

นิพนธ์ต้นฉบับ

Original article

Comparative Study the Impact of COPD Clinic and GP Clinic Treatment on Clinical Outcomes in Real Word Clinical Practice

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Abstract

In Thailand, the prevalence of chronic obstructive pulmonary disease (COPD) is rising, with many patients receiving suboptimal or non-guideline-directed treatment. Acute exacerbations of COPD (AECOPD) significantly impact patients' quality of life, increase mortality risk, and contribute to higher healthcare costs. This study aimed to compare the clinical outcomes of COPD patients managed at general practitioner versus specialized COPD clinics. This retrospective, multi-center, cross-sectional observational study included 2,578 patients diagnosed with acute exacerbations of chronic obstructive pulmonary disease (AECOPD). Data were collected from both specialized COPD clinics — comprising outpatient departments, emergency rooms and inpatient wards — and from the medical records of general practitioners. The primary endpoints were the frequency of AECOPD events leading to ER visits, hospitalizations, the occurrence of pneumonia, and all-cause mortality. Data were analyzed and summarized using descriptive statistical methods. A total of 2,578 patients were included in the study, with similar demographic and clinical characteristics observed between those managed at COPD clinics ($n = 355$) and general practitioner (GP) clinics ($n = 2,333$). At COPD clinics, 93% of patients received long-acting muscarinic antagonist (LAMA) therapy; and 32% were prescribed triple therapy (LAMA + LABA/ICS). In contrast, 92% of patients treated at GP clinics received a combination of long-acting beta-2 agonist and inhaled corticosteroid (LABA/ICS). Patients managed in GP clinics experienced significantly higher rates of acute exacerbations of COPD (AECOPD) — including mild, moderate, and severe episodes — as well as increased incidences of pneumonia and all-cause mortality, compared to those treated at COPD clinics ($p < 0.05$ for all comparisons).

Keywords: chronic obstructive pulmonary disease (COPD); acute exacerbations of chronic obstructive pulmonary disease (AECOPD); LABA/ICS (salmeterol/fluticasone propionate); LAMA (long-acting muscarinic antagonist); pneumonia

Introduction

Chronic obstructive pulmonary disease (COPD) is the third leading cause of death worldwide.^(1,2) In the Asia-Pacific region, the prevalence of COPD, asthma, and other allergic respiratory conditions has increased significantly in recent years, likely due to environmental changes, pollution, genetic predispositions, and rapid urbanization driven by economic development.^(3,4) The Asia-Pacific Burden of Respiratory Disease (APBORD) study found that COPD was one of the most common respiratory diagnoses (8%) and accounted for the highest medication costs among respiratory conditions in Thailand.⁽⁵⁾ Although COPD is a preventable and manageable disease, many patients still experience acute exacerbations.⁽⁶⁾ These episodes can range from mild to severe and may lead to respiratory failure, hospitalization, higher risk of subsequent exacerbations, increased morbidity and mortality, and greater healthcare costs.⁽⁶⁻⁸⁾ To optimize treatment and outcomes, the Global Initiative for Chronic Obstructive Lung Disease (GOLD) categorizes patients into groups A – D based on symptom severity and risk of future exacerbations.⁽⁹⁾ According to the 2017 GOLD guidelines, bronchodilator therapy should be initiated for all COPD patients. Specifically, group B patients should receive at least one long-acting muscarinic antagonist or long-acting bronchodilator (LAMA or LABA); group C patients should begin treatment with LAMA; and group D patients are recommended to receive combination therapy with LAMA+LABA or triple therapy (LABA/ICS+LAMA).⁽¹⁰⁾ Despite these guidelines, many Thai patients are under-receiving less than recommended therapies or only short-acting bronchodilator.⁽¹¹⁻¹³⁾ At the time of this study, LAMA

was not included in Thailand's essential drug list and could not be prescribed by pulmonologists. While previous studies in Thailand have described the prevalence and pharmacological management of acute COPD exacerbations, few have compared how different clinical settings influence patient outcomes.⁽¹³⁻¹⁵⁾

The objective of this study was to report and compare the treatment regimens used for COPD management in COPD clinics versus GP clinics, as well as to assess the incidence of acute exacerbation of chronic obstructive pulmonary disease (AECOPD) in real-world clinical practice in Thailand.

Materials and Method

Study Design and Patient Population

This was a retrospective, multi-center, cross-sectional observational study conducted across all hospitals in Phitsanulok Province, Thailand. The study period was from October 2017 to September 2018. Data were collected from the Health Data Center (HDC) of the Ministry of Public Health and from medical records at nine hospitals within the province.

A total of 2,578 patients diagnosed with chronic obstructive pulmonary disease (COPD) were included. The diagnosis was confirmed through pulmonary function testing (spirometry) in all patients using both pre- and post-bronchodilator measurements, in accordance with established diagnostic criteria for COPD. In cases where the diagnosis remained uncertain, additional imaging — such as chest X-ray (CXR) or computed tomography (CT) of the chest — was performed to rule out other conditions. Patients with varying degrees of airflow limitation (mild GOLD 1, moderate GOLD 2, severe GOLD 3 and very

severe GOLD 4) were classified according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2017 criteria. Modified Medical Research Council (mMRC) and COPD Assessment Test (CAT) had evaluated all patients. History of AECOPD in the preceeding year had evaluated to mild, moderate, severe AECOPD and frequency of exacerbations. Data were extracted from both specialized COPD clinic and general practitioner (GP) clinics, encompassing out-patient departments, emergency rooms (ERs), and inpatient services.

Inclusion Criteria:

1. Age over 40 years
2. Diagnosis of COPD confirmed by pre- and post-bronchodilator spirometry
3. Completed assessments using the modified Medical Research Council (mMRC) Dyspnea Scale and the COPD Assessment Test (CAT) at each visit

Exclusion Criteria:

1. Spirometry results not consistent with a COPD diagnosis
2. Alternative diagnoses identified via chest CT or chest X-ray

According to the GOLD 2017 guidelines, patients were categorized into groups A, B, C and D based on symptom severity and risk of exacerbation. The stratification was determined using the Modified Medical Council (mMRC) dyspnea Scales, the COPD Assessment Test (CAT), and the number of acute exacerbations of COPD(AECOPD) experienced in the preceding year.

Symptom severity was defined as follows:

- Low symptom burden: mMRC grade 0–1 and/or CAT score <10
- High symptom burden: mMRC grade ≥ 2 and/or

CAT score ≥ 10

AECOPD classification

- Mild AECOPD was defined as experienced occasional shortness of breath, a persistent cough, or mild exercise intolerance, these symptoms are often manageable and may not be immediately noticeable.
- Moderate AECOPD was defined as an acute worsening of respiratory symptoms requiring additional treatment with a short-acting bronchodilator (SABD), along with antibiotic and/or oral corticosteroids.
- low-risk: 0–1 moderate exacerbation per year
- High-risk: 2 or more moderate exacerbations per year
- Severe AECOPD was defined as an exacerbation requiring emergency room (ER) visits or hospitalization; and was classified as high risk.

Pneumonia and all-caused mortality were recorded as clinical endpoints. Each patient's AECOPD status was assessed at least once annually during the study.

Statistical Analysis

Data were summarized by descriptive statistics. Continuous variables were reported as mean and standard deviation (SD) and categorical variables were reported as percentages or frequency. To analyze the difference in demographics between the groups, Chi-square and Mann-Whitney tests were used for categorical and continuous variables, respectively. Differences in medication use between the groups were analyzed using Fisher's exact test; and $p < 0.05$ was considered statistically significant.

Results

Baseline Demographics and Clinical Characteristics

The baseline demographic and clinical

Table 1 Baseline demographic and clinical characteristics of patients

	Patients attending COPD clinic (N=355)		Patients attending GP clinic (N=2,223)	
	Number	%	Number	%
Age, years (Mean±SD)	65.6±6.5		64.4±7.2	
Male	292	82.22	1,880	84.57
Body mass index, kg/m ² (Mean±SD)	20.4±1.6		19.9±1.7	
Current smoker	72	20.28	482	21.68
COPD classifications				
Group A	25	7.04	178	8.01
Group B	106	29.86	578	26.00
Group C	110	30.99	720	32.39
Group D	114	32.11	747	33.60
Comorbidities				
Hypertension	114	32.11	756	34.01
Diabetes mellitus	44	12.39	256	11.52
Bronchiectasis	56	15.77	386	17.36
Dyslipidemia	36	10.14	196	8.82
Cardiovascular disease	23	6.48	160	7.20
Congestive heart failure	18	5.07	133	5.98

Remark; COPD = chronic obstructive pulmonary disease, GP = general practitioner

characteristics of patients attending COPD and GP clinics were broadly similar, as shown in Table 1. The mean age of patients at COPD clinics was 65.6±6.5 years, compared to 64.4±7.2 years for those at GP clinics. The majority of patients in both groups were classified as GOLD group D, followed by groups C, B, and A in descending order.

Medications

A significantly higher proportion of patients attending COPD clinics received a long-acting muscarinic antagonist (LAMA), whereas none of the patients at GP clinics were prescribed this medication (92% vs. 0.0%; $p<0.05$) (Table 2). Conversely, a significantly greater proportion of patients at GP clinics

received a combination of long-acting beta-2 agonist and inhaled corticosteroid (LABA/ICS), compared to those at COPD clinics, where patients were more likely to receive triple therapy (91.99% vs. 32.11%; $p<0.05$). Additionally, patients managed at GP clinics were more frequently prescribed theophylline, procaterol, and mucolytics ($p<0.05$), while those at COPD clinics were more likely to receive roflumilast (7.89% vs. 0.0%; $p<0.05$). The use of short-acting bronchodilators (SABD) and prednisolone was similar between the two groups.

AECOPD Events

A summary of AECOPD events over a one-year period for both groups is presented in Table 3. Patients

Table 2 Summary of medications received by patients

Medication	Patients attending COPD clinic (N=355)		Patients attending GP clinic (N 2,223)		p-value
	Number	%	Number	%	
LAMA alone	216	60.80	0	0.00	<0.05
LAMA+LABA/ICS	114	32.11 ^a	0	0.00	<0.05
LABA/ICS	0	0.00	2,045	91.99 ^b	<0.05
SABD	340	95.77	2,103	94.50	NS
Theophylline	92	25.92	2,000	89.96	<0.05
Procaterol	64	18.03	1,738	78.18	<0.05
Prednisolone	14	3.94	106	4.77	NS
Mucolytic	126	35.49	1,844	82.95	<0.05
Roflumilast	28	7.89	0	0.00	<0.05
Influenza vaccine	60	16.90	312	14.03	NS

Remark: a Patients received formoterol/budesonide

b Patients received salmeterol/fluticasone propionate

COPD, chronic obstructive pulmonary disease; GP general practitioner; ICS, inhaled corticosteroids;

LAMA, long acting muscarinic antagonists; LABA, long acting beta agonists;

SABD, short-acting bronchodilators; NS, not significant

Table 3 Summary of AECOPD events

AECOPD events	Patients attending COPD clinic (N=355)		Patients attending GP clinic (N 2,223)		p-value
	Number	%	Number	%	
Number of mild AECOPD events	127	35.77	1,422	63.97	<0.05
Number of moderate-severe AECOPD events	149	41.97	2,455	110.43	<0.05
Emergency room, visits/year (moderate AECOPD)	52	14.65	984	44.26	
Hospital admission/year (severe AECOPD)	97	27.32	1471	61.17	
All-cause mortality	6	1.69	92	4.14	<0.05

Remark: AECOPD Acute exacerbations of COPD; COPD, chronic obstructive pulmonary disease

managed at GP clinics experienced a significantly higher number of mild, moderate AECOPD events compared to those treated at COPD clinics ($p<0.05$). Similarly, the number of severe AECOPD events was also significantly greater among patients in the GP clinic group ($p<0.05$). Consequently, these patients had a significantly higher number of emergency room visits and hospital admissions within the year

($p < 0.05$). Additionally, the all-cause mortality rate was notably higher in the GP clinic group compared to the COPD clinic group (4.14% vs. 1.69%).

Discussion

This retrospective observational study examined the impact of two distinct treatment approaches for acute exacerbations of chronic obstructive pulmonary disease (AECOPD) in Thailand — those used in specialized COPD clinics versus general practitioner (GP) clinics. We found that most patients managed in COPD clinics received a long-acting muscarinic antagonist (LAMA), while those in GP clinics were more commonly treated with a long-acting beta-2 agonist/inhaled corticosteroid (LABA/ICS) combination. This difference in prescribing patterns likely reflects the unavailability of LAMA on Thailand's essential drug list, limiting its use in primary care settings. Importantly, patients who received LAMA-based therapy at COPD clinics experienced significantly fewer mild moderate and severe AECOPD episodes. These patients also had reduced rates of emergency room visits, hospital admissions, and all-cause mortality compared to those treated at GP clinics with LABA/ICS.

These findings are consistent with numerous clinical trials that have established the safety and efficacy of LAMA or LABA (either as monotherapy or in combination with ICS) in managing COPD. For example, the UPLIFT (Understanding Potential Long-Term Impacts on Function with Tiotropium) study demonstrated that long-term treatment with tiotropium (a LAMA) reduced symptoms, exacerbations, and hospitalizations, while improving lung function and overall health status.⁽¹⁶⁾ Similarly, the TORCH

(Towards a Revolution in COPD Health) study showed that LABA/ICS therapy (salmeterol/fluticasone) significantly lowered exacerbation rates by 25% and improved quality of life, though it also led to an increased risk of pneumonia compared to ICS alone.⁽¹⁷⁾

A systematic review further supported the superiority of LAMA over LABA in preventing exacerbations and reducing the risk of subsequent events.⁽¹⁸⁾

However, not all findings in the literature are consistent. The INSPIRE (Investigating New Standards for Prophylaxis in Reducing Exacerbations) study found no significant difference in exacerbation reduction between tiotropium and SFC (salmeterol/fluticasone) treatment arms. Nevertheless, the SFC group had a higher incidence of pneumonia (8% vs. 4%), though mortality was lower in that group (3% vs. 6%).⁽¹⁹⁾ These findings suggest that even among patients with similar characteristics — such as those with severe COPD or high rates of current smoking (as was the case in both INSPIRE and our study, where >60% of patients were classified as GOLD group C or D) — treatment responses can vary depending on drug selection. GOLD 2019 guidelines suggest that biomarkers like blood eosinophil count may help guide ICS use more effectively.

Influenza vaccination rates were substantially below recommended standards in both treatment groups, though the difference between groups was not statistically significant. This low vaccination rate may have contributed to the increased frequency of AECOPD observed.^(20,21)

The discrepancies in treatment approaches between COPD clinics and GP clinics are likely due to limited access to essential medications such as LAMA and LABA in primary healthcare settings. A report from the

World Health Organization's South-East Asia Region emphasized the importance of decentralizing drug distribution and reducing reliance on nonessential medications to ensure broader access to guideline-recommended therapies in all healthcare facilities.⁽²²⁾

This study has several limitations. As a retrospective analysis, it relied on existing medical records, which may contain missing or inaccurate information. Additionally, prescription records may not reflect actual patient adherence or dosage use. Finally, since the data were drawn from a single province, further research is needed to explore prescribing patterns and outcomes across other regions of Thailand.⁽²²⁾

Overall, our findings highlight the importance of equitable access to essential COPD medications and adherence to clinical guidelines to improve patient outcomes.

Conclusion

This retrospective study highlights the significant differences in clinical outcomes associated with varying treatment practices for COPD patients across healthcare settings in Thailand. These variations are largely attributed to the limited availability of essential medications—particularly LAMA—in general practitioner (GP) clinics. Consistent with findings from existing literature, patients treated at specialized COPD clinics with LAMA-based regimens experienced markedly better outcomes, including fewer AECOPD events, reduced emergency room visits and hospitalizations, and lower all-cause mortality, compared to those treated with LABA/ICS combinations more commonly prescribed in GP clinics.

Financial Disclosure

No potential conflict of interest was reported by the author.

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การศึกษาเปรียบเทียบผลกระทบของการรักษาในคลินิกโรคปอดอุดกั้นเรื้อรัง (COPD Clinic) และ คลินิกเวชปฏิบัติทั่วไป (GP Clinic) ต่อผลลัพธ์ทางคลินิกในเวชปฏิบัติจริง

ขจร สุนทรากวัฒน์

โรงพยาบาลพุทธชินราช พิษณุโลก จังหวัดพิษณุโลก

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บทคัดย่อ: ในประเทศไทยมีแนวโน้มการเพิ่มขึ้นของผู้ป่วยโรคปอดอุดกั้นเรื้อรัง (chronic obstructive pulmonary disease - COPD) โดยพบว่าผู้ป่วยจำนวนมากยังได้รับการรักษาที่ไม่สอดคล้องกับแนวทางเวชปฏิบัติหรือได้รับการรักษาที่ไม่เหมาะสม การกำเริบเฉียบพลันของโรค COPD (acute exacerbation of chronic obstructive pulmonary disease - AECOPD) ส่งผลกระทบอย่างมากต่อคุณภาพชีวิตของผู้ป่วย เพิ่มความเสี่ยงต่อการเสียชีวิต และก่อให้เกิดภาระค่าใช้จ่ายด้านสุขภาพที่สูงขึ้น การศึกษานี้มีวัตถุประสงค์เพื่อเปรียบเทียบผลลัพธ์ทางคลินิกของผู้ป่วย COPD ที่ได้รับการดูแลจากคลินิกเวชปฏิบัติทั่วไปกับผู้ที่ได้รับการดูแลจากคลินิกเฉพาะทางโรคปอด การศึกษานี้เป็นการศึกษาแบบย้อนหลัง เชิงสังเกต ภาคตัดขวาง ดำเนินการในหลายศูนย์ โดยรวบรวมข้อมูลจากผู้ป่วยจำนวน 2,578 ราย ที่ได้รับการวินิจฉัยว่ามีภาวะกำเริบเฉียบพลันของโรคปอดอุดกั้นเรื้อรัง (AECOPD) ข้อมูลถูกรวบรวมจากคลินิกเฉพาะทางโรคปอด ซึ่งรวมถึงแผนกผู้ป่วยนอก ห้องฉุกเฉินและหอผู้ป่วยใน รวมถึงเวชระเบียนของคลินิกเวชปฏิบัติทั่วไป จุดสิ้นสุดหลักของการศึกษานี้ ได้แก่ ความถี่ของการเกิด AECOPD ที่นำไปสู่การมาโรงพยาบาล การเข้ารับการรักษาในโรงพยาบาล การเกิดโรคปอดบวม และอัตราการเสียชีวิตจากทุกสาเหตุ ข้อมูลที่ได้ถูกวิเคราะห์และสรุปโดยใช้วิธีสถิติเชิงพรรณนา จากผู้ป่วยทั้งหมด 2,578 ราย ที่เข้าร่วมการศึกษา พบว่าลักษณะทางประชากรศาสตร์และข้อมูลทางคลินิกของผู้ป่วยที่ได้รับการดูแลในคลินิกโรคปอดจำนวน 355 ราย และคลินิกเวชปฏิบัติทั่วไป จำนวน 2,333 ราย มีความใกล้เคียงกัน ในกลุ่มผู้ป่วยที่ได้รับการดูแลจากคลินิกโรคปอด พบว่า 93% รับประทานยา long-acting muscarinic antagonist (LAMA) และ 32% ได้รับการรักษาแบบสามกลุ่มยา (triple therapy: LAMA + LABA/ICS) ขณะที่ผู้ป่วยที่รักษาในคลินิกเวชปฏิบัติทั่วไป 92% ได้รับการรักษาด้วยยา long-acting beta-2 agonist ร่วมกับ inhaled corticosteroid (LABA/ICS) อย่างไรก็ตาม ผู้ป่วยที่ได้รับการดูแลจากคลินิกเวชปฏิบัติทั่วไปมีอัตราการเกิดภาวะกำเริบเฉียบพลันของโรค COPD ทั้งในระดับเล็กน้อย ปานกลาง และรุนแรง รวมถึงอุบัติการณ์ของโรคปอดอักเสบ-ติดเชื้อและอัตราการเสียชีวิตจากทุกสาเหตุสูงกว่ากลุ่มที่รักษาในคลินิกโรคปอดอย่างมีนัยสำคัญทางสถิติ ($p < 0.05$ สำหรับการเปรียบเทียบทั้งหมด)

คำสำคัญ: โรคปอดอุดกั้นเรื้อรัง (COPD); โรคปอดอุดกั้นเรื้อรังภาวะกำเริบเฉียบพลัน (AECOPD); กลุ่มยา LABA/ICS (salmeterol/fluticasone propionate); กลุ่มยา LAMA (long-acting muscarinic antagonist); ปอดอักเสบติดเชื้อ