The age ranges from 3 to 12 years. The mean age was (6.37) with standard deviation ( $\pm 3.073$ ).
2. Gender distribution was: 87 males and 38 females.
3. Results of I.Q. test showed that the mean score was (98.65) with standard deviation ( $\pm 9.927$ ).
4. Results showed high frequency of both inattention symptoms (60.8%) and hyperactivity symptoms (72%) in asthmatic children.

Figure (1): Frequency distribution of cases according to inattention and hyperactivity symptoms

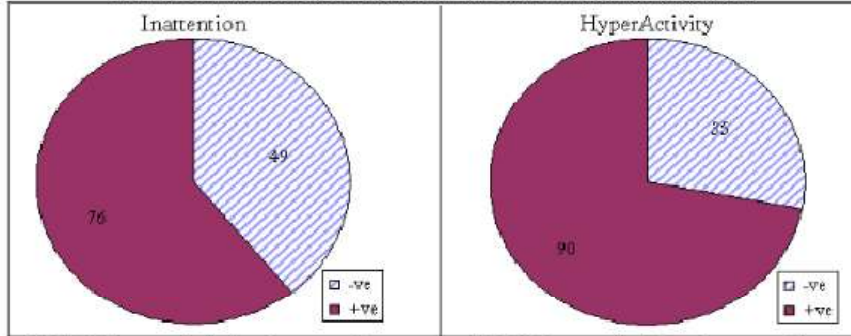


Table (1): Frequency distribution of cases according to bronchial asthma severity and inattention symptoms

BA Severity	Inattention		Total	X <sup>2</sup>	P	r
	-Ve	+Ve				
Intermittent	N 30	28	58	16.383	0.000 (H S)	0.335
	% 51.7%	48.3%	100%			
Mild	N 16	19	35			
Persistent	% 45.7%	54.3%	100%			
Moderate	N 3	29	32			
Persistent	% 9.4%	90.6%	100%			
Total	N 49	76	125			
	% 39.2%	60.8%	100%			

Results showed a high statistical significance ( $p=0.000$ ) with positive correlation moderate association ( $r=0.335$ ) between bronchial asthma severity and inattention symptoms.

Table (2): Frequency distribution of cases according to bronchial asthma severity and hyperactivity symptoms

BA Severity	Hyperactivity		Total	X <sup>2</sup>	P	r
	-Ve	+Ve				
Intermittent	N 23	35	58	11.423	0.003 (H S)	0.297
	% 39.7%	60.3%	100%			
Mild	N 10	25	35			
Persistent	% 28.6%	71.4%	100%			
Moderate	N 2	30	32			
Persistent	% 6.3%	93.8%	100%			
Total	N 23	35	58			
	% 39.7%	60.3%	100%			

Also, results showed a high statistical significance ( $p=0.003$ ) with positive correlation fair association ( $r=0.297$ ) between bronchial asthma severity and hyperactivity symptoms.

Table (3): Frequency distribution of cases according to bronchial asthma control and inattention symptoms

BA Control	Inattention		Total	X <sup>2</sup>	P	r
	-Ve	+Ve				
Uncontrolled	N	2	5	33.669	0.000 (H S)	-0.453
	%	28.6%	71.4%			
Partially Controlled	N	9	52			
	%	14.8%	85.2%			
Controlled	N	38	19			
	%	66.7%	33.3%			
Total	N	49	76			
	%	39.2	60.8			

Results showed a high statistical significance (p=0.000) with negative correlation (r=-0.453) between bronchial asthma control and inattention symptoms.

Table (4): Frequency distribution of cases according to bronchial asthma control and hyperactivity symptoms

BA Control	Hyperactivity		Total	X <sup>2</sup>	P	r
	-Ve	+Ve				
Uncontrolled	N	1	6	16.129	0.000 (H S)	-0.33
	%	14.3%	85.7%			
Partially Controlled	N	8	53			
	%	13.1%	86.9%			
Controlled	N	26	31			
	%	45.6%	54.4%			
Total	N	35	90			
	%	28.0%	72.0%			

Also, results showed a high statistical significance (p=0.000) with negative correlation (r=-0.33) between bronchial asthma control and hyperactivity symptoms.

Table (5): Frequency distribution of cases according to duration of bronchial asthma and inattention symptoms

Duration of BA	Inattention		Total	X <sup>2</sup>	P
	-Ve	+Ve			
Short	N	21	31	0.052	0.819 (N S)
	%	40.4%	59.6%		
Long	N	28	45		
	%	38.4%	61.6%		
Total	N	49	79		
	%	39.2%	60.8%		

There were no statistical significance (p=0.819) between duration of bronchial asthma treatment and

**(Inattention And Hyperactivity . . .)**

inattention symptoms.

Table (6): Frequency distribution of cases according to duration of bronchial asthma and hyperactivity symptoms

Duration Of BA	Hyperactivity		Total	X <sup>2</sup>	P
	-Ve	+Ve			
Short	N	16	36	0.339	0.561 (N S)
	%	30.8%	69.2%		
Long	N	19	54		
	%	26.0%	74.0%		
Total	N	35	90		
	%	28.0%	72.0%		

There were no statistical significance (p=0.561) between duration of bronchial asthma treatment and hyperactivity symptoms.

Table (7): Frequency distribution of cases according to type of bronchial asthma treatment and inattention symptoms

Type Of BA Treatment	Inattention		Total	X <sup>2</sup>	P
	-Ve	+Ve			
Corticosteroids	N	4	36	21.044	0.000 (H S)
	%	10.0%	90.0%		
Non Corticosteroids	N	45	40		
	%	52.9%	47.1%		
Total	N	49	76		
	%	39.2%	60.8%		

Results showed a high statistical significance (p=0.000) between type of bronchial asthma treatment and inattention symptoms. The majority among the cases treated by corticosteroids (90%) were inattentive.

Figure (2): Frequency distribution of cases according to type of bronchial asthma treatment and inattention symptoms

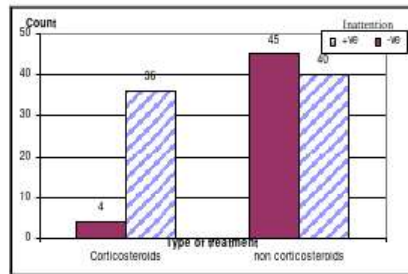
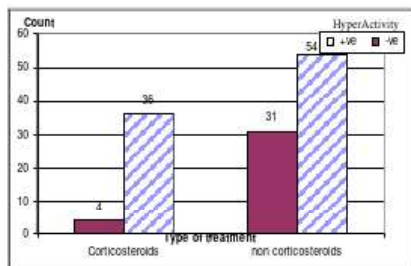


Table (8): Frequency distribution of cases according to type of bronchial asthma treatment and hyperactivity symptoms

Type Of BA Treatment	Hyperactivity		Total	X <sup>2</sup>	P
	-Ve	+Ve			
Corticosteroids	N	4	36	9.454	0.002 (H 5)
	%	10.0%	90.0%		
Non Corticosteroids	N	31	54		
	%	36.5%	63.5%		
Total	N	35	90		
	%	28.0%	72.0%		

Results showed a high statistical significance (p=0.002) between type of bronchial asthma treatment and hyperactivity symptoms. The majority among the cases treated by corticosteroids (90%) were hyperactive.

Figure (3): Frequency distribution of cases according to type of bronchial asthma treatment and hyperactivity symptoms



**Discussion:**

On the studying the demographic data in this work, gender distribution was nearly 2:1 as males were 87 (69.6%) and females were 38 (30.4%). This indicates that asthma is more prevalent in boys than girls. These results coincided with most of the asthma studies as asthma had a higher prevalence in boys than in girls before puberty and a higher prevalence in women than in men in adulthood (Horwood et al., 1985, and Postma, 2007).

The reasons for this sex-related difference are not clear. However, lung size is smaller in males than in females at birth but larger in adulthood (Gina, 2008).

Most of the studied cases had low economic

status, thus poverty predominated. In the studied cases, (13.6%) of fathers were unskilled workers, (27.2%) were partially skilled workers and (25.6%) were skilled workers while the majority of mothers 113 (90.4%) were housewives.

These results coincided with those of Forno and Celadon, (2009) who found that socioeconomic status was a rough marker of a variety of environmental/ behavioral exposures and a very important determinant of differences in asthma prevalence and severity.

Economic determinants may also govern access to material resources and medical facilities for asthma control, and the poor may have a poor recognition of asthma or live in poorer areas with inadequate home characteristics and/or polluted environments that may cause acute exacerbations of pre-existent respiratory disease (Mutius and Schmid, 2006)

As regards inattention symptoms, the results indicated that the majority of cases 76 (60.8%) had inattention symptoms where (33) were moderately inattentive and (43) were severe cases.

Recent studies enforced our results that inattention was more prevalent in children with asthma, when compared to the healthy control subjects. This inattentive behavior among children with asthma might be influenced by the level of hypoxia or increased work of breathing during recurrent attacks. Moreover, inattention in children with asthma might be attributed to the sleep disturbance due to nocturnal symptoms (Yuksel et al., 2008).

Similarly, concerning hyperactivity symptoms, our results indicated that the majority of bronchial asthma cases 90 (72%) had hyperactivity symptoms where (29) were moderately hyperactive and (61) were severe hyperactive cases.

The study results coincided with those of

Fowler et al., (1992) and Lindgren et al., (1992) who found that children with asthma had greater difficulty in school compared to their peers. They were often-described as hyperactive and impulsive. Their behaviors had been thought to be secondary to this chronic illness or its treatment. Additionally, parental reports reported elevated rates of learning and behavioral difficulties in children with asthma.

Many studies emphasized our results that asthmatic children were found to have higher rates of inattention and hyperactivity symptoms (McQuaid et al., 2001, Blackman et al., 2007 and Harold, 2006).

The current study showed high statistically significant correlation between bronchial asthma severity and inattention and hyperactivity symptoms, These results came in line with those of several authors who had reported that children with severe asthma were 3 times more likely to have severe behavioral problems as inattention and hyperactivity when compared to children without chronic conditions, also the frequency of these problems increased as the severity of asthma increased (Bussing et al., 1995, Halterman et al., 2006 and Blackman et al., 2007).

In the current study there was no statistical significant relation ( $p=0.819$ ) between duration of bronchial asthma and inattention symptoms. This was against the results of Yuksel et al., (2008) who found that the duration of asthma was significantly correlated with attention deficit. On the other hand, the same study showed no correlation between duration of bronchial asthma and hyperactivity symptoms. This coincided with the present study's results where  $p$  was (0.561).

The asthma treatment results in this study showed a high statistical significance between type of bronchial asthma treatment and inattention symptoms. It was found that 90% of cases treated by

corticosteroids had inattention and hyperactivity symptoms.

This is supported by several studies as those of Stuart et al., (2005) and Varies et al., (2008) who found that steroids could influence the behavior of children resulting in several psychological adverse effects including anxiety, aggressiveness and hyperactivity.

Pretorius, (2004) in his study concluded that symptomatic asthmatic patients had increased levels of free serotonin in plasma. Treating patients with asthma by medications decreased serotonin levels. This had been linked to various psychological conditions like depression, oppositional defiant disorder and ADHD like symptoms (Inattention and Hyperactivity) in children.

Similarly, several studies indicated that medications used in asthma treatment had been reported to cause restlessness, sleep disturbance, inattentiveness, emotional and mood lability (Rachelefsky et al., 1986, Stein et al., 1993 and White et al., 1999).

Regarding I.Q. of the children, the study showed that the mean score was (98.65) with standard deviation ( $\pm 9.927$ ) and the majority (75.4%) had average I.Q.

These findings were in agreement with those of Mohamed, (2008) who found that in children suffering from hyperactivity and inattention symptoms the IQ score was average with a mean 100.8 (SD= 11.8). Also, Sullivan, (2009) found that children with symptoms of inattention and hyperactivity might appear to be average or even lower in intelligence. This denotes that bronchial asthma did not affect the cognitive functions of the children, neither did its treatment.

There is a lot of debate upon the correlation between bronchial asthma and neurobehavioral disorders in children. Although a lot of studies and

reports favored the relation between bronchial asthma and neurobehavioral disorders in children (Harold, 2006, Blackman et al., 2007 and Yuksel et al., 2008), still many other studies opposed that behavioral or school problems might be caused by asthma or its treatment in school-age children (Nall et al., 1992, Daly et al., 1996 and Bender et al., 1998).

**Conclusion:**

- ☐ Children suffering from asthma were found to have increased frequency of inattention and hyperactivity symptoms.
- ☐ This comorbidity between asthma and symptoms of inattention and hyperactivity may be due to the nature of bronchial asthma disease or the medications used in its treatment
- ☐ Increased rates of inattention and hyperactivity symptoms in asthmatic children reflected the negative impact of asthma and its treatment on neurobehavioral health of the children.
- ☐ This might lead to scholastic underachievement with its further psychological impact.

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### المشخص

#### أعراض نقص الانتباه وفرط النشاط في الأطفال المصابين

##### بالربو الشعبي

لربو هو أكثر الأمراض المزمنة شيوعاً في مرحلة الطفولة وقد تكون تأثيرات سلبية على حياة الطفل.

##### الهدف:

تقييم العلاقة بين أعراض فرط النشاط ونقص الانتباه والربو الشعبي في الأطفال، وايضا تحديد العلاقة بين أعراض فرط النشاط ونقص الانتباه والخطة العلاجية للربو.

##### طرق البحث:

هذا البحث تم على ١٢٥ طفل من الاطفال المصابين بالربو ويتراوح اعمارهم بين ٣-٦ سنة ويترددون على العيادة الخارجية بمستشفى صدر العباسية في الفترة من (١) يناير حتى ٣١ مارس ٢٠٠٦) ويتطابقون مع مواصفات الحالات التي تتضمنها الدراسة.

جميع الاطفال المصابين بالربو تم لهم الأتي:

أخذ التاريخ المرضي بالتفصيل، استخدام استمارة البيانات الشخصية الاجتماعية (اعداد الدكتور فوزة يوسف)، الفحص الكلينيكي ويشمل الفحص البدني والفحص النفسي، استخدام الدليل المختصر لاستخدام الصورة الرابعة من قائمة قصور الانتباه وفرط النشاط (ترجمة الدكتور جمعة مبد يوسف) واختيار الذكاء رسم الرجل (ترجمة الدكتور محمد فرغلي).

##### نتائج البحث:

١. اشارت نتائج البحث لوجود زيادة في أعراض نقص الانتباه وفرط النشاط في الاطفال الذين يعانون من الربو وهذه الأعراض تزداد بزيادة شدة الأزمة الربوية. وقد حدثت هذه الأعراض نتيجة لمرض الربو او للادوية المعالجة له.
٢. اخيرا الربو مرض مزمن له تأثير على الحالة البدنية والنفسية والاجتماعية للاطفال. كل من المرض والادوية المعالجة له قد يؤدي الى وجود أعراض نقص الانتباه وفرط النشاط في الاطفال.