ORIGINAL ARTICLE

Mind the Gap: A Clinical Audit of Asthma and COPD Documentation Practices at a University Primary Care Clinic in Selangor, Malaysia

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ABSTRACT

Introduction: Clinicians are responsible for meticulous documentation and maintaining a systematic record-keeping system. Good documentation practices improve patient care and uphold quality assurance. This audit assessed documentation practices during asthma and COPD clinic consultations. **Methods**: This retrospective descriptive audit examined electronic medical records (EMRs) for documentation completeness of asthma and COPD patients attending a university primary healthcare clinic in Selangor, Malaysia, from January 1, 2020, to December 31, 2020. Patients' EMRs meeting the inclusion/exclusion criteria were evaluated using standardised checklists to collect sociodemographic and clinical data, including selected asthma and COPD indicators across three domains: clinical assessment, disease control assessment, and disease management. Documentation completeness for each indicator was recorded and marked as "Yes" for documented or "No" for undocumented. Data were analysed using IBM SPSS V26.0. **Results**: 180 asthma and 15 COPD patients' EMRs were analysed. The asthma cohort had a mean age of 54.46 (SD:18.99), were predominantly female (61.7%), Malay (92.8%) and obese (54.9%). The COPD cohort had a mean age of 73.67 (SD: 7.61), were mostly male (80.0%), Malay (73.3%) and overweight (54.5%). In asthma documentation, four indicators achieved > 50%, while the remaining four indicators achieved <50% completion rates. In COPD documentation, four indicators achieved >50%, while seven indicators achieved <50% completion rates. **Conclusions**: Documentation completion for asthma and COPD care indicators fell below targets. Regular training, feedback and audits are crucial for enhancing documentation, improving care and minimising medicolegal risks. Study limitations include variability in documentation practices and the generalizability of findings to a single setting.
Malaysian Journal of Medicine and Health Sciences (2026) 22(3): 1-8.doi:10.47836/mjmhs.v22i3.1589

Keywords: Asthma, COPD, Clinical Audit, Primary Care, Documentation

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INTRODUCTION

Asthma and chronic obstructive pulmonary disease (COPD) are prevalent respiratory conditions often encountered in primary care. They impose a significant healthcare burden when not managed with optimal care and treatment in the primary care setting.

In the 2021 Global Burden of Disease (GBD) study, approximately 260 million people (95% UI 227–298) were affected by asthma, revealing substantial disparities in burden across different Socio-Demographic Index (SDI) groups. The highest age-standardised disability-adjusted life years (DALY) rate for asthma was recorded in South Asia. (465·0 [357·2–648·9] per 100,000). According to further forecast models, it is expected that there will be 275 million (224–330) cases of asthma by 2050, primarily driven by population growth.

The COPD health burden was highlighted by the World Health Organisation, reporting 3.5 million deaths in 2021, approximately 5% of deaths globally, making it the fourth leading cause of worldwide mortality (2).

Optimal asthma care is crucial for reducing the disease

burden and enhancing patients' quality of life (3). Likewise, due to the potential impact on patients' and their families' lives, as well as the pressure on resources, care for COPD patients should adhere to the highest quality standards (4).

Delivery of care and treatment is evidenced by meticulous clinical documentation of patients, which provides valuable insights into the care process involved. Documentation during each clinic consultation is vital in ensuring the seamless transfer of health information among busy medical practitioners in primary care clinics (5). Records can be presented in the clinic charting or logged into electronic medical records. This delivers quality healthcare and fulfils medicolegal requirements (5). Poor record-keeping and inadequate documentation compromise the quality and continuity of healthcare delivery (5,6).

Asthma and COPD documentation entails care processes, including patient assessment, monitoring, treatment, exacerbation management, home monitoring, emergency action plans, and follow-up (7). However, previous studies have identified deficiencies in the documentation of these care aspects (8, 9). Therefore, it is crucial to evaluate documentation practices in primary care clinic settings continually.

The main aim of this study was to evaluate and assess the documentation practice using the electronic medical record (EMR) during asthma and COPD clinic consultations. This includes examining the components of asthma and COPD care by assessing the quality of the care process during these consultations (6). The goal is to highlight and enhance the documentation practices and the overall quality of asthma and COPD care for our patients.

METHODS

This was a retrospective, descriptive audit of electronic medical records (EMRs) from patients with asthma and COPD at an urban, university-based primary healthcare clinic in Selangor, Malaysia.

The clinic accepts walk-in and follow-up patients, covering a range of cases from acute care to chronic diseases, including asthma and COPD. Clinical records are maintained exclusively through electronic methods.

The clinic provides radiography services and spirometry by appointment. There is also a pathway to respiratory clinic services, accessible through direct referrals to the respiratory physician or by appointment for non-urgent cases. Patient consultations were conducted by postgraduate trainees in the Family Medicine Master's programme and resident family medicine specialists.

The sample size for asthma patients was determined based on the study by Shanmuganathan et al. (9), which involved 496 asthma patients attending a clinic. Using Open Epi Version 3.01 for "Sample Size: Proportion" with a significance level of 0.05, a 95% confidence interval (two-sided), and 80% power, the minimum calculated sample size is 164 (10). For COPD, all patients who attended the clinic during the study period were included, as the population had a small number of COPD patients.

Data collection commenced on October 1, 2021, and continued until December 1, 2021, with a retrospective study period from January 1 to December 31, 2020. During the 12-month study period, patients' records were identified through an EMR search using the following criteria: the presence of 'asthma' or 'chronic obstructive pulmonary disease' keywords in typed chart notes, the prescription of asthma/COPD medications, and the assignment of the International Classification of Diseases (ICD-10) billing code for 'asthma/COPD'.

Patients identified were then screened for inclusion and exclusion criteria. The inclusion criteria encompassed patients diagnosed with either bronchial asthma or COPD for more than one year, who had attended follow-up appointments for asthma or COPD at least twice in the past year and were receiving treatment for either condition within the previous 12 months. We excluded patients whose last follow-up visits were over 12 months ago, those with unretrievable medical records, those who were followed up or receiving medication prescribed by other centres or clinics, and asthma patients without asthma control test (ACT) scores.

Patients with exercise-induced bronchoconstriction, ACO (Asthma-Chronic Obstructive Pulmonary Disease overlap), and those attending the clinic for acute exacerbation requiring referral to a tertiary centre were also excluded.

To conduct the audit, the EMRs of patients who fulfilled the inclusion and exclusion criteria were extracted for further evaluation. The researchers developed standardised, pre-tested audit data collection forms and checklists to collect sociodemographic and clinical background data, as well as selected indicators of asthma and COPD care. This includes age, gender, ethnic group, paying status, family history of asthma, smoking status, other comorbidities, current treatment and body mass index (BMI). Paying status is categorised as either self-funded or government subsidised. Smoking status is classified as non-smoker, ex-smoker and active smoker. BMI is categorised into underweight, normal, overweight and obese.

Asthma and COPD care indicators were derived from:
1. Clinical Practice Guidelines for the Management of Asthma in Adults 2017 (11)
2. National Asthma and Chronic Obstructive

Pulmonary Disease Audit Programme (NACAP) Primary Care Queries, Royal College of Physicians, 2018 (12)

The following indicators are listed in Table 1 below. Each indicator was reviewed for completeness of documentation and was marked as "Yes" for documented or "No" for not documented. Completing <50% is considered a critical area requiring urgent steps for improvement. A cutoff limit of >50% was determined as a good completion rate based on comparisons with two previous audits conducted in a university clinic setting, which revealed that the indicators of the process of care achieved less than 50% of their standard targets (8,9).

All data were entered into the IBM SPSS Statistics software version 26 for analysis. Numerical variables were described using the mean (± standard deviation [SD]), and categorical variables were described using frequency and percentages.

Table I: Indicators derived from asthma and COPD clinical guidelines (CPG Asthma 2017 and NACAP 2018)

Indicators	Predefined criteria for completeness
Clinical assessment	
Peak flow reading (asthma only)	Best reading out of three, or all three readings
Oxygen saturation (COPD only)	Recorded in the vital signs section or clinical notes
FEV1 (COPD only)	Report available in EMR or stated in clinical notes
Smoking status (Asthma and COPD)	Documented as either active smoker, ex-smoker or non-smoker
Disease control assessment	
Asthma control test (ACT) score*	From 5 to 25
MRC dyspnoea scale (COPD only)	From 0 to 4
COPD assessment test (CAT) score	From 0 to 40
Exacerbation of disease in the last 1 year (Asthma and COPD)	Documented as an acute attack in clinical notes
Disease management	
Treatment adherence (Asthma and COPD)	Documented in the clinical notes at each follow-up visit
Inhaler technique assessment (Asthma only)	Documented in the clinical notes at each follow-up visit
Written asthma action plan (WAAP) provided to patients (Asthma and COPD)	Documented components of WAAP: Doses and frequencies of regular medication, how to adjust during exacerbations and danger signs.
Influenza and/or pneumococcal vaccination (COPD only)	Documented in the prescription list or stated in clinical notes
Smoking cessation advice/referral to smoking cessation services (Asthma and COPD)	Documented in the clinical notes at each follow-up visit

*Disease control assessment of asthma is based on ACT scores.

RESULTS

A total of 180 asthma and 15 COPD patients' EMRs who met the inclusion and exclusion criteria were analysed. As shown in Table 2, sociodemographic and patient characteristics revealed a mean age of 54.46 years (SD: 18.99) in the asthma group, with the majority being female (61.7%), Malay (92.8%), obese (54.9%), and receiving government subsidies (82.8%). In the COPD group, the mean age was 73.67 years (SD: 7.61). The majority were male (80.0%), Malay (73.3%), overweight (54.5%), and on government subsidies (73.3%). For both cohorts, patients had other underlying comorbidities besides asthma and COPD, with hypertension being the most common. Regarding current treatment, most of the asthma group were on short-acting beta agonist (SABA) and inhaled corticosteroids (ICS) therapy (52.25%), while the COPD group were predominantly on long-acting beta agonist (LABA) therapy.

Table II: Sociodemographic and clinical background of patients (Asthma, n=180, COPD, n=15)

Patient characteristics	Asthma	COPD
Age (mean)	54.46 (SD: 18.99)	73.67 (SD: 7.61)
Gender		
Male	69 (38.3)	12 (80.0)
Female	111 (61.7)	3 (20.0)
Ethnicity		
Malay	167 (92.8)	11 (73.3)
Chinese	4 (2.2)	2 (13.3)
Indian	7 (3.9)	2 (13.3)
Others	2 (1.1)	-
BMI		
Underweight	5 (2.8)	1 (9.1)
Normal	18 (10.3)	0
Overweight	56 (32.0)	6 (54.5)
Obese	96 (54.9)	4 (36.4)
Paying status		
Self-paying	31 (17.2)	4 (26.7)
Government funded	149 (82.8)	11 (73.3)
Comorbid		
T2DM	72 (40.0)	5 (33.3)
HPT	113 (62.8)	10 (66.7)
IHD	28 (15.6)	9 (60.0)
Atopy	51 (28.3)	
Smoking status*(asthma, n=113, COPD, n=8)	7 (6.2)	5 (62.5)
Active smoker	93 (82.3)	0
Non-smoker	13 (11.5)	3 (37.5)
Ex-smoker		
Family history of asthma* (n=45)	29 (64.4)	-
Yes	16 (35.6)	
No		
Type of inhaler		
SABA only	50 (27.8)	2 (13.3)
ICS only	1 (0.6)	-
SABA and ICS	94 (52.2)	-
LABA only	1 (0.6)	9 (60.0)
LABA and ICS	1 (0.6)	2 (13.3)
SABA and LABA	1 (0.6)	1 (6.7)
LABA ICS combination	11 (6.1)	-
LABA+ICS combination and SABA	21 (11.7)	1 (6.7)

***N is less than 180 or 15 as the data was not documented in the electronic medical records**

Table III: Completion rate for Asthma care indicators (n = 180)

Indicators	Yes (%)	No (%)
Clinical assessment		
Peak flow reading	7(3.9)	173(96.1)
Smoking status	113(62.8)	67(37.2)
Disease control assessment		
Asthma control test (ACT) score	156 (86.7)	24 (13.3)
Exacerbation of disease in the last 1 year	61 (33.9)	119 (66.1)
Disease management		
Inhaler technique assessment	39 (21.7)	141(78.3)
Treatment adherence	155 (86.1)	25 (13.9)
Smoking cessation advice/referral to smoking cessation services (n=total documented as active smokers)	5 (71.4)	2 (28.6)
Written asthma action plan (WAP) provided to patients	85 (47)	95 (53)

Among the asthma patient cohort (Table 3), most patients' EMRs did not record peak flow readings (96.1%) or asthma exacerbations in the past year (66.1%). In the disease management area, most records did not include inhaler technique assessments (78.3%) or whether a written asthma action plan (WAAP) was provided to patients. Otherwise, other indicators, such as smoking status, asthma control test (ACT) scores, treatment adherence, and smoking cessation advice, demonstrated a good completion rate of documentation.

Table IV: Completion rate for COPD care indicators (n = 15)

Indicators	Yes (%)	No (%)
Clinical assessment		
Oxygen saturation	2 (13.3)	13 (86.7)
FEV1	2 (13.3)	13 (86.7)
Smoking status	8 (53.3)	7 (46.7)
Disease control assessment		
MRC dyspnoea scale (COPD only)	7 (46.7)	8 (53.3)
COPD assessment test (CAT) score	7 (46.7)	8 (53.3)
Exacerbation of disease in the last 1 year	4 (33.3)	11 (66.7)
Disease management		
Inhaler technique assessment	6 (40.0)	9 (60.0)
Treatment adherence	11 (73.3)	4 (26.7)
Smoking cessation advice/ referral to smoking cessation services (n=total documented as active smokers)	5 (100)	0 (0)
Influenza and/or pneumococcal vaccination	1(6.7)	14 (93.3)
Written COPD action plan provided to patients	9 (60)	6 (40)

Meanwhile, for the COPD cohort (Table 4), most indicators did not achieve a good completion rate for documentation. This includes documentation of oxygen saturation (13.3%), FEV1 (13.3%), MRC dyspnoea scale (46.7%), CAT score (46.7%), episode of exacerbation in the last one year (33.3%), inhaler technique (40%) and influenza and/or pneumococcal vaccination (6.7%). Only documentation of smoking status, smoking cessation advice, treatment adherence and a written COPD action plan provided to patients achieved more than 50% completion rate.

Table V: Summary of achievement for asthma and COPD care indicators

Indicators	Asthma		COPD	
	>50% documented	<50% documented	>50% documented	<50% documented
Clinical assessment	1	1	1	2
Disease control assessment	1	1	0	3
Disease management	2	2	3	2
Total	**4**	**4**	**4**	**7**

The indicators for the completion rate for both asthma and COPD are summarised above in Table 5. For the asthma cohort, we observe that four indicators achieved a completion rate of more than 50%, while four indicators did not meet this threshold. The COPD cohort had only four indicators achieving a completion rate of above 50%, in contrast to seven indicators with a completion rate of below 50%.

DISCUSSION

High-quality, evidence-based asthma and COPD management in primary care settings necessitates adherence to practice guidelines and meticulous documentation of key care indicators (11,12). This audit of a university-based primary care clinic investigated documentation practices for asthma and COPD care indicators. The indicators were derived from national and international clinical guidelines, encompassing clinical assessments, disease control assessments, and disease management (11, 12, 13, 14). A thorough documentation of these standards during clinic visits is essential for optimal patient care and a clear communication path among the primary healthcare team (13)

In a typical clinic encounter for asthma patients, peak flow readings and ACT scores are assessed before consultation. Follow-up patients undergo inhaler technique checks, are asked about smoking status and exacerbation history, and receive counselling on

treatment adherence and smoking cessation before being given a written asthma action plan (WAAP).

Examining the indicators (Table 3) of asthma clinical assessment, we observe that while documentation of smoking status (62.8%) met the benchmark of >50%, recording of peak flow measurements was only 3.9%. This difference results from the limited practice of peak flow testing, which was intended to minimise aerosol generation during the COVID-19 pandemic. Surgical masks and eye protection were used as infection control measures during peak expiratory flow testing, when necessary. While consistent peak flow monitoring provides objective data on lung function, which is essential for assessing asthma control in an outpatient setting [15], this lower documentation rate of (3.9%) was expected, considering the period of testing.

The disease control assessment of asthma is indicated by the Asthma Control Test (ACT) score and the number of asthma exacerbations over the past year (Table 3). Although asthma control scores were well-documented up to 86.7%, documentation of exacerbations was only 33.9%. Regularly documenting exacerbation history is essential for assessing the effectiveness of treatment plans and identifying triggers and disease patterns to optimise patient care (16). A study by Baddar et al. demonstrates that a documented history of exacerbations leads to more appropriate modifications to treatment plans and a reduction in exacerbation frequency (16).

Regarding asthma disease management, documentation of treatment adherence and smoking cessation advice met the established standards (Table 3). However, documentation of inhaler technique assessment (21.7%) and provision of written asthma action plans (47%) were deficient. Proper inhaler technique is crucial for effective medication delivery. Common errors include issues with timing, posture, and breath-holding post-inhalation (17). Primary care providers should diligently assess and address these errors, providing educational interventions as needed (18).

Meticulous documentation of inhaler technique facilitates tracking of patient progress in medication self-delivery technique (17,18). In a busy primary care setting, inhaler training may have occurred. Still, without consistent and standardised documentation, there is neither a demonstrable proof of quality assurance nor a verifiable audit trail.

Asthma clinic encounters usually conclude with a written asthma action plan created collaboratively by the patient and provider, detailing daily asthma management at home and steps to take during worsening symptoms (20). Poor documentation and access to WAAP can discourage patients from adhering to and actively participating in their disease management (21). Goronfolah, Loie et al. further emphasised that clinics with well-documented WAAPs demonstrate better compliance with asthma management guidelines, resulting in improved quality of care and patient outcomes (21).

For patients attending a COPD clinic consultation, the initial assessment begins with measuring oxygen saturation for all patients. First-time patients also require a review of their FEV1 at diagnosis, while follow-up patients undergo assessments of the MRC dyspnoea scale and CAT score. Smoking and exacerbation histories are then recorded, inhaler technique is checked, and advice is provided on smoking cessation, treatment adherence, and vaccinations, along with a COPD home action plan.

The COPD care indicators of clinical assessment met the stipulated expectations for documenting smoking status (53.3%). In comparison, the recording of oxygen saturation and FEV1 (13.3% for both) fell short of expectations for both indicators. (Table 4) Pulse oximetry offers a quantifiable point-of-care measure of oxygenation and respiratory function (22). Given their potential for fluctuating oxygen levels, regular SpO2 monitoring and documentation are vital for COPD patients, allowing clinicians to assess treatment effectiveness and disease stability (22). Another key metric of clinical assessment that is often unmet is the baseline FEV1, which serves as a crucial prognostic indicator. A longitudinal study by Drummond et al. has shown that a lower baseline FEV1 correlates with more severe disease and an increased risk of hospitalisation (23). Knowledge and documentation of this metric are essential for personalised treatment planning based on lung function at diagnosis.

This audit further examined documentation rates of two key measurable indicators for COPD disease control assessment in primary care (Table 4). The MRC dyspnoea scale and the COPD assessment test score both showed a documentation rate of 46.7%, which is slightly below the expected level. These tools are vital for assessing and monitoring COPD, enabling healthcare providers to track disease progression and make objective decisions about escalating or de-escalating therapy (24, 25). Low documentation rates for these essential tools could hinder effective disease management. Additionally, disease control was evaluated through documentation of COPD exacerbations in the past year, which was notably lacking at 33.3%.

An exacerbation history is essential for risk stratification, as patients with multiple exacerbations face a higher risk of future acute events (26). The low rate of documenting exacerbation history reveals a significant gap in current practice.

Lastly, documentation practices in various aspects of COPD management, including treatment adherence, provision of written COPD action plans, advice on influenza and/or pneumococcal vaccination, and

referral to smoking cessation services, were examined (Table 4). This showed good documentation rates of over 50% for treatment adherence, action plan provision, and smoking cessation referrals, indicating satisfactory performance in these areas. However, documentation of advice on influenza and/or pneumococcal vaccination was markedly low, at 6.7%. Given the increased risk of respiratory infections such as pneumonia and influenza in patients with COPD, clear documentation of vaccination discussions is vital (27). Such records reinforce the importance of preventive care and may lead to higher vaccination rates in this vulnerable group (28). Enhancing documentation in this area should be prioritised.

Limitations: The audit recognises several limitations. Clinical documentation practices may vary among attending doctors, resulting in anecdotal record-keeping, as some care indicators may have been evaluated or discussed verbally but not documented systematically. This could result in incomplete or inconsistent records. Such variability may affect the accuracy of the audit findings. The study also highlighted the unavailability of long-acting muscarinic antagonist (LAMA) treatment options for COPD within this university's primary care clinic, necessitating referrals to hospital respiratory physicians for more optimal treatment. Additionally, being conducted at a single university primary care clinic, this study limits the generalisability of the findings to broader populations. Lastly, data collection occurred during the movement control order period, which may have influenced clinic attendance. Nevertheless, the overall target sample size for both the asthma and COPD populations was achieved.

Recommendations: Enhancing documentation practices within this university's primary healthcare setting is imperative. Comprehensive documentation is fundamental for optimising patient care, ensuring adherence to established standards, and mitigating potential health and legal risks. We recommend several strategies to achieve these objectives.

First, we propose implementing standardised, disease-specific clerking templates for asthma and COPD. These templates should encompass all essential standards of care, facilitating meticulous yet efficient recording during consultations (29). Integrating these templates into the existing electronic health record system, along with customised fields, prompts, and alerts, can further improve usability and data entry. Regular training and feedback mechanisms are essential for ensuring the effective use of the EHR system (30). In settings without electronic health records, existing disease-specific booklets could include sections for speech dictation, allowing for freehand documentation and comprehensive management of other underlying patient conditions.

Secondly, establishing a weekly dedicated asthma and COPD clinic is justified to enhance patient access to care, facilitate regular monitoring, promote best management practices, and ultimately streamline the documentation of care.

Next, conducting regular, similar audit processes that concentrate on documentation quality can offer valuable feedback and encourage compliance with standards (31). Additionally, translating audit findings into tangible adjustments to existing workflows, followed by subsequent re-audit cycles, can foster continuous quality improvement (31).

Finally, leveraging the university teaching setting, continuous medical education teaching sessions (CME) can focus on best practices in healthcare documentation, emphasising accuracy, completeness, and accountability (32). Medical education on the legal and regulatory implications of inadequate documentation, including potential malpractice claims, should be integrated into these sessions (33). This comprehensive approach can foster a culture of meticulous documentation, minimising risks and optimising patient care.

CONCLUSION

This audit revealed insufficient documentation of key asthma and COPD care indicators. While only half of the required asthma indicators were adequately recorded, documentation for more than half of the COPD indicators was inadequate (Table 5). We recommend implementing standardised disease-specific templates within a dedicated asthma and COPD clinic setting, supported by regular training, feedback, and audits, to improve documentation quality and practices. These actions will improve patient care, ensure compliance with standards, and reduce health and legal risks, ultimately optimising primary care management of asthma and COPD.

ACKNOWLEDGEMENT

The authors thank the family medicine specialists, postgraduate family medicine trainees, nursing staff, and administrative personnel of the university primary care clinic for their participation in this audit.

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