

Documentation of the Management of Asthma Exacerbation in Adults by Primary Health Care Physicians in a Teaching Hospital in Oman

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توثيق علاج حالات تفاقم الربو عند الكبار بواسطة أطباء الرعاية الصحية الأولية في مستشفى تعليمي بسلطنة عُمان

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المخلص: الهدف: تعتبر حالات تفاقم الربو سبباً رئيسياً للإعتلال، وعادة ما تكون مؤشراً على ضعف السيطرة على المرض. يعتبر تقديم العلاج المناسب وتوثيق التقييم السريري لحالات التفاقم وشدتها، والعوامل المساهمة، وأساليب العلاج كلها عناصر أساسية للتمكن من السيطرة على مرض الربو. الهدف: تقييم مدى توثيق حالات تفاقم الربو بين أطباء الرعاية الصحية الأولية. الطريقة: تحليل استعادي للفترة من 1 مايو 2008 إلى 31 أبريل 2009 لجميع حالات تفاقم الربو عند المرضى الذين تتراوح أعمارهم من 14 سنة فما فوق والذين عولجوا بموسعات القصبات الهوائية الرذاذية ولديهم تشخيص موثق بالربو في السجلات الطبية الإلكترونية في عيادتي طب الأسرة التابعة لمستشفى جامعة السلطان قابوس. وقد تم تصميم استمارة خاصة لجمع المعلومات المتعلقة بذلك. النتائج: عولج سبعة وستون مريضاً خلال 100 مراجعة من قبل 42 طبيباً. كان توثيق التقييم السريري منخفضاً (2% لحالات الترقيد السابقة، 25% للإسعاف بموسعات القصبات الهوائية الرذاذية، 57% لمدة الأعراض، 19% للعوامل المساهمة، 9% للالتزام بأخذ الأدوية، 48% للعلامات السريرية، 3% لمعدل قياس سرعة التنفس و 5% لطريقة استعمال أجهزة الاستنشاق). وقد تم توثيق التشخيص لحالات تفاقم الربو في 77% من المراجعات. كان توثيق أساليب العلاج منخفضاً أيضاً (3% للعلاج بالأكسجين و 24% للعلاج بالستيروئيدات الجهازية)، وقد تم توثيق التقييم السريري بعد العلاج في 37% من المراجعات فقط. وكان توثيق إعطاء مواعيد للمراجعة في 23%، والإحالة إلى عيادة الربو المتخصصة في 11%. ولا توجد أدلة موثقة عن الإحالة إلى أخصائي الصدر أو فحص قياس التنفس. الخلاصة: تشير الدراسة إلى وجود نقص كبير في توثيق حالات تفاقم الربو بين أطباء الرعاية الصحية الأولية. هناك حاجة إلى مزيد من البحث لتحديد أسباب هذا النقص وربما يكون استخدام برنامج علاج موحد مفيداً.

مفتاح الكلمات: العلاج، حالات تفاقم الربو، الصحة الأولية، إرشادات، توثيق، عمان

ABSTRACT: Objectives: Asthma exacerbation is a major cause of morbidity and it is usually an indication of poor control. Appropriate management and documentation of the clinical assessment of an exacerbation, its severity, contributing factors and treatment are all essential components of asthma control. The aim of this study was to assess the documentation of the management of asthma exacerbations by primary care physicians (PCPs). **Methods:** A retrospective analysis was carried out on patient records from 1 May 2008 to 31 April 2009. We included all acute exacerbation episodes in asthmatic patients aged ≥ 14 , who received nebulized bronchodilators in the two family medicine clinics attached to Sultan Qaboos University Hospital (SQUH), Oman. A special form was designed to collect PCP's documented management. **Results:** A total of 67 patients with 100 episodes were treated by 42 PCPs. Documentation of clinical assessment was low for previous admissions (2%), rescue nebulization (25%), duration of symptoms (57%), trigger factors (19%), compliance (9%), clinical signs (48%), peak flow rate (3%), and inhaler technique (5%). The diagnosis of asthma exacerbation was documented in 77% of the episodes. Documentation of therapy was also low (3% for oxygen therapy and 24% for systemic steroids). Documentation of post-nebulization assessment, follow-up appointment, and referral to asthma clinic were found in 37%, 23% and 11% of cases respectively. No documented evidence was found for referral to chest specialist or spirometry. **Conclusion:** Our study indicates major deficiencies in the documentation of asthma exacerbation management among PCPs. Further research is needed to identify the causes of those deficiencies. Following the standardised management protocol can be helpful.

Keywords: Management; Asthma Exacerbation; Primary care; Guidelines; Documentation; Oman

ADVANCES IN KNOWLEDGE

1. *This is the first study in Oman to look into the documentation of the management of acute exacerbation of asthma and the compliance of primary health care physicians with the Oman National Asthma Management Guidelines.*
2. *The study has identified important deficiencies in the documentation of essential elements of asthma management by primary health care physicians.*

APPLICATION TO PATIENT CARE

1. *The study has identified areas for improvement in the management of asthma exacerbation.*
2. *The study has highlighted the importance of documentation in the medical records for the management and follow-up of asthma patients.*

ASTHMA IS A CHRONIC DISEASE WHICH requires regular follow-up for monitoring of disease activity and the necessary adjustment of pharmacological treatment. Asthma exacerbation is a major cause of morbidity and reflects poor asthma control.¹ The assessment of severity, identification of contributing factors and the review of therapy are not only the main components of asthma exacerbation management, but are also essential for long term asthma control.²

Despite advances in asthma management and the widespread use of evidence-based asthma management guidelines, there are worldwide concerns that many asthma patients receive inadequate care.¹ Due to time limitation or busy clinics, the unfamiliarity of general practitioners with the guideline components, multiple providers and the lack of standardised management protocols, most of the time patients are treated for the existing acute symptoms, and long term management issues are often forgotten, missed or neglected.¹⁻⁴

Our previous studies indicated that asthma is common in Omani school children and is often associated with relatively severe symptoms.⁵⁻⁸ Although there is no information on the burden of asthma in Omani adults, our clinical experience suggests that asthma is also common in adults and may be under-treated. In a previous study, we found asthma care providers have poor inhaler techniques.⁹ We also demonstrated poor documentation of asthma management in a tertiary hospital outpatient setting despite availability of a documentation protocol.¹⁰ Furthermore, an earlier survey, conducted in 1997 among general practitioners practising in private practice in Oman, revealed that the treatment of stable and acute asthma was not in line with international guidelines.¹¹

The aim of the present study was to assess the documentation of primary care physicians in the

management of asthma exacerbation by reviewing the patient's electronic medical records in the two family medicine clinics attached to Sultan Qaboos University Hospital.

Methods

Sultan Qaboos University, Oman, has on its campus one teaching hospital, Sultan Qaboos University Hospital, (SQUH) and two family medicine clinics (FMCs): the Students Clinic and the Staff Clinic. SQUH has a fully equipped Pulmonary Function Tests Laboratory (PFTL) which serves the hospital and the two FMCs. Each FMC has its own pharmacy in addition to access to the SQUH main pharmacy. All the necessary medications for the management of asthma are available in SQU pharmacies including: intravenous hydrocortisone; oral corticosteroids; inhaled corticosteroids (ICs) in three different devices; inhaled long acting β_2 agonists (LABA) in two different devices; combined medication in two different devices; inhaled short β_2 agonists (salbutamol in two different devices); and nebulized bronchodilators (salbutamol and ipratropium bromide solutions). Both clinics have peak flow meters with disposable mouthpieces, oxygen therapy, and pulse oxymeters. The two clinics are run by medical officers (MOs) and family medicine residents (Residents) under the supervision of senior family medicine physicians. Medical care is free for all Omanis and there is no restriction on the primary care physicians prescribing any of the available asthma medications, or referring the patient to the SQUH pulmonary clinic or the PFTL.

A retrospective analysis of patient records was carried out for the 12 month period 1 May 2008 to 31 April 2009. It included all episodes of asthma exacerbation in patients aged 14 years or more, who received nebulized bronchodilator therapy

Table 1: The number (n) and percentage (%) of episodes with documentation of the essential elements of clinical assessment of asthma exacerbation

	Episodes by physician category		
	All Episodes (N = 100 episodes) (%)	Medical Officers (n = 23 episodes) (%)	Residents (n = 77 episodes) (%)
Symptoms	81	17 (74)	64 (83)
Symptoms duration	57	8 (35)	49 (64)
Trigger factors	19	4 (17)	15 (19)
Family history	29	6 (26)	23 (30)
Medication history	30	7 (31)	23 (30)
Nebulization history	25	5 (21)	20 (26)
Admission history	2	0	2 (3)
History of atopy	13	2 (9)	11 (14)
Smoking history	8	2 (9)	6 (8)
Compliance	7	0	7 (10)
Clinical signs	48	8 (35)	40 (52)
Inhaler technique	5	0	5 (6)
Actual peak expiratory flow rate	3	0	3 (4)
Diagnosis	77	19 (83)	58 (75)

Note: # = $P = 0.02$

(salbutamol with or without ipratropium bromide) and had a diagnosis of asthma documented in their electronic medical records. Episodes treated by the investigators were excluded from the study. Since repeated nebulization for the same episode are directly given by the nurse without routine re-assessment by the physician, they were excluded from the analysis. Patients with other diagnoses were also excluded from analysis. The data were extracted from physician's documentation in clinical notes, prescribed medication, nursing notes and summary management sections of the Hospital Information System (HIS) (InterSystems Trakcare™, Version W650, 2001-2005, Cambridge, Massachusetts) using a specifically designed form

derived from our asthma management protocol.¹⁰ Statistical analysis was performed with using the Statistical Package for the Social Sciences software (SPSS), Version 10, (SPSS, Chicago, Illinois). Comparisons between groups were done using the chi-square test. A P value of <0.05 was considered statistically significant. The study was approved by the Medical Research & Ethics Committee of the College of Medicine & Health Sciences at Sultan Qaboos University.

Results

A total of 67 patients (39 male) with 100 asthma exacerbation episodes met the criteria and were included in this analysis. Fifty-one episodes were managed in the Staff Clinic and 49 episodes in the Students Clinic. These episodes were managed by 42 Primary Care Physicians (PCPs) (17 medical officers and 25 residents), and 51% of the episodes were managed by more than one physician. Nebulized bronchodilator therapy consisted of salbutamol alone in 68% of the episodes and combination therapy (salbutamol and ipratropium bromide) in 32%.

Table 1 compares the documentation for asthma exacerbation management by the medical officers and residents. Documentation of clinical assessment was low for previous admissions (2%), rescue nebulization (25%), duration of symptoms (57%), trigger factors (19%), compliance (9%), clinical signs (48%), peak flow rate (3%), and inhaler technique (5%). The diagnosis of asthma exacerbation was documented in 77% of the episodes. There was no significant difference between the two physician groups in the documentation in any of the items except for the duration of symptoms which was documented more frequently by residents (64%) compared to medical officers (35% $P = 0.02$).

Table 2 shows the percentages of episodes with physicians' documentation of the standard components of asthma exacerbation management. Documentation of therapy was low (3% for oxygen therapy and 24% for systemic steroids). Most of the episodes (73%) had no documentation for post-nebulization assessment. ICs therapy was prescribed in 58% of the episodes. Cough preparations and antibiotics were prescribed in 37% and 10% of the episodes respectively. Documentation for follow-up appointments was present in 23%. Referral to the

Table 2: The number and percentage of various therapeutic interventions documented for the management of asthma exacerbations

	Episodes by physician category		
	All Episodes (n = 100 episodes) %	Medical Officers (n = 23 episodes) %	Residents (n = 77 episodes) %
Systemic steroids	24	5 (22)	19 (25)
Inhaled Corticosteroids	58	15 (62)	43 (56)
Long acting β 2 agonist	23	8 (35)	15 (19)
Short acting β 2 agonist	83	18 (78)	66 (86)
Oxygen therapy	3	1 (4)	2 (3)
Antibiotics	10	0	10 (13)
Cough preparations	37	10 (43)	27 (35)

asthma counselling clinic was evident in 11%, but there was no documented evidence of referral to a chest specialist or for spirometry.

A review of the records of the 67 patients revealed that 19 (28%) of patients had had more than one asthma exacerbation during the previous year. Although 32 (48%) of patients had documented evidence of maintenance ICs treatment, only 22 (33%) had ICs prescribed during the three months prior to the current exacerbation. Documentation of compliance and assessment of inhaler technique was present in only (3.5%) of patients who received inhaled medication.

Discussion

Acute asthma exacerbations reflect poor asthma control and are strong independent predictors of future exacerbations.² Documentation of clinical assessment and treatment is not only important for assessing quality of care, but also for follow-up and communication with other health care providers who may also participate in the care of the same patient.¹² International asthma guidelines recommend assessment and documentation of symptoms and signs to ascertain control. This in turn helps in optimising therapy.^{13,14} This study revealed significant deficiencies in the documentation of

the clinical assessment and management steps for acute asthma exacerbation in a setting of university primary health care clinics, with no significant difference between medical officers and residents. The findings of this study have major implications for the quality of asthma care not only in our setting, but also in the community at large as the majority of Omani primary care physicians are trained in SQUH and its affiliated health care centres.

A history of previous admission for asthma exacerbation, especially to an intensive care unit, is an index of poorly controlled severe asthma and is considered essential information in the evaluation of asthma especially during exacerbation.¹⁵ Montealegre *et al.*, found that the documentation of previous admission to an emergency room and intensive care unit was present in only 3.5% of the records.¹⁵ In our study, a previous record of acute exacerbation was present in 25% of the episodes, but a history of admission for asthma was documented in only 2%.

The intensity of asthma exacerbations may vary from mild to life-threatening.¹⁶ Asthma exacerbations are associated with airways obstruction that should be objectively quantified by peak expiratory flow rate (PEFR) or forced expiratory volume in one second (FEV1) measurement.¹⁴ In this study, actual PEFR was documented in only 3% of the episodes with no documentation for percentage predicted values. In our previous study, where we used a standardised management protocol supported by a special form to document all aspects of asthma management during follow-up, the documentation of actual and percentage predicted PEFR was present in 100% and 88% of the records of patients seen by primary care physicians at the same primary care clinic.¹⁰

Asthma is a variable disease, and various factors can lead to an increase (or decrease) in asthma symptoms and the level of asthma control. Documenting asthma variability and assessing both adherence and possible triggers over time may allow patients and physicians to develop treatment plans that anticipate, rather than follow, changes in the level of asthma symptoms.¹⁷ In our study, the documentation of these elements was very poor. For example, the documentation of a history of atopy, smoking and trigger factors was present in only 13%, 3% and 18% of the episodes respectively. The documentation of compliance and

inhaler technique was also very low (5% and 9% respectively).

The low documentation of clinical assessment and treatment observed in our study is consistent with findings in others studies.¹⁸⁻²¹ In a study of 100 consecutive children from Kuwait admitted with acute asthma exacerbation,¹⁹ there was no documentation of severity in 63%, with poor documentation of most aspects of management including lack of post-discharge planning. Similarly, Arnold *et al.*²⁰ found that only 47% of admitted asthmatic patients were receiving ICs prior to admission and, upon discharge, 25% of patients did not receive ICs for maintenance therapy. Like previous reports,^{19,21} improper use of medications such as antibiotics and cough suppressants for acute exacerbations of asthma appears to be common in our primary care clinics (prescribed in approximately 40% of the episodes).

In an institution where multiple providers are involved in the management of the same patient, as is the case in our setting, adherence to guidelines may be difficult and the risk of poor documentation with omission of essential elements of the management could be high leading to poor or inadequate management. In these institutions, standardisation of care becomes even more essential. In a previous study, we found that introducing a standardised protocol, supported by a specifically designed documentation form, resulted in better adherence to asthma management guidelines by primary care physicians during asthma outpatients follow-up.¹⁰ For example, the documentation of previous admission history was present in 95% of the records compared to only 2% in this study. Training of health care providers has also been shown to reinforce good practice.²²

The present study has several limitations. Our objective was to assess PCPs' compliance with the standard guidelines for the management of acute exacerbation by reviewing the documentation in the electronic medical records. We only analysed the documented information. We did not interview the physicians to assess their knowledge, attitude or actual practice during management of asthma exacerbations. We also did not assess their accuracy in using the peak flow meter or inhaler devices. It is possible that the physicians measured the peak flow rate and assessed the severity of asthma exacerbation, but did not document these

actions. Similarly, some management plans and interventions might have been arranged and/or executed without documentation. Therefore poor documentation may not directly translate to poor compliance with the guidelines of asthma exacerbation management. Senturia *et al.*²³ compared medical records to parents' interviews and found that the medical record was not an accurate measure of specific aspects of asthma care due to missing data. However, in our HIS (Trakcare) system some management steps can only be executed through specific orders (e.g. prescriptions, referrals, and follow-up appointments), and therefore the system does reflect a true record of these steps of management. In addition, since patient follow-up and monitoring can only be done through reference to previous documentations regarding their condition, proper documentation is an essential component of best clinical practice and is commonly used as an index of actual practice in retrospective studies.^{12,2}

Conclusion

Our study showed inadequate documentation in every aspect of clinical assessment and management of asthma exacerbation among primary care physicians. In our opinion, this is a major cause for concern and may indicate poor compliance with national and international guidelines for asthma management. Given the fact that the majority of Omani primary care physicians are trained in SQUH and its affiliated healthcare centres, it is imperative to evaluate the causes of such deficiencies carefully and ensure good compliance not only with documentation guidelines, but also with actual management guidelines. The use of a standardised management protocol supported by specifically designed forms could encourage physicians to adhere to guidelines and document their practice. Obstacles to best practice should be identified and addressed urgently.

CONFLICT OF INTEREST

The authors reported no conflict of interest.

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