IMPACT OF CHILDREN`S NUTRITIONAL STATUS ON THE CONTROL OF BRONCHIAL ASTHMA

By

Sherif Mostafa Reda*, Mahmoud Rashad El-Shandidi*, Tarek Abdelkareim El-Dahshan, Muhammad Ahmed Sultan**

Pediatrics* Clinical Pathology Departments,**
Faculty of Medicine, Al-Azhar University

ABSTRACT

Background: *Diet plays an important role in asthma, the most likely and most efficient method of exploiting that effect to individual and population benefit is probably dietary manipulation to increase intake of natural foods, and particularly fresh fruits and vegetables, in a balanced diet throughout life the purpose of this study was to evaluate the effect of Body Mass Index on childhood asthma outcome.*

Objectives: *to assess the Impact of Children`s Nutritional Status on The Control of Bronchial Asthma*

Patients and Methods: *This is a cross sectional study carried out on 60 child attending Al-Azhar University- Pediatric Pulmonology Unit. In AL-Hussein University Hospitals.*

The time of the study was 6 months from Dec 2017 to May 2018. The study included 60 children with mild persistent asthma with age range from 6-12 years they were 26 males & 34 females. Divided into 3 groups; group A including 20 underweight , group B included 20 overweight and group C including 20 normal weight. All patients were assessed clinically and by Spiro metric examination. Patients were subjected to full history taking including dietary intake, full medical examination including anthropometric measurements, and laboratory investigations including complete blood picture, serum iron, total serum protein & albumin. Data were collected, tabulated and statistically analyzed.

Results: *Comparing both groups A and B by group C as regards their Spiro metric results; group B had higher values in all parameters (Forced Vital Capacity, Forced Expiratory Volume in 1second, and Forced Expiratory Flow 25-75).*

Conclusion: *High Body Mass Index is a cause of poor asthma control while low Body Mass Index have no significant effect on asthma outcome in children.*

Recommendation: *Interventions that aim to prevent excessive weight gain in the pre-school and elementary school years are especially important to healthy development and may also help to reduce asthma- and obesity-related morbidity in school-aged children, adolescents, and adults.*

Key words: Asthma, Body Mass Index (BMI), pulmonary function, overweight, underweight children, spirometry.

INTRODUCTION

Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation. ***(GINA, 2015)***.

The maintenance of optimum nutritional status in patients with respiratory diseases is vital because overall malnutrition has direct repercussions on the lung's function as a respiratory "pump" and because malnutrition directly affects both the respiratory muscles and the lung parenchyma, thereby contributing to worsening of the underlying disease. ***(Batres et al., 2007)***.

The dramatic increase in asthma prevalence in westernized countries in recent decades, and the development of asthma in susceptible individuals who have migrated to a western country, suggests that environmental factors, such as dietary intake, must play a role in the onset and development of the disease. Key features of a westernized diet are low antioxidant intake, high fat intake and chronic metabolic surplus, resulting in obesity. Each of these may be contributing to increased asthma prevalence, due to their ability to modulate the innate immune response, which drives a neutrophilic pattern of airway inflammation, which is increasingly recognized in asthma ***(Wood and Gibson, 2009).***

AIM OF THE WORK

The thesis was to asses the impact of different nutritional status on the control of bronchial asthma in children.

PATIENT AND METHODS

Avenue of the Study: The study conducted at Al-Hussein University Hospital Pediatric Pulmonology Unit.

Type of the Study: Cross sectional comparative study

Inclusion Criteria:

- Children Aged 6-12 years
- Patients Already diagnosed with mild Bronchial Asthma according to GINA guidelines for classification of asthma.

Exclusion Criteria:

- Children with any systemic or chronic diseases.

Plan of the study:

The study conducted at Al-hussien University Hospital Pediatric Pulmonology Unit. Patients recruited randomly from the Outpatient's clinic. The study carried out on 60 patients with mild persistent asthma according to GINA guidelines for classification of asthma.

- **The enrolled patients was classified into the following groups:**

Group (A): Underweight Patients was included in this group according to Z Score by the world Health organization.

Group (B): Overweight Patients was included in this group according to Z Score by the world Health organization.

Group (C): Patients with average weight was included in this group according to Z Score by the world Health organization.

Ethical consideration:

1. Written consent for the study was obtained from the patients or parents.
2. Approval of the local committee in the pediatrics department, college and university were obtained before the study.
3. There is no conflict of interest regarding the study, authorship and publication .
4. The data of the patients and the results of the study are confidential and the patients have the right to keep.
5. The authors received no financial support for the study and publication .
6. The patients has the right to withdraw from the study at any time.

- **The patients recruited in this study subjected to the following:**

- **Anthropometric measurements (Height, Weight and BMI).**

Height was measured to the nearest 1 cm against a wall chart, and weight was measured to the nearest 0.1 kg using an electronic digital scale. BMI was calculated as weight (kg) divided by the square of height in meters(kg/m^2). Mean BMI was calculated for each group.

The body mass index according to sex- and age-specific BMI reference range using Z Score by the world Health organization.

The BMI percentile for age was used for classification of patients.

Underweight is defined by BMI < -2 SD. Normal weight by a BMI Between -2 SD to 1SD, overweight by a BMI above 1 SD

■ **Full medical history including detailed nutritional history and History of exacerbations**

For the diagnosis of asthma, we established the following:

1. Episodic symptoms of airflow obstruction are present,
2. Airflow obstruction or symptoms are at least partially reversible
3. Alternative diagnoses are excluded such as congenital anomalies with airway deformity, Systemic diseases
4. Usual prodromal symptoms, rapidity of onset, associated illnesses, number in the last year, need for hospitalization

■ **Family history**

- History of asthma, allergy, sinusitis, rhinitis or eczema in close relatives

▪ **Social history**

- Factors that may contribute to non-adherence of asthma medications such as low socioeconomic people who cannot afford the medications.

■ **Thorough clinical examination**

- Physical examination in the absence of an acute episode (during an outpatient visit between acute episodes). Signs of atopy or allergic rhinitis, such as conjunctival congestion and inflammation, pale violaceous nasal mucosa due to allergic rhinitis, may be present.
- Chest examination for prolongation of the expiratory phase, expiratory wheezing, coarse crackles, or unequal breath sounds.

SPIROMETRY

Dynamic spirometry (**win spiro pro**) was performed in all subjects. The best of at least three technically acceptable values for forced expiratory volume in 1 second (FEV1), forced vital capacity (FVC), forced expiratory flow 25–75% (FEF 25–75) were selected. The spirometric pulmonary function test results were expressed as percentages of predicted normal values. For the purpose of this study, the threshold of abnormality was identified as less than 80% of the predicted value.

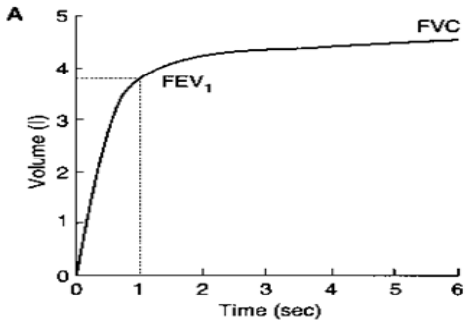
Vital capacity (VC): This is the amount of air (in liters) moved out of the lung during normal breathing. Vital capacity is usually about 80% of the total lung capacity. Because of the elastic

nature of the lungs and surrounding thorax, a small volume of air will remain in the lungs after full exhalation. This volume is called the residual volume (RV).

Forced vital capacity (FVC): is the volume of air that is expelled into the spirometer following a maximum inhalation effort.

Forced expiratory volume (FEV): At the start of the FVC maneuver, the spirometer measures the volume of air delivered through the mouthpiece at timed intervals of 0.5, 1.0, 2.0, and 3.0 seconds. The sum of these measurements normally constitutes about 97% of the FVC measurement. The most commonly used FEV measurement is FEV-1, which is the volume of air exhaled into the mouthpiece in one second. The FEV-1 should be at least 70% of the FVC.

Forced expiratory flow 25–75% (FEF 25–75): This is a calculation of the average flow rate over the center portion of the forced expiratory volume recording. It is determined from the time in seconds at which 25% and 75% of the vital capacity is reached. The volume of air exhaled in liters per second between these two times is the FEF 25–75. This value reflects the status of the medium and small sized airways.



Normal values for FVC, FEV, and FEF are dependent on the patient's age, gender, and height. **(Braunwald et al., 2001).**

Laboratory Assessment Of Nutrition:

1. CBC
2. Serum Iron
3. Total Serum Protein and Serum Albumin.

RESULTS

Pulmonary function for the three groups with BMI Correlation

Table (1): Mean and SD of Forced vital capacity (FVC) with correlation among the three groups.

Groups	FVC Mean ± SD	P value	S
Group (A) Underweight	**93.4 ± 13.24**	***0.0001**	**Highly Significant**
Group (B) Overweight	**78.33 ± 10.98**	****0.2**	**NS**
Group (C) Average weight	**98.33 ± 6.19**	*****0.0001**	**Highly Significant**

*** Underweight (group A) Vs Overweight (Group B).**
**** Underweight (group A) Vs Average weight (Group C) .**
***** Overweight (Group B) Vs Average weight (Group C)**

The group means and SDs of FVC for the three groups with their correlation are shown in table (1) and graphically presented in Fig (1). It revealed that there was a significant difference between under weight and Over weight, There was no significant difference between underweight and average weight, there was a significant difference between overweight and average weight.

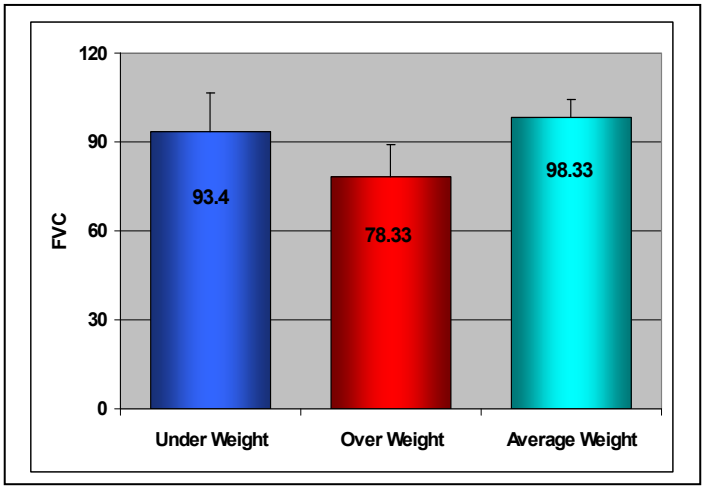


Figure (1): Mean and ±SD of FVC for the three groups. There was a significant decrease of FVC in group b (over weight)

Forced expiratory volume in 1 second (FEV1): The group means and SDs of FEV1 for the three groups with correlation are shown in Table(2) and graphically presented in Fig (2).

Table (2): Mean and SD of FEV1 for the three groups with correlation.

Groups	FEV1 Mean ± SD	P value	S
Group (A) Underweight	**84.0 ± 12.33**	*0.009	**Highly Significant**
Group (B) Overweight	**72.33 ± 12.55**	**0.86	**NS**
Group (C) Average weight	**84.73 ± 9.81**	***0.006	**Highly Significant**

*** Underweight (group A) Vs Overweight (Group B).**
**** Underweight (group A) Vs Average weight (Group C).**
***** Overweight (Group B) Vs Average weight (Group C)**

The group means and SDs of FEV1 for the three groups with their correlation are shown in table (2) and graphically presented in Fig (2). It revealed that there was a significant difference between under weight and Over weight, There was no significant difference between underweight and average weight, there was a significant difference between overweight and average weight as shown in Table (2)

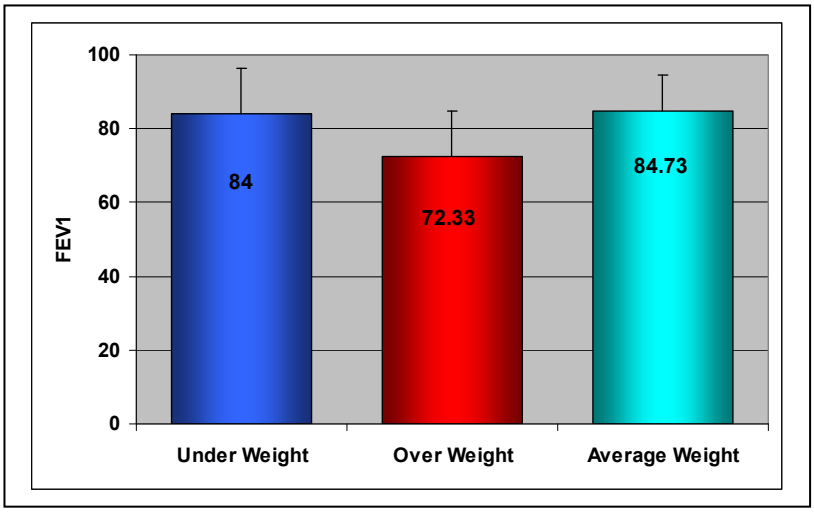


Figure (2): Mean and ±SD of FEV1 **for the three groups. There was a significant decrease of FEV1 in group (b) (over weight)**

Forced expiratory flow 25–75% (FEF 25–75). The group means and SDs of FEF 25-75 for the three groups with correlation are shown in table (3)and graphically presented in Fig (3).

Table (3): Mean and SD of FEF 25-75 for the three groups.

Groups	FEV1 Mean ± SD	P value	S
Group (A) Underweight	**66.26 ± 20.08**	*0.04	**S**
Group (B) Overweight	**53.46 ± 12.2**	**0.53	**NS**
Group (C) Average weight	**70.13 ± 17.4**	***0.01	**S**

*** Underweight (group A) Vs Overweight (Group B).**
**** Underweight (group A) Vs Average weight (Group C).**
***** Overweight (Group B) Vs Average weight (Group C)**

The group means and SDs of FEF 25-75 for the three groups with their correlation are shown in table (3) and graphically presented in Fig (3). It revealed that there was a significant difference between under weight and Over weight, There was no significant difference between underweight and average weight, there was a significant difference between overweight and average weight.

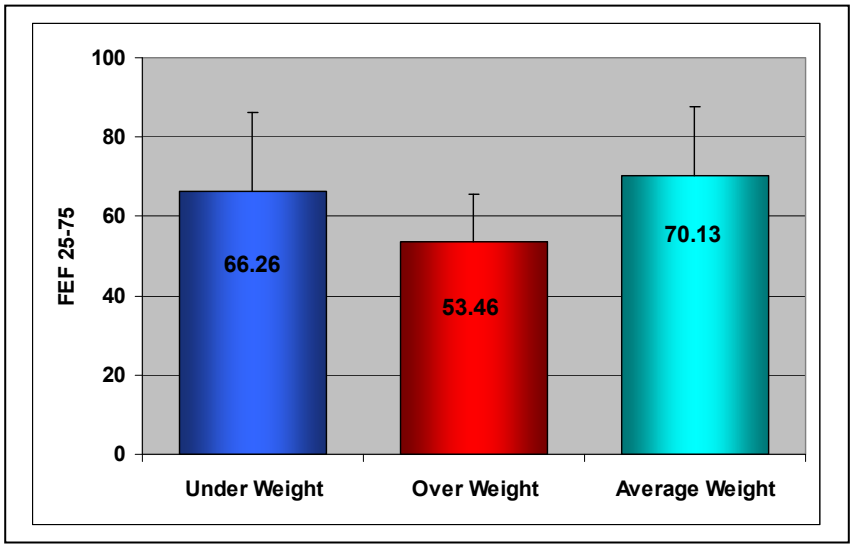


Figure (3): Mean and ±SD of FEF 25-75 for the three groups. There was a significant decrease of FEF 25-75 in group (b) (over weight)

- **Correlation between body mass index(BMI) and pulmonary function:**

■ **Correlation between body mass index (BMI) and Forced vital capacity (FVC):**

Table (4): Correlation Analysis between the BMI and FVC.

correlation coefficient	
P-value	**0.003**
S	**S**

As shown in table(4), the correlation analysis between BMI and FVC revealed that there was significant correlation between BMI and FVC

■ **Correlation between body mass index (BMI)and Forced expiratory volume in one second (FEV1):**

Table (5): Correlation Analysis between the BMI and FEV1.

correlation coefficient	
P-value	**0.03**
S	**S**

As shown in table (5), the correlation analysis between BMI and FEV1 revealed that there was a significant correlation between BMI and FEV1

■ **Correlation between BMI and forced expiratory flow(FEF) 25-75 :**

Table (6): Correlation Analysis between the BMI and FEF 25-75.

correlation coefficient	
P-value	**0.09**
S	**NS**

As shown in table (6), the correlation analysis between BMI and FEF 25-75 revealed that there was no significant correlation between BMI and FEF 25-75.

DISCUSSION

Asthma is one of the most common chronic childhood medical disorders, with a remarkable increase in prevalence and severity. ***(Mannina et al., 2002).***

Although previous studies have attempted to show a relation between asthma prevalence and obesity, and evaluated the correlation between obesity and asthma without considering the severity and few previous studies attempted to evaluate the correlation between underweight and asthma. Our study suggests a relationship between the degree of asthma severity and body mass index, using full medical history, physical examination and objective tests (spirometry).

At our study, the demographic data of 60 children in 3 groups showed ,

➢ **The correlation analysis between Body Mass Index and Pulmonary Function Test revealed that:**

● That there was significant correlation between Body Mass Index and Forced Vital Capacity where P value was (0.003).

● There was a significant correlation between Body Mass Index and Forced expiratory volume in 1sec where the P value was (0.03).

● There was no significant correlation between Body Mass Index and Forced Expiratory Flow 25-75 where the P value was (0.09).

This proves that non obese patients have better Spiro metric values than obese patients.

These results agree with previous studies: which found that increased BMI lesds to more sever asthma.

● **El-Baz F et al., 2009 found that** BMI was inversely correlated with most of pulmonary function abnormalities. Low FVC, FEV1 values indicated a restrictive pulmonary defect. This could have been due to the mechanical limitation of the chest expansion, as the accumulation of excess fat could interfere with the movement of the chest wall and the descent of the diaphragm. This may reflect intrinsic changes within the lung in the presence of obesity.

● **Kajbaf T *et al.*, (2011), studied**

903 children, 7 to 11 years of age, enrolled in a study through cluster sampling .This study showed that obese children had significantly higher prevalence of current wheezing than children of normal weight (68.7% vs. 0.53%). Also, the prevalence of current wheezing among overweight children was higher than in normal-weight children (37% vs. 0.53%) and concluded a strong association between asthma symptoms and both overweight and obesity in both sexes among school-age children**.**

● **Visness CM *et al.*, (2010), reported that** excess weight in children is associated with higher rates of asthma, especially asthma that is not accompanied by allergic disease.

● **Elhelaly N *et al.*, (2009), concluded that** obesity is a cause of poor asthma control and asthmatics are more liable to sedentary life (due to their recurrent asthmatic attacks which limits their exercise ability) and thus to obesity. Also weight reduction programs can be used as an adjunctive to decrease the need for medications and to improve the quality of life in obese patients with persistent asthma.

● A longitudinal study by **Celedón J C *et al.*, (2001), showed that** girls who become overweight or obese between 6 and 11 yr of age have an increased risk of developing new asthma symptoms and increased bronchodilator unresponsiveness during the early adolescent years**.**

● **Charususin N *et al.*, (2007), mentioned that** obese children tend to observe airway obstruction higher than non-obese children.

Also our results partially agree with:

● **Yuksul H *et al.* ,(2012),** concluded that mean asthma symptom score was significantly higher in the obese children with asthma than in the non-obese children with asthma but lung function test results were not significantly different between the obese and non-obese children with asthma (P>0.05 for FEV1, FVC, and PEF).

○ **Ginde A.A *et al.*, (2010),** concluded that the prevalence of obesity among children presenting to the emergency departement with acute asthma was significantly higher compared with children from the general population but BMI was not associated with markers of chronic and acute asthma severity. An increased risk of asthma associated with being at risk for overweight among 6–11 year old girls but not among younger girls or among boys. The importance of intervening among pre-adolescent girls who are at risk for overweight

was also suggested by a longitudinal study of children in the Tucson Children's Respiratory Study, which demonstrated that girls, but not boys, with BMIs greater than or equal to the 85th percentile at age 11 were more likely to experience wheezing at 11 and 13 years of age than those with BMIs less than the 85th percentile. In addition, girls in the Tucson study who became overweight or at risk for overweight between ages 6–11 years were seven times more likely to develop new asthma symptoms at 11 or 13 years of age than girls who did not become overweight or at risk for overweight during this period of development. **(Kwon HL *et al.*, 2006).**

While others have found no difference in lung function or asthma severity

● **Dordević M, (2011) stated that** numerous studies conducted so far have not shown significant differences in spirometric parameters between the degree of obesity, and subjects with normal body weight.

● Lung function test results were not significantly different between the obese and non-obese children with asthma (P>0.05 for FEV1, FVC, and PEF) . **(Ginde A.A *et al.*,2009).**

● **Borani P *et al.*, (2007), stated that** baseline pulmonary function test parameters were not different between mildly obese and normal weight children. Anthropometric parameters had no significant effect on pulmonary function. Longitudinal studies including physiological tests are needed to explore the effects of different levels of obesity on pulmonary function in children.

● The results of **Hom J *et al.*, (2009),** study showed that in some groups of asthmatic patients (5-10 years) there is no association between the increased BMI and severity of asthma.

➢ **The results of our study showed that in group A of asthmatic 20 underweight children**.

There are non significant difference of asthma severity as compared to group C 20 average weight asthmatic children of the same class(mild persistant asthma) indicated by non significant values of PFT in all parameters

■ FVC there was there was no significant difference between underweight and average weight as the P value was (0.2).

■ FEV1 there was no significant difference between underweight and average weight as the and P value was (0.86).

■ FEF 25-75 there was no significant difference between

underweight and average weight as the P value was (0.53).

That non significant association we observed between underweight and asthma among boys needs to be further explored with a large, prospective study, which utilizes both continuous and categorical measures of BMI and includes assessments of gestational age and weight at birth along with a substantial number of very young children.

These results partially agree with previous studies.

A case-control study to investigate the major risk factors for asthma in Syria at 2009 concluded that in this Middle East population, about one in three patients are overweight and 1 in 10 is obese. However, obesity or underweight was not a major risk factor for asthma, or its severity. **(Al Ali W, 2009).**

While others have found significant evidence between underweight and asthma severity.

● The results of **Behmanesh F *et al.,* (2010),** study showed that in group of asthmatic patients (<5 years) there was inverse correlation between BMI and severity of asthma which was statistically significant (P<0.05). The analysis also revealed that an association between being underweight and asthma appears to occur early in the life course.

● Previous investigation done by **Schachter *et al.,* (2003),** has found association between being under-weight and asthma in adults and adolescents.

● A prospective study of children recruited during 1974–1979 in six U.S.cities by **Gold DR *et al.,* (2003),** demonstrated an increased risk of asthma among the leanest boys; however, their analysis did not include children younger than 6 years.

● For both male and female patients and controls, FVC, FEV1 and PEF correlated positively with FFM (fat-free mass) (P < 0.001) . (**Dorothy J *et al.,* 2008).**

● **Lang JE *et al.,* (2012), concluded that** both underweight and obese children with asthma have worse lung function and asthma-related outcomes compared to similar normal weight children, though the phenotypic characteristics of underweight and obese asthmatics differed considerably.

Limitations of the study:

● It was a cross sectional study and, since measurements of the obese subjects were taken at a single point in time, they may not have accurately reflected the clinical status.

● Our study was carried out in a small group in a single institute. A longitudinal multi-centric study in a larger population is needed.

Radiological assessment would have been helpful in this study, since it is capable of determining fat distribution more accurately than anthropometric indices.

REFERENCES

1. **BoranI, Gulnur Tokuc, Burcu Pisgin, Sedat OktemI, Zeliha Yegin andOzlem Bostan(2007):** Impact of obesity on ventilatory function.J. Pediatr, (Rio J.) vol.83 no.2

2. **Celedón J, Palmer LJ, Litonjua AA, Weiss ST, Wang B, Fang Z and Xiping XU (2001):** Body Mass Index and Asthma in Adults in Families of Subjects with Asthma in Anqing, China,Am. J. Respir. Crit. Care Med. vol. 164 no. 10 1835-1840.

3. **Charususin N, Suwannee Jarungjitaree, Pipop Jirapinyo, Saipin Prasertsukdee (2007):** The Function and Respiratory Muscle Strength in Thai Obese Children, Siriraj Medical Journal Volume 59.

4. **El-Baz FM, Eman AA, Amal AA, Terez BK and Fahmy A. (2009):** Impact of obesity and body fat distribution on the pulmonary function in Egyptian children, EJB. 3:49-58.

5. **El-Helaly N, Kamel Y, Abd-Elaziz E, Elwan A and Nabih M (2009):** Childhood obesity and asthma severity: Is there a link?,J. Biol. Sci. 9: 259-263.

6. **Gibson PG, Powell H and Ducharme FM (2007):** Differential effects of maintenance long-acting beta agonist and inhaled corti-costeroid on asthma control and asthma exacerbation , J Allergy Clin Immunol 119(2):344-50.

7. **Global Initiaive for Asthma (GINA) (2015):** Global Strategy for asthma management and prevention, GINA 2015 appendix chapter 1 7-13

8. **Hom J, Morley EJ, Sasso P,and Sinert R (2009):** Body mass index and pediatric asthma outcomes, Pediatr Emerg Care.25(9):569-71.

9. **Kajbaf TZ, Asar S, and Alipoor MR (2011):** Relationship between obesity and asthma symptoms among children in Ahvaz, Iran: a cross sectional study,Ital J Pediatr; 37: 1.

10. **Kwon HL, Benjamin Ortiz, Rachel Swaner, Katherine Shoemaker, Betina Jean-Louis, Mary E. Northridge, Roger D. Vaughan, Terry Marx, Andrew Goodman, Luisa N. Borrell, Stephen W. Nicholas (2006):** Childhood Asthma and Extreme Values of Body Mass Index: The Harlem Children's Zone Asthma Initiative,J Urban Health; 83(3): 421–433.

11. **Liu AH, Zeiger R, Sorkness C, Mahr T, Ostrom N, Burgess S, Rosenzweig JC and Manjunath R (2007):** Development and cross-sectional validation of the Childhood Asthma, J Allergy Clin Immunol ; 119(4): 817-25.

12. **Muralidhara DV, Bhat MR. (2007):** Some aspects of the pulmonary functions in underweight and overweight human subjects.

Thai Journal of Physiological Sciences; 20:3-7.

13. **Schachter LM, Peat JK and Salome CM (2003):** Asthma and atopy in overweight children, Thorax; 58(12):1031-5.

14. **Visness CM, London SJ, Daniels JL, Kaufman JS, Yeatts KB, Siega-Riz AM, Calatroni A and Zeldin DC (2010):** Examination Survey 1999-2006;Association of childhood obesity with atopic and nonatopic asthma: results from the National Health and Nutrition. J Asthma; 47(7): 822–829.

15. **Yuksel H, Ayhan Sogut, Ozge Yilmaz, Ece Onur, and Gonul Dinc (2012):** Role of Adipokines and Hormones of Obesity in Childhood Asthma,Allergy Asthma Immunol Res; 4(2): 98–103.

تأثير الحالة الغذائية للأطفال علي التحكم في مرض الربو الشعبي

شريف مصطفي رضا* محمود رشاد الشنديدي طارق عبدالكريم الدهشان* محمد أحمد سلطان****

***قسم طب الأطفال ** قسم الباثولوجيا الإكلينيكية - كلية الطب - جامعة الأزهر**

النظام الغذائي يلعب دورا مهما في مرض الربو عند الأطفال ، والطريقة الأرجح والأكثر كفاءة لاستغلال هذا التأثير لمصلحة الطفل هى التعديل في النظم الغذائية لزيادة تناول الأطعمة الطبيعية، والفواكه الطازجة والخضروات وإتباع نظام غذائي متوازن في جميع مراحل الحياة. هذا ليس فقط التفسير الأكثر منطقية وواقعية، بل هو أيضا استراتيجية فعاله تحقق فوائد في صحة الرئة وتقلل من حده الربو عند الأطفال. وكان الغرض من هذه الدراسة تقييم تأثير مؤشر كتلة الجسم على التحكم في مرض الربو الشعبي في الأطفال . ومما يعقد هذا الهدف من خلال حقيقة أن مؤشر كتلة الجسم ليس من أكبر العوامل في تطور أو السيطرة على مرض الربو، ومن المرجح أن يكون ضعيفا نسبيا بالمقارنة مع عوامل الخطر الأخرى مثل الحساسية، وتلوث الهواء، و التاريخ العائلي لمرض الربو.وينبغي النظر في مصادر عدة من التحيز في تفسير هذه النتائج.

هذه الدراسة تقدم دليلا قويا على أن ارتفاع مؤشر كتلة الجسم خلال فترة الطفولة يزيد من حدة الربو، في حين أن انخفاض مؤشر كتلة الجسم ليس لها أي تأثير كبير على نتيجة مرض الربو في الأطفال الذين يعانون من الربو المعتدل المستمر ومع ذلك، توجد محدودية هامة من تحليلنا هو عدم القدرة على ضبط المتغيرات الفردية فى العينة قيد البحث.

التدخلات التي تهدف إلى منع زيادة الوزن في السنوات الدراسية ما قبل المدرسة الابتدائية ذات أهمية خاصة لتنمية صحية وربما يساعد أيضا على الحد من مرض الربو، والأمراض المرتبطة بالسمنة في الأطفال في سن الدراسة، والمراهقين، والبالغين .وينبغي للأطباء الاستمرار في تركيز اهتمامها على علاجات ثبتت كفاءتها بما في ذلك تجنب المثيرات البيئية والاستخدام السليم للأدوية.

هناك العديد من الأسئلة والأجوبة قليلة في شأن العلاقة بين الربو والسمنة لدى الأطفال و هناك حاجة لدراسات إضافية لتوضيح العلاقة بين المرضين حتى يتسنى وضع التدخلات الفعالة لتحسين صحة وحياة هؤلاء الأطفال.