

Asthma Education and its Impact on Emergency Department Visit by Asthmatic Children

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Abstract

Background: Asthma is a public health problem in all countries irrespective of their level of development, being generally under-diagnosed and undertreated, and most asthma-related deaths commonly occurs in low-income and lower-middle income countries. Children rely heavily on their parents for asthma management. Therefore, asthma education needs to target the entire family. There is a need for ongoing asthma education, increased sensitivity to complex home management, and family-centered interventions by caregivers of asthmatic children that enhance communication and collaboration between caregivers and providers.

Aim of Study: This study is aiming at evaluating the effects of an education program on the emergency department visits by asthmatic children.

Patients and Methods: Was a clinical trial study which has been conducted at emergency department of children's teaching hospital Ain Shams teaching hospital during the period of January 2019 to June 2019. The study was conducted on 30 asthmatic pediatric patients aged from 6 months-15 years old with documented asthma diagnosis (intermittent wheezes, breathlessness, dry cough, etc.). The age of patients included in the study ranged between 6 months-15 years. This study investigated an asthma education intervention in pediatric patients aged 6 months-15 years and its effect on emergency room (ER) visits.

Results: The study enrolled 30 pediatric patients. Asthma education was associated with less ER visits, and better identification the signs of a severe asthma attack.

Conclusion: In this study, asthmatic patients who received education about asthma had less ER visits, and feeling more confident about managing asthma.

Key Words: Asthma – Emergency department – Children.

Introduction

BRONCHIAL asthma is a public health problem in all countries irrespective of their level of development, being generally under-diagnosed and undertreated, and most asthma-related deaths commonly occurs in low-income and lower-middle income countries [1].

There are several risk factors for emergency department visits in asthmatic children i.e., young age, duration of symptoms, high consumption of asthma medication, previous asthma hospitalizations, low parental confidence on efficacy of asthma medication, lack of use of a strict treatment plan for asthma, allergen exposures, low family income, and lack of increasing asthma medication doses at the beginning of a cold episode [2].

Children rely heavily on their parents for asthma management. Therefore, asthma education needs to target the entire family. There is a need for ongoing asthma education, increased sensitivity to complex home management, and family-centered interventions by caregivers of asthmatic children that enhance communication and collaboration between caregivers and providers [3].

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A family-centred multidisciplinary asthma education program can improve the quality of care to paediatric patients with asthma admitted to the hospital by decreasing the rates of asthma-related re-admissions and acute care visits at the emergency department. Increased knowledge of asthma was associated with improved lung function and self-efficacy, reduction of restricted activity days, school absenteeism, visits to an emergency department, and fewer nights disturbed by asthma [4].

Improving asthma outcomes, especially in high-risk groups, begins in the emergency department. It is crucial to seize the emergency department visit as a time to provide access to high-risk patients with Asthma by Improving discharge communication, starting or providing medications at the time of the emergency department visit, and bringing families back within a week of care to investigate causes of poor control and propose solutions. The emergency department represents an important opportunity to engage families in asthma care and management. That engagement can yield benefits in a child's overall health and educational status [5].

Aim of work:

This study is aiming at evaluating the effects of an educational asthma program on the emergency department visits.

Patients and Methods

This was a clinical trial study has been conducted at emergency department of children's hospital of Ain Shams Teaching Hospital during the period of January 2019 to June 2019. The study was conducted on 30 asthmatic pediatric patients aged from 6 months-15 years old with documented asthma diagnosis (intermittent wheezes, breathlessness, dry cough, etc.). The age of patients included in the study ranged between 6 months-15 years.

Inclusion criteria:

Age group between 6 months and 15 years old with:

- A known history of asthma
- A primary diagnosis of asthma exacerbation

- At least one previous emergency room visit / or inpatient admission / or pediatric intensive care unit admission secondary to asthma
- Asthma reversibility test for children older than 5 years .

Exclusion criteria:

- Chronic lung diseases other than bronchial asthma.

Each patient was subjected to:

1- Complete history taking:

- a- Demographic data: Name, age, gender, family history and consanguinity.
- b- Residence: Urban or rural.
- c- Symptoms suggestive of asthma exacerbations including: Intermittent attacks of dry cough, dyspnea, chest tightness and cyanosis with a special stress on frequency and severity of asthma exacerbations.
- d- Analysis of chest symptoms: including (dry cough, wheezes, dyspnea, chest tightness, respiratory distress).

2- Clinical examination:

- a- General examination with anthropometric measurement.
- b- Local chest examination with special emphasis on signs of hyperinflation, tachypnea, prolonged expiratory phase, expiratory sibilant rhonchi, air entry, signs of respiratory distress, and oxygen saturation.

3- The following investigations:

- Complete blood count that was done using Beckman Coulter-Gen system it included the levels of (Hemoglobin (Hb), Hematocrit (Hct), Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH) & Red Cell Diameter Width (RDW), Platelets count, Reticulocyte count).
- Laboratory methods for the rest of biomedical investigations as C-reactive protein, erythrocyte sedimentation rate and serum immunoglobulin E level also were recorded.
- Chest X ray P-A view was done in asthma exacerbations to exclude other diagnoses.

4- Educational asthma program introduced to asthmatic children.

All the study participants were subjected to an educational asthma program for 4 months for providing children with information and skills to manage their asthma [6].

Statistical analysis:

Recorded data were collected, revised, coded and entered to the Statistical Package for Social Science (IBM SPSS) version 23. The quantitative data with parametric distribution were presented as mean, standard deviations and ranges while with non-parametric were presented as median with inter-quartile range (IQR). Also, qualitative variables were presented as number and percentages.

The comparison between groups regarding qualitative data was done by using Chi-square test and/or Fisher exact test when the expected count in any cell found less than 5.

Results

Table (1): Demographic data among the studied patients.

Patients' demographics	No. = 30
<i>Age (years):</i>	
Mean ± SD	6.18±3.37
Range	0.5-15
6 months-5 yrs	16 (53.3%)
6-11 yrs	10 (33.3%)
12-15 yrs	4 (13.3%)
<i>Sex:</i>	
Male	17 (56.6%)
Female	13 (43.3%)
<i>Residency rural/urban:</i>	
Urban	15 (50.0%)
Rural	15 (50.0%)
<i>Paternal consanguinity:</i>	
No consanguinity	23 (76.7%)
First cousin consanguinity	5 (16.7%)
Second cousin consanguinity	2 (6.7%)
<i>Similar attacks:</i>	
No	0 (0.0%)
Yes	30 (100.0%)

The previous table shows that bronchial asthma was higher in children less than 5 years (53.3%) compared to the other age groups. As regarding the sex distribution, asthma was more prevalent among males (56.6%) than females (43.3). All the studied patients reported previous similar attacks.

Table (2): The clinical characteristics of the studied patients.

	No. = 30	
<i>Age of symptoms onset (year):</i>		
Mean ± SD	2.74±1.41	
Range	0.25-5	
<i>Oxygen saturation:</i>		
Mean ± SD	95.93±2.23	
Range	89-99	
<i>Presenting respiratory symptoms:</i> No. = 30		
Dyspnea	25	83.3%
Respiratory distress	24	80.0%
Dry cough	16	53.3%
Productive cough	9	30.0%
Expectoration	6	20.0%
<i>Grade of respiratory distress:</i>		
No respiratory distress	6	20.0%
I	7	23.3%
II	16	53.3%
III	0	0.0%
IV	1	3.3%
<i>Physical signs:</i>		
Wheezes	24	80.0%
Hyperinflated chest	12	40.0%
Diminished air entry	6	20.0%
Crepitations	3	10.0%
Cyanosis during attack	1	3.3%

The previous table shows that the age of onset of disease ranged from 4 months to 5 years. The main presenting symptom was dyspnea which was observed among (83.3%) of asthmatic patients. While the most common sign elicited were wheezes (80%).

Table (3): Grading and control of asthma among the studied patients.

No. = 30	
<i>Day time symptoms:</i>	
≤1-2 day/week	3 (10.0%)
3-4 days/week	5 (16.7%)
Daily	13 (43.3%)
Throughout the day	9 (30.0%)
<i>Nighttime symptoms (times/month):</i>	
≤2 times/month	5 (16.7%)
3-4 times/month	13 (43.3%)
>1 time/week	1 (3.3%)
7 times/week	11 (36.7%)
<i>Short acting beta agonists frequency:</i>	
1-2 day/week	3 (10.0%)
3-4 days/week	5 (16.7%)
Daily	11 (36.7%)
Several times/days	11 (36.7%)

The previous table shows that (10%) of the asthmatic patients were diagnosed as having intermittent asthma and (16.7%) were diagnosed as mild persistent asthma, whereas (73.4%) were having moderate to severe persistent asthma.

Table (4): Frequency of the ER visits pre and post asthma education among the studied patients.

Variables	Pre asthma education No.=30	Post asthma Education No.=30	Test value	p-value	Sig.
<i>Total ER visits:</i>					
Median (IQR)	3 (3-4)	2 (1-2)	16.276	0.000	HS
Mean ± SD	3.47±1.01	1.73±0.91			
Range	2-5	0-3			
<i>Pediatric intensive care unit:</i>					
No	28 (93.3%)	30 (100.0%)	2.069	0.150	NS
Yes	2 (6.7%)	0 (0.0%)			

This table shows that ER visits were significantly lower asthma education (1.73 ± 0.91) with a range of (0-3), than pre asthma education (3.47 ± 1.01) with a range (0-3).

Discussion

The current study showed that, the prevalence of bronchial asthma was higher in children less than 5 years old compared to different age groups. It was reported that the number of children with active symptoms of bronchial asthma was (53.3%) in those aged 6 months-5 years and (33.3%) in those aged 6 to 11 years and (13.3%) in those aged 12 to 15 years.

Additionally, this study showed, there was no statistically significant difference between males and females as regarding the sex distribution ($p > 0.05$). However, males (56.6%) were more than females (43.3 %).

Our study showed that, the main presenting symptoms of asthma were dyspnea, observed in 83.3% of patients, respiratory distress in 80%, and dry cough in 53.3%.

According to asthma grading guidelines and the level of asthma severity in the current study, it was found that (10%) of the patients were diagnosed as having intermittent asthma and (16.7%) were diagnosed as mild persistent asthma and (37.7%) were with moderate persistent asthma, whereas (37.7%) had severe persistent asthma.

Our study shows a statistically significant difference pre and post asthma education regarding ER visits which were significantly lower post asthma education (1.73 ± 0.91) with a range of (0-3) respectively, than pre asthma education (3.47 ± 1.01) a range (2-5).

Conclusion:

In conclusion, our study demonstrated that asthmatic patients who received education about asthma had less ER visits, and better self-management of asthma. So, we conclude that asthma education may be considered as a preventive factor in development of asthmatic visits in children and have a positive impact on decreasing emergency room visits.

Recommendations:

- Larger studies with well-designed programs and longer follow-up of asthmatic patients are needed to evaluate the effect of educational programs with a different structure in various population settings.
- Increase health information about bronchial asthma and its treatment and control.
- Preventing severe asthma exacerbations requires identifying and focusing on high-risk patients and patients who visit the ER frequently to develop personalized care protocols that may prevent such exacerbations.
- Continued attempts to define factors important in the etiology of bronchial asthma, as well as their management.

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تثقيف المريض بمرض الربو وتأثيره على زيارات قسم الطوارئ لدى الأطفال المصابين بالربو

يعد مرض الربو لدى الأطفال أكثر مرض إلهابى مزمن انتشاراً فى مرحلة الطفولة ويصيب ما يقدر بثلاثمائة مليون شخص حول العالم. يتميز الربو بفرط الاستجابة فى الشعبيات الهوائية والذي قد يؤدى إلى الصفير والسعال وضيق التنفس ويمكن أن يؤدى إلى فشل الجهاز التنفسى.

حددت الدراسات الوبائية العديد من عوامل الخطر المرتبطة بكثرة تردد الأطفال على أقسام الطوارئ ومنها صغر العمر، زيادة مدة الأعراض، الاستهلاك المرتفع لدواء الربو، كثرة الحجز داخل المستشفيات، إنخفاض ثقة الوالدين فى فعالية دواء الربو، عدم استخدام خطة علاج صارمة للربو، التعرض لمثيرات الحساسية، إنخفاض دخل الأسرة، الازدحام، شدة أعراض الازمة، والافتقار إلى جرعات دوائية متزايدة فى بداية نوبة البرد.

تهدف هذه الدراسة إلى تقييم دور برنامج التثقيف الصحى على تكرار الزيارات لقسم الطوارئ.

وفقاً لدراستنا، فإنه يُظهر فرقاً ذا دلالة إحصائية بين التثقيف قبل وبعد الربو وفقاً لطلب الرعاية الطبية، مما أظهر إنخفاضاً مهماً إحصائياً فى التثقيف بعد الربو فى إجمالي عدد زيارات غرفة الطوارئ، وتكرار زيارات غرفة الطوارئ.

من النتائج السابقة تم استنتاج أن مرضى الربو الذين تلقوا تثقيفاً حول الربو لديهم زيارات أقل تواتراً، ودخولاً أقل إلى المستشفى، وتفاقم ربو أقل حدة، بالإضافة إلى ذلك، أدى التثقيف بشأن الربو إلى تحسين قدرة الأطفال المصابين على التعامل مع حالات الربو وله تأثير إيجابى فى تقليل زيارات غرفة الطوارئ.