

Factors Associated with Emergency Department Revisits and Hospitalization Following Discharged Acute Asthma Exacerbation

NIK MUHAMAD NA, KWONG LJ

Department of Emergency Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia.

ABSTRAK

Objektif kajian ini adalah untuk mengenalpasti faktor-faktor yang berkaitan dengan kehadiran semula pada peringkat awal pesakit asma yang didisajikan daripada Jabatan Kecemasan. Ia adalah satu kajian kohort retrospektif untuk pesakit-pesakit yang berumur 12 tahun atau lebih dalam tempoh 1 bulan yang telah dirawat untuk asma akut dan didisajikan daripada Jabatan Kecemasan, Hospital Umum Sarawak. Seramai 397 pesakit memenuhi kriteria sampel dan daripada jumlah ini, 13.9% telah hadir semula dalam tempoh 2 minggu. Daripada kes-kes kehadiran semula, 9.1% dimasukkan ke wad. Kadar perskripsi kortikosteroid oral adalah rendah (24.9 %) dan melarikan diri daripada hospital adalah tinggi (25.1 %). Pesakit yang telah melarikan diri dari jabatan kecemasan dan jangkitan mereka berkadar terus dengan ketibaan semula ke Jabatan Kecemasan.

Kata kunci: serangan asma akut, jabatan kecemasan, kehadiran semula, kortikosteroid

ABSTRACT

The objectives were to identify factors associated with early revisit of adult patients with acute asthma exacerbation discharged from the Emergency Department (ED). It was a retrospective cohort study with patients aged 12 years or more within a period of 1 month and who were treated for acute asthma and discharged from the ED of Sarawak General Hospital. A total of 397 patients fulfilled sampling criteria and out of this number, 13.9% had revisit to the ED within 2 weeks. In all of these revisit cases, 9.1% were actually admitted. Prescription rate of oral corticosteroid was found to be low (24.9%) and abscond rate was high (25.1%). Patients who absconded from the ED and their concurrent infection were associated with early ED revisit.

Address for correspondence and reprint requests: Nik Azlan Nik Muhamad, Department of Emergency Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Jalan Yaacob Latif, Bandar Tun Razak, 56000 Cheras, Kuala Lumpur, Malaysia. Tel: +603-91455703 Fax: +603-91456577 Email: nikazlanmuhamad@hotmail.com

Keywords: acute asthma exacerbation, emergency department, revisit, corticosteroid

INTRODUCTION

Acute exacerbation of bronchial asthma (AEBA) contributes to a large number to attendance. In Sarawak General Hospital, there are about 700 - 800 cases per month, which translates to approximately 10% of total ED workload.

The rate of asthma admission has been constant throughout years especially among paediatric population, even though there is an increase in emergency asthma attendance (Russo et al. 1999). This is due even though attendance is increasing and many are not admitted due to high threshold for admissions. In developed countries, low asthma admission rates are an indicator for improved asthma care. Significant reductions in admission have occurred in several countries, such as North America, European countries and Australia (Anderson et al. 2008; Anderson et al. 2007).

Even though a large number of patients are discharged, a small percentage in developed countries revisited the ED. A study at Kansas City showed out of 4228 patients visited ED, 3276 was discharged and revisit within 7 days was 133 (4%). It was concluded that lower asthma quality of life scores correlated with frequency of revisit (Walsh-Kelly et al. 2008). This study aims to quantify the numbers of asthma revisits and identify influencing factors in our population. High percentage of revisit can translate to poor asthma care which increases the mortality and

morbidity, as factors that lead to this can be addressed.

The present study aimed to identify factors influencing early revisit of adult patients with AEBA discharged from ED. The specific objectives were: (i) to determine whether demographics (gender, age and ethnicity) are factors influencing early revisit (ii) to determine whether concurrent infection influence early revisit (iii) to determine if prescription of oral corticosteroid upon discharge influence early revisit (iv) to determine if the number of nebulizations given during the initial presentation influence early revisit.

MATERIALS & METHODS

This was a retrospective cohort study. Data was collected from patient's medical charts who attended Emergency Department (ED) Sarawak General Hospital during March 2014. Study sample included all adult asthma exacerbated patients discharged from the ED of within the study period.

Ethical approval was obtained for clearance to access and use of patient data within the study period. It was registered under National Medical Research Register and approved by Medical Research and Ethics Committee under Universiti Kebangsaan Malaysia (UKM approval number UKM 1.5.3.5/244/FF-2015-225).

All adult asthma exacerbated patients discharged from the ED within the study period were included.

Patients that were excluded were those who concurrently had other lung pathologies such as chronic obstructive pulmonary disease, acute pulmonary edema, tuberculosis and pneumonia. Revisit to ED for other diagnosis than exacerbation of asthma was also excluded. Asthma revisits more than 2 weeks were also not included.

The case notes or triage forms of all adult acute exacerbation of bronchial asthma (AEBA) cases within the study period were identified and collected from the records of Emergency and Trauma Department. Relevant data including demographics, case history, clinical findings, ED management and disposition from these cases were then transferred to the data collection sheets.

STATISTICAL ANALYSIS

Data entry and all analyses were performed using SPSS software version 12. Data was summarized using proportions, mean standard deviation and median. Univariate analyses of the relation of various factors to risk for ED revisit employed X² test, Student's t test and Mann-Whitney test where appropriate. $P < 0.05$ was considered statistically significant.

RESULTS

The number of adult patients who fulfilled the study criteria was 397. Majority of patients who presented to the ED were Malays (59.2%) followed by Chinese (14.6%). Other ethnic groups like Iban and Bidayuh were 8.8% and 4.2%, respectively. Based on the clinical characteristics, majority of the patients

were within the mild to moderate severity of asthma exacerbations. Mean heart rate was 100/min SpO₂ pre-treatment was 98%. Divided according to sex, there were 178 male and 219 female patients (Table 1).

A total of 76.7% patients had concurrent infection during initial presentation to the ED. These included upper respiratory tract infections, tonsillitis, urinary tract infections and community acquired pneumonias. There were 99 patients (25.1%) who left the ED after receiving one to two nebulizations. Two weeks revisit rate was 13.9%, which contributed an extra ED workload of 15.2% .

Male gender had a higher percentage of ED revisit (56.4%), whereas female ED revisit was 43.6%. Out of the total 55 patients that revisited ED, 65.5% (n=39) had concurrent infection. Out of 342 patients who did not revisit ED, it was recorded that 78.7% (n=269) had concurrent infection.

Oral corticosteroid was prescribed to only 24.9% (n=99) of patients who initially attended ED for asthma exacerbation. Of this, 10% (n=9) who were prescribed initially with corticosteroids, revisited ED. Eighteen percent (n=46) of patients who were not prescribed corticosteroids, revisited the ED.

Twenty five percent (n=99) of initial attendees to ED absconded before treatment could be completed. Thirty two percent (n=32) out of those who absconded during first presentation revisited ED, compared to 7.7% (n=23) of those who completed the initial treatment.

Although 42 patients revisited ED once within 2 weeks, only 4 of them

Table 1: Demographic and outcome of asthma visits to Sarawak General Hospital Emergency Department during March 2014

Demographic (Total=397)							
Age Mean:37, SD 17	Years	12-20	21-30	31-40	41-50	51-60	>60
	Numbers	82 (21%)	91 (23%)	62 (16%)	62 (16%)	57 (14%)	43 (10.8%)
Gender		Male: 178 (45%)			Female: 219 (55%)		
Ethnicity	Malay	Chinese	Iban	Bidayuh	Others	Foreigners	
	59%	15%	14%	8%	4%	1%	
Clinical and Treatment (total=397)							
Concurrent infections (P value <0.031)	Present 303 (77%)			Absent 92 (23%)			
	Revisited 36 (12%)	No Revisit 269 (88%)		Revisited 19 (21%)	No Revisit 73 (79%)		
Absconded (P value <0.001)	Yes 99 (25%)			No 296 (75%)			
	Revisited 67 (68%)	No Revisit 32 (32%)		Revisited 23 (8%)	No Revisit 275 (92%)		
Oral steroids prescribed at 1 st visit (P value 0.113)	Yes 99 (25%)			No 296 (75%)			
	Revisited 9 (9%)	No Revisit 90 (91%)		Revisited 46 (16%)	No Revisit 252 (84%)		
2 weeks ED revisit	Yes 55 (14%)			None 342 (86%)			
	Male =31(56%)		Female =24 (44%)		Male = 179(43%)		Female=195(57%)
Frequency of revisit	First =46 Admitted=4		Second=5 None admitted		Third=1 None admitted		Fourth=3 Admitted=1

were admitted. Of 2 patients who revisited ED 4 times, one of them was admitted. None of the revisits resulted in intensive care unit admission or hospital death.

DISCUSSION

This study obtained an ED revisit rate of 13.9% within two weeks of discharge. The results relate to previous studies done by Emerman et al. (1999) and Rowe et al. (2008) who reported revisit rates of 17% and 13.9%, respectively. In another study done by Yaacob et al. (1991) in Hospital Universiti Sains

Malaysia reported a relapse rate of 18.8% within 3 months of discharge. Their study also looked at ED cases only with no telephone follow-up but instead of 2 weeks, they looked at revisits within a period of 3 months. Although, there is no common definition of an acceptable relapse or revisit rate, we think the finding of a revisit rate of 13.9% over short period of 2 weeks gives an impression of high treatment failure rate.

Causes of asthma relapse are multifactorial. Consistent with studies done by Emerman et al. (1999), patient's demographic data, including gender, age and ethnic group did not

show any association with early revisit. Male patients had a slightly higher ED revisit (56.4%). However, it was not statistically significant.

There is a significant abscond rate of 25.1% among the patients studied. This high percentage influences significant early revisit to the ED. Factors contributing to this include early termination of nebulizer therapy and no discharge medicine among patients who left abruptly. This was due to a substantial number of patients who did not complete asthma treatment in ED and absconded early during subsequent visits. This problem is not unique to this hospital alone and should apply to other Kementerian Kesihatan Malaysia (KKM) hospitals as well although their percentage may vary. In contrast, this situation was not observed at Universiti Kebangsaan Malaysia Medical Centre (UKMMC) due to dedicated staff for asthma cases and hence shorter waiting time. Higher ED registration fees at UKMMC compared to KKM is also a contributing factor.

Concurrent infection is a contributing factor to early ED revisit following asthma treatment. There is a significant correlation between concurrent infection and ED revisit. This finding is of low clinical value as most of our patients presented with concurrent infection (76.7%). This factor can be subjective as it depends on the patients' reported symptoms and clinical findings that suggest an infection such as fever, injected throat or chest x-ray features. Emerman and Cydulka (1995) found no association between patient's white blood cell (WBC) count and eosinophil count with relapse.

Oral corticosteroid prescriptions were only 24.9%, which is significantly lower than other study reports. Emerman et al. (1999) and Rowe et al. (2008) reported oral steroid prescriptions of 63% and 70.8%, respectively. Even when excluding those absconded cases, our sample still showed a prescription rate of only 33.2%. GINA report 2015 recommended oral corticosteroids to be prescribed in severe acute exacerbation of asthma discharged home. This is because various studies had confirmed the benefit of oral corticosteroid during acute exacerbations as well as preventing relapse (Rowe et al. 2008). Not only our prescription rate was low, we also found a number of patients who were not given steroid prescription even during second revisit. This was probably due to failure to identify this group of patients who were actually revisit cases. In our study, we found no apparent association between oral steroid prescription and risk of ED revisit. This is due to the limitation of a observational study where the attending doctor were more likely to give a steroid prescription to patients with more complex conditions and higher risk of relapse, an excess that may not be completely reversed by the effects of the prescribed steroid.

Many clinical parameters that describe the severity of asthma exacerbations, including heart rate, baseline SpO₂ and the number of nebulizations needed were not shown to predict ED revisit. This is consistent with studies done by Emerman et al. (1999) and Rowe et al. (2008). Additionally, they also found that peak expiratory flow rate (PEFR) does not predict relapse outcome.

The present study did not record patients who relapsed and attended other hospitals or clinics. Therefore, it is possible that healthcare revisit in acute asthma exacerbation could be higher than 13.9%. This study is also a retrospective chart review, hence there will be significant biases and observation depends heavily on accurate record keeping. It also did not mention the severity of asthma according to PEFr because of inadequate data.

Further studies should explore the reasons for patients to abscond from a complete treatment of AEBA at the ED. Corrective measures can then be outlined and later implemented to see if it is effective in reducing asthma revisits. This can be done as a quality assurance project in the department.

Efforts should be made to identify patients who frequently revisit the ED for AEBA. This can be done by history taking alone by the attending doctor or assistant medical officer. Alternatively, a computerized system can be designed to reveal the number of recent ED visits when a particular patient registers at the registration counter. Identifying this group of patients will greatly help in the management as we can look into their compliance, inhaler techniques, deciding on longer observation in the ED or even admission. Furthermore, the attending doctor can refer this group of patients to asthma educators, pharmacists or respiratory clinic for further management in the area of asthma control.

More emphasis should be given on the prescription of oral corticosteroid in AEBA patients discharged from the ED. This can be carried out as part of regular

CME programs in the department. A simple guideline or standard operating procedure (SOP) can also be made to facilitate new medical officers in attending asthma cases.

In addition to this a more efficient system for attending patients who received nebulizers in ED to avoid high level of abscond patients. Patients who went home before being assessed have a higher risk for ED revisit. This reflects to inadequate treatment and increase mortality and morbidity. Doctors should be informed once the patients has finished their first nebulizers and not let patients waiting for a long time.

CONCLUSION

The revisit rate of AEBA patients discharged from the ED remained high. This is partly due to high abscond rate and perhaps low prescription rate of oral corticosteroid. Concurrent infection was also shown to be associated with early revisit. These data can be useful for clinicians to identify patients at risk and for the development of ED guidelines, educational strategies and follow-up plans for the prevention of asthma relapses.

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