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Study on Characteristics of Patients with Repeated Admissions for Asthma in Hospital Tengku Ampuan Afzan, Kuantan, Pahang, Malaysia

Mohd. Aznan Md. Aris¹⁾, Shaiful Bahari Ismail¹⁾,
and Mohd Fauzi Mohamad²⁾

ABSTRACT

Objective: To determine the characteristics in patients with repeated admissions for asthma compared to patients with no repeated admission for asthma over the same period of one-year duration.

Methods: A cross-sectional comparative study among 30 patients with asthma who had repeated admissions and another 30 patients with asthma who had no repeated admission for exacerbation of asthma over the same period of one-year duration (2001). The socio-demographic, clinical characteristics and evaluation data were collected. The evaluation included measurement of peak expiratory flow (PEF), inhaler technique skills and questionnaires on knowledge of asthma.

Results: There was no significant difference in socio-demographic characteristics, measurement of PEF and inhaler technique skills in both groups. In clinical characteristics, there was significant difference noted in history of atopy, history of absenteeism, asthma symptoms and use of medications. There was significant difference in the knowledge of asthma where the total mean scores was 14.8 in repeated admissions group and 17.7 in non-repeated admission group from the total score of 31.

Conclusions: Patients with repeated admissions for asthma tend to have high past history of atopy, high history of absenteeism from work or school, more frequent nocturnal symptoms and more use of low dose inhaler corticosteroids. They also had poor inhaler techniques and less asthma knowledge.

KEY WORDS

asthma, repeated admission

INTRODUCTION

General introduction

Asthma is responsible for much morbidity and mortality with an increasing trend in many countries in the recent decade. The prevalence of asthma is on the increase^{1,2,3)}. A study done among Singaporean children revealed a period prevalence of wheezing of 12% and a doctor diagnosed asthma of 20%²⁾. Among Singaporean adults, the lifetime cumulative prevalence of physician-diagnosed asthma was 4.7% in men and 4.3% in women⁴⁾. The Second National

Health and Morbidity Survey carried out by the Ministry of Health, Malaysia in 1996 found that estimated prevalence of asthma in Malaysia was 4.2%⁵⁾.

Asthma is one of the most common causes for admission in the hospital particularly with repeated admissions. In Malaysia, respiratory illnesses including asthma rank as the fifth most common causes of admission in government hospital. In year 2000, there were 104,064 admissions in government hospital for respiratory illness including asthma⁶⁾.

Reasons for the increase in asthma prevalence and repeated admissions include socioeconomic factors, poor inhalation technique skills and underutilization of preventive medications, inappropriate management and insuffi-

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1) Department of Family Medicine, School of Medical Sciences, Universiti Sains Malaysia
16150 Kubang Kerian, Kelantan, Malaysia

2) Hospital Tengku Ampuan Afzan
Kuantan, Pahang, Malaysia

Correspondence to: Shaiful Bahari Ismail
(e-mail: shaibi@kb.usm.my)

cient patient knowledge on asthma^{2,5,7-13}). Two of the major factors for the inappropriate management of asthma are underdiagnosis and undertreatment of the condition by medical profession¹⁴.

Asthma is not only increasingly becoming a global problems, it also costs the nation a large amount of money when economic outcome is considered. If other factors such as reduction in productivity, loss of working hours, losses of schooling hours are considered, it actually costs the country much more.

METHODS

This is a cross sectional comparative study conducted at Hospital Tengku Ampuan Afzan (HTAA), Kuantan. Sixty patients with asthma were selected from asthma clinic HTAA and they were divided into two groups.

The first group was the repeated admissions group that consisted of thirty patients with asthma that had multiple admissions in year 2001 for exacerbation of asthma. The second group was the non-repeated admission group that consisted of thirty patients with asthma that had no admission or only one admission for exacerbation of asthma during year 2001. Both groups were chosen from first sixty consecutive patients with asthma in Asthma Clinic lists that fulfill the inclusion and exclusion criteria.

Inclusion criteria

1. All patients with asthma at Asthma Clinic HTAA follow-up.
2. Patients on metered dose inhaler treatment.
3. Age between 12 to 45 years old.
4. Give consent to involve in the study.

Exclusion criteria

1. Patients who were known to have other concurrent medical illness such as congestive cardiac failure, chronic obstructive airways diseases, pneumonia and pulmonary tuberculosis.
2. Patients who were unable to comprehend the questionnaire.
3. Patients who were not on metered dose inhaler medications.
4. Patients who did not give their consent for the study

Instruments

The questionnaire used in this study was designed based on various reading of literature research. This questionnaire was grouped into few categories that consisted of the demographic and socioeconomic data, clinical characteristics and knowledge of asthma.

The demographic and socioeconomic data were gender, age, educational levels, marital status, occupations and household income. The clinical characteristics consisted of duration of asthma, history of atopy, smoking, absenteeism, nocturnal symptoms, number of emergency departments or clinic visits for exacerbation of asthma, number of hospital admission for the past one year, medications and assess-

ments.

The assessments were done on inhaler technique skills and peak expiratory flow (PEF) measurement tests. The inhaler techniques for metered dose inhaler consisted of nine steps with slight modifications¹⁵ (appendix 1). The knowledge of asthma was determined by interviewing, using modified validated questionnaires¹⁶. (appendix 2)

STATISTICAL METHODS

Analysis of the data was done using SPSS version 10.0 for Windows and scoring were based on the inhaler technique skills and knowledge. Continuous data was analyzed using Student t-test and ANOVA, while categorical data was analyzed using Chi-square. The test was considered significant if $p < 0.05$.

RESULTS

1) Demographic data

Table 1 showed the demographic characteristics of 60 patients with asthma who completed the study. Majority of them were female, Malay and married.

2) Socioeconomic data

In educational background, they were equally divided between secondary school and tertiary school. Majority of them have household income more than RM1000 per month. Table 2 showed the socio-economic characteristics in both groups of patients.

3) Clinical characteristics

Table 3 showed the clinical characteristics in both groups of patients where mean duration of asthma in both groups was more than 10 years. Majority of them in this study were non-smoker. Sixty two point five percent of patients in repeated admissions group had severe persistent asthma (daily nocturnal symptoms) whereas only 12.5% patients in non-repeated admission group had severe persistent asthma.

4) Peak flow meter and inhaler techniques

Table 4 showed the peak expiratory flow measurements and inhaler technique skills in both groups. Thirty-six patients with asthma in both groups had mild peak expiratory flow measurements.

5) Asthma knowledge

Table 5 showed the knowledge of asthma between both groups. Ten percent in repeated admissions group recognized wheezing as one of the symptoms, and 22.3% in non-

Table 1. The demographic characteristics of 60 patients with asthma who completed the study

Variables	Repeated admissions group n (%)	Non-repeated admissions group n (%)	p-value ^a
1. Sex			
a) Male	11 (36.7%)	11 (36.7%)	NS
b) Female	19 (63.35)	19 (63.35)	
2. Age *	27.97	30.3	NS
(Range)	(14-44 years)	(14-44 years)	
	SD : 10.17	SD : 10.16	
3. Race			
a) Malay	26 (86.7%)	23 (76.7%)	NS
b) Non-Malay	4 (13.3%)	7 (23.3%)	
4. Marital Status			
a) Single	11 (36.7%)	11 (36.7%)	NS
b) Married	19 (63.3%)	19 (63.3%)	

a - Student t-test for Age and Chi-square test for others

* - mean, SD - standard deviation

NS - Not significant

Table 2. Socioeconomic characteristics of 30 patients in repeated admissions group and 30 patients in non-repeated admission group

Variables	Repeated admissions group n (%)	Non-repeated admissions group n (%)	p-value ^a
1. Education			
a) Secondary	16 (53.3%)	14 (46.7%)	NS
b) Tertiary	14 (46.7%)	16 (53.3%)	
2. Occupation			
a) Student	8 (26.7%)	7 (23.3%)	NS
b) Not working	11 (36.7%)	7 (23.3%)	
c) Government	6 (20.0%)	7 (23.3%)	
d) Private sector	5 (16.7%)	9 (30.0%)	
3. Household income			
a) < RM 1000	12 (40%)	10 (33.3%)	NS
b) > RM 1000	18 (60%)	20 (66.7%)	

a - Chi - square test

NS - not significant

repeated admission group recognized wheezing as one of the symptoms. Figure 1 showed the total means scores on asthma knowledge in both groups.

DISCUSSION

This study demonstrated similarity in demographic and socio-economic characteristics between both groups. In clinical characteristics, both groups were almost similar, except for a high past history of allergy, absenteeism from school or work and frequent nocturnal symptoms in repeated admissions group. Previous study also showed high history of atopy, absenteeism among patient with asthma that had multiple admissions or emergency visits for asthma^{9,17,18}.

This study revealed that all patients in repeated admissions group had nocturnal symptoms with 62.5% of them

had severe persistent asthma. Thirty-six point seven percent in repeated admissions group used high dose corticosteroids (>800mcg/days) and none of them used high dose corticosteroids in non-repeated admission group. Even though majority of patients (62.5%) with asthma in repeated admissions group had severe persistent asthma, usage of high dose inhaled corticosteroids still low. Overall, this study showed that the asthma control in both groups still did not achieved the target goal of asthma management for symptom control¹⁹.

There was no significant difference between both groups in peak flow meter measurement. Our study showed that patients from both groups have good peak flow meter measurement. This is probably related to the time when the assessment was done. Majority of them came for the assessment after they were stable i.e asymptomatic even after been discharged from hospital.

Inhalation therapy is the main route of drug administration in patients with asthma. The efficacy of inhalation

Table 3. Clinical characteristics of 30 patients in repeated admissions group and 30 patients in non-repeated admission

Variables	Repeated admissions group n (%)	Non-repeated admission group n (%)	p-value ^a
1. Duration of asthma *	10.07	11.63	0.000
(Range)	(1-21 years)	(2-35 years)	
	SD: 5.84	SD: 8.77	
2. History of atopy			
a) Yes	25 (83.3%)	15 (50%)	0.006
b) No	5 (16.7%)	15 (50%)	
3. History of smoking			
a) Smoker	4 (13.3%)	2 (6.7%)	
b) Ex-smoker	3 (10%)	1 (3.3%)	NS
c) Non-smoker	23 (76.7%)	27 (90%)	
4. Absenteeism from work/school (days)*	6.11	1.87	0.003
(Range)	(0-20 d)	(0-10 d)	
	SD: 5.66	SD : 2.88	
5. Nocturnal symptoms			
a) Yes	30 (100%)	16 (53.3%)	0.001
b) No	0	14 (46.7%)	
6. Frequency of nocturnal symptoms			
a) < 2 x / month	4 (13.3%)	10 (62.5%)	
b) > 2 x / month	7 (23.3%)	4 (25%)	0.001
c) every night	19 (62.5%)	2 (12.5%)	
7. Hospitalization			
a) Yes	30 (100%)	6 (20%)	0.001
b) No	0	24 (80%)	
8. Frequency of previous admission *	2.63	1.0	0.001
(Range)	(2-6 admissions)	(0-1 admission)	
	SD : 1.07	SD : 0	
9. Use of medications			
a) B2 agonists	30 (100%)	7 (23.3%)	NS
b) MDI Steroids			
a) Yes	30 (100%)	23 (76.7%)	0.005
b) No	0	7 (23.3%)	
c) Doses of MDI Steroids			
i- < 800 mcg/day	19 (63.3%)	23 (100%)	0.001
ii- > 800 mcg/day	11 (36.7%)	0	

^a - Student t-test for duration of asthma and Chi-square test for others

* - mean, SD - standard deviation

therapy depends on several factors including the individual choice of the device, its correct use and patients' compliance. There are many types of inhaler such as metered dose, dry powder and breath actuated pressurized but pressurized metered dose inhalers remain the first line delivery devices and the most widely used inhalation therapy. However, the use of inhalation therapy is complex and many patients do not use it properly^{10,11,15,20-22}.

In this study, there were only 9 (15%) patients from both groups that managed to perform all inhaler steps correctly. Patients with repeated admissions had less satisfactory score in inhaler techniques than those with non-repeated admission group. There were 73.3% satisfactory score in

repeated admissions group compared to 93.3% in non-repeated admission group. In the essential steps of the inhaler techniques, the highest mistake from the patients in both groups was not tilting the head slightly backward while performing the inhaler maneuvers.

Overall, the techniques of metered dose inhaler in both groups were still inadequate. Both groups of patients were on asthma clinic follow-up and majority of them were supervised on the use of the inhaler previously. This may imply inadequate supervision or possibly wrong supervision. Limited time in each consultation, junior doctors running each clinic session and too many patients in asthma clinic could contribute to lack of supervision on patients'

Table 4. Peak expiratory flow rate (PEFR) and inhaler techniques of 30 patients in repeated admissions group and 30 patients in non-repeated admission group

Variables	Repeated admissions group n (%)	Non-repeated admission group n (%)	p-value ^a
1) PEFR			
a) Mild	21 (70%)	15 (50%)	
b) Moderate	7 (23.3%)	15 (50%)	NS
c) Severe	2 (6.7%)	0	
2) Inhaler technique steps (Number of Correct)			
1. Remove cap and shake inhaler vigorously	27 (90%)	29 (96.7%)	NS
2. Hold inhaler in upright position	30 (100%)	30 (100%)	NS
3. Breath out slowly and completely	21 (70%)	28 (93.3%)	0.02
4. Tilt head slightly back	5 (16.7%)	10 (33.3%)	NS
5. Place lip tightly around mouthpiece, or two fingers width from the mouthpiece	28 (93.3%)	29 (96.7%)	NS
6. Actuate inhaler at start of inhaler	25 (83.3%)	29 (96.7%)	NS
7. Begin slow deep inhalation	25 (83.3%)	29 (96.7%)	NS
8. Hold breath for as long as comfortable (5 to 10 seconds)	22 (73.3%)	22 (73.3%)	NS
9. Single actuation with each inhalation	17 (56.7%)	26 (86.7%)	0.01
3) Total scores of inhaler techniques			
a. Satisfactory	22 (73.3%)	28 (93.3%)	0.038
b. Not satisfactory	8 (6.7%)	2 (6.7%)	

^a - Chi-square test
NS - not significant

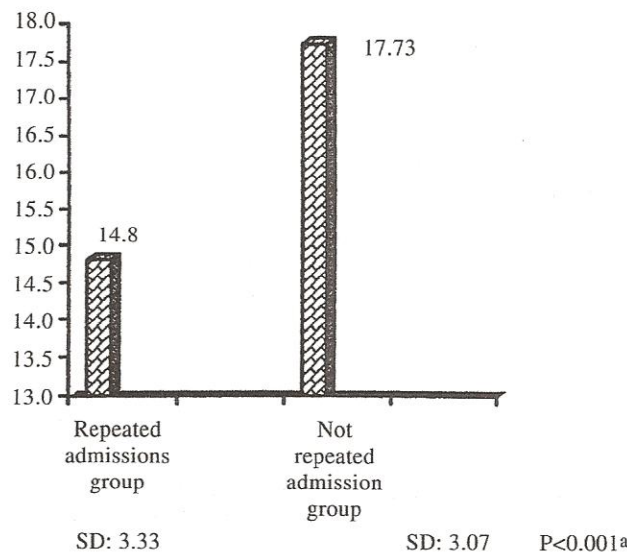


Figure 1. Total mean scores on asthma knowledge for both groups

^a - student t-test

SD - standard deviation

▨ total scores (mean)

inhaler techniques. However, previous study showed that there were no difference in the occurrence of incorrect performance between different sexes, age groups; duration of inhaler used and previous supervision or no supervision by the doctors¹⁵.

In the knowledge of asthma, the total mean scores for repeated admissions group was 14.8 out of 31, whereas in non-repeated group the total mean scores was 17.73 out of 31. The finding in this study was lower than the previous study that used the same questionnaires^{16,23-25}. There were almost similar percentage in the score on the knowledge of asthma in both groups.

The lack of knowledge among patients could be due to the non-availability of educational materials at the clinics and lack of educative efforts by the doctors. Doctors may not be communicating well to the patients probably because of barriers of education levels such as language problems, difficulty in explaining the inhaler techniques and the concept of prophylaxis, particularly to the lower education group or may be due to constraint of time²⁶.

All patients with asthma in both groups were on Asthma clinic follow-up but they still had inadequate or sub-optimal management especially among patients with repeated admissions. Therefore, there was a clear needs to improve

Table 5. Comparison of scores in each question on asthma knowledge in both groups (please see appendix 2 for the questions)

Questions No.	Repeated admission group n (%)	Non-repeated admission n (%)	p value ^a
1.	2 (6.6%)	2 (6.6%)	NS
2.	6 (20%)	15 (50%)	0.015
3.	21 (70%)	24 (80%)	NS
4.	22 (73.3%)	26 (86.7%)	NS
5.	22 (73.3%)	20 (66.7%)	NS
6.	3 (10%)	2 (6.7%)	NS
7.	20 (66.7%)	26 (86.7%)	NS
8.	13 (43.3%)	16 (53.3%)	NS
9.	7 (23.3%)	20 (66.7%)	0.001
10.	4 (13.3%)	1 (3.3%)	NS
11.	4 (13.3%)	1 (3.3%)	NS
12.	6 (20%)	15 (50%)	0.015
13.	14 (46.7%)	23 (76.7%)	0.017
14.	14 (46.7%)	14 (46.7%)	NS
15.	3 (10%)	3 (10%)	NS
16.	24 (80%)	28 (93.3%)	NS
17.	22 (70%)	27 (90%)	NS
18.	21 (70%)	27 (90%)	NS
19.	9 (30%)	15 (50%)	NS
20.	15 (50%)	21 (70%)	NS
21.	2 (6.6%)	3 (10%)	NS
22.	17 (56.7%)	14 (46.7%)	NS
23.	30 (100%)	30 (100%)	NS
24.	24 (80%)	25 (83.3%)	NS
25.	13 (43.3%)	23 (76.7%)	0.008
26.	30 (100%)	29 (96.7%)	NS
27.	25 (83.3%)	28 (93.3%)	NS
28.	2 (6.7%)	3 (10%)	NS
29.	30 (100%)	29 (96.7%)	NS
30.	20 (66.7%)	22 (73.3%)	NS
31.	30 (100%)	30 (100%)	NS

^a - Chi-square test

not only education but also the standard of care provided by doctors.

CONCLUSIONS

There was no significant difference between repeated admissions group and non-repeated admission group for asthma in terms of their demographic and socio-economic characteristics. Patients with repeated admissions for asthma tend to have high past history of allergy, high history of absenteeism from works or schools, more frequent nocturnal symptoms, more use of low dose inhaler corticosteroids,

more inadequate inhaler techniques and lesser knowledge about asthma.

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Appendix 1. Inhaler technique steps

1. Remove cap and shake inhaler vigorously.
2. Hold inhaler in upright position.
3. Breathe out slowly and completely.
4. Tilt head slightly back.
5. Place lip tightly around mouthpiece, or two fingers width from the mouthpiece.
6. Actuate inhaler at start of inhalation.
7. Begin slow deep inhalation.
8. Hold breath for as long as comfortable (5 to 10 seconds)
9. Single actuation with each inhalation

Each step was scored zero (0) for incorrect use and one (1) for correct use. Scores were then summed. If patient were given zero (0) for essential steps 2, 5 or 6, their score will automatically become zero for the whole survey. Those who scored less than five were considered insufficient.

Appendix 2. Modified asthma knowledge questionnaire

True or False response mark (T/F)

1. What are the 3 main symptoms of asthma?
 - a) cough
 - b) wheeze
 - c) breathlessness
2. More than 1 in 10 children will have asthma at some time during their childhood. (T)
3. Asthma patient have abnormally sensitive air passages in their lungs. (T)
4. If one child in a family has asthma then all his/her brothers and sister are almost certain to have asthma as well. (F)
5. Most children with asthma have an increase in mucus when they drink cow's milk. (F)
6. Write down all the things you know the cause asthma or trigger factors.
 - a) Infection
 - b) exercise/emotional stress
 - c) allergens
7. During an attack of asthma the wheeze may due to muscle tightening in the wall of the air passages in the lungs. (T)
8. During an attack of asthma the wheeze may due to swelling in the lining of the passage in the lungs. (T)
9. Asthma damages the heart. (F)
10. Write down two asthma treatments (medicines), which are taken everyday on regular basis to prevent attack of asthma from occurring.
 - a) Two of oral /inhaled steroids
 - b) Sodium cromoglycate
11. What are three asthma treatments (medicines), which are useful during an attack of asthma?
 - a) Theopyline
 - b) Oral steroids
 - c) Ipratropium bromide
 - d) B 2 agonist and Oxygen
12. Antibiotic are important part for treatment for most asthmatics. (F)
13. Most asthmatic patient should not eat diary products. (F)
14. Allergy injections cure asthma.(F)
15. If a person dies from an asthma attack, this usually means that the final attack must have begun so quickly that there was no time to start ant treatment. (F)
16. People with asthma usually have "nervous problem" (F)
17. Asthma is infectious diseases. (F)
18. Inhaled medications for asthma (eg. Ventolin puffers) have fewer side effects than tablets. (T)
19. Short courses of oral steroids such as prednisolone usually cause significant side effect. (F)
20. Some asthma treatment such as Ventolin damages the heart. (F)
21. A twenty years old man has an attack of asthma and takes two puffs of ventolin from a puffer (meter dose inhaler). After five minutes he is no better. Give some reasons why this might has happened.
 - a) Two of empty puffers/out of date medication
 - b) Insufficient doses
 - c) Incorrect technique
 - d) Severe attack
22. If you have nebuliser at home and during an attack of asthma, you required a nebuliser (mask) every two hour. You gaining benefit but still very breathless after two hours. Provided you are not getting any worse, is it fine to continue with two hourly treatment. (F)

23. Write down ways of helping to prevent attacks of asthma during exercise.
 - a) Two of salbutamol pre-exercise
 - b) Warm-up
 - c) Sodium cromoglycate pre-exercise
 - d) Nose breathing , warm humid environment
24. Those who have asthma become addicted to their asthma drugs. (F)
25. Swimming is the only suitable exercise for asthmatic. (F)
26. Smoking may made asthma worse. (T)
27. With appropriate treatment, most asthmatic should lead a normal life with no restriction on activity. (T)
28. The best way to measure the severity of asthmatic patient is for the doctor to listen his chest. (F)
29. Asthma is usually more of problem at night than during the day. (T)
30. Most children with asthma will have stunted growth. (F)
31. Those with frequent asthma should have preventive drugs. (T)

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