Drug prescription pattern in asthma at Tertiary Care Teaching Hospital

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Abstract

Introduction: *Asthma is one of the most serious health concerns worldwide, affecting approximately 300 million individuals. Asthma-related health care use and medical costs are comprehensive and enormous.2, 3 In Taiwan, the estimated prevalence of adult asthma is approximately 11.9%, and 26% of all health care use among all individuals relates to asthma care.4, 5 Thus, a successful asthma management is crucial not only for public health improvement but also for medical cost reduction. The aim of this study was to investigate the prescription patterns among ambulatory patients with asthma and to further evaluate the discrepancy of the medication use patterns and guideline adherence among different medical institutions and physician specialties* ***MATERIAL AND METHODS:*** *The present prospective, observational study was conducted in the Department of Pharmacology, Tertiary Care Teaching Hospital over period of 1 year. The study was started only after getting the ethical approval from the Institutional Ethics Committee. Total 180 patients who were diagnosed with asthma as primary disease were recruited after fulfilling our inclusion exclusion criteria. In this study we attempted to evaluate the prescribing trend of anti-asthmatic drugs in asthma patients. WHO core prescribing indicators were taken into consideration in evaluating the rationality of prescriptions* ***Results:*** *The study included 180 asthma patients, of whom 107 (59.4%) were female and 73 (40.6%) were male, with a female-to-male ratio of 1.47:1. Age distribution showed that 16.7% were between 18-30 years, 45.6% between 33-46 years, and 37.7% between 47-60 years, with a mean age of 43.95 ± 10.62 years. Among the risk factors, 10.6% of patients were smokers, while 28.3% had an allergic predisposition. Regarding comorbidities, 23.9% had hypertension, 21.1% had diabetes mellitus, 12.8% had dyslipidemia, 8.9% had hypothyroidism, and 6.7% had coronary artery disease. Additionally, 2.2% had a history of tuberculosis, and 21.1% had respiratory infections. The drug prescription pattern revealed a total of 547 drugs prescribed across 180 prescriptions,* ***Conclusion*** *: There is need to encourage the physician to use the treatment guidelines while managing patients with asthma. In conclusion, National Asthma Education program would benefit as an initial step to improve asthma knowledge and increase awareness in the medical community on current treatment practice.*

Keywords: *Drug Prescription Pattern; Bronchial Asthma; Antiasthmatic Drug*

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INTRODUCTION

Asthma is one of the most serious health concerns worldwide, affecting approximately 300 million individuals.[1] Asthma-related health care use and medical costs are comprehensive and enormous. In Taiwan, the estimated prevalence of adult asthma is approximately 11.9%, and 26% of all health care use among all individuals relates to asthma care. Thus, a successful asthma management is crucial not only for public health improvement but also for medical cost reduction.[2]

The key concepts of global guidelines for asthma management have been revised to optimize clinical decision making by means of stepwise approaches or great emphasis on the use of inhaled anti-inflammatory agents.[3] The advantages of inhalers are specifically mentioned in the Global Initiative for Asthma (GINA) guidelines. The inhaled therapy can deliver drugs directly into the airways to generate higher concentration in the airways and entail less risk of systemic adverse effects. In addition, the Salmeterol Multicentre Asthma Research Trial (SMART),[4] which was a large randomized trial, reported that more serious adverse events and asthma-related deaths occurred among patients receiving inhaled long-acting ß2-agonists (LABAs) alone; the GINA guidelines suggest that LABAs should not be used alone but must be used in combination with inhaled corticosteroids (ICSs).[5] Clinical physicians principally adopt these updated recommendations for satisfactory asthma control. However, previous studies have reported that low adherence to the guidelines for asthma management and suboptimal treatments were common problems, such as low prescription rates of ICSs for patients with asthma, inadequate doses or overdoses, underuse of anti-inflammatory medications, and preference for oral medications over inhalers.

Currently, ICSs remain the first-line anti-inflammatory therapy for asthma. They inhibit airway inflammation, resulting in the decreases in airway hyperresponsiveness and in the numbers of epithelial eosinophils and mast cells in the asthmatic airways.[6] Numerous large randomized clinical trials have found that LABAs in combination with ICSs can reduce acute exacerbations and improve asthma control better than ICS alone or even doubling the ICS dose.[7] It appears that the trend of fixed-dose combinations of LABAs plus ICSs as single inhalers was widely used in most asthmatic patients without prior ICS therapy.[8]

The aim of this study was to investigate the prescription patterns among ambulatory patients with asthma and to further evaluate the discrepancy of the medication use patterns and guideline adherence among different medical institutions and physician specialties.[9] The rates of hospitalization and emergency department (ED) visits due to asthma exacerbations were also analyzed.[10]

MATERIALS AND METHODS

The present prospective, observational study was conducted in the Department of Pharmacology, Tertiary Care Teaching Hospital over period of 1 year. The study was started only after getting the ethical approval from the Institutional Ethics Committee. Total 180 patients who were diagnosed with asthma as primary disease were recruited after fulfilling our inclusion exclusion criteria. In this study we attempted to evaluate the prescribing trend of anti-asthmatic drugs in asthma patients. WHO core prescribing indicators were taken into consideration in evaluating the rationality of prescriptions

Inclusion criteria All patients
diagnosed with bronchial asthma; either male or female; patients within the age limit of 18 and above, patients willing to get enrolled in a study with consent were included.

Exclusion criteriaPatients
who are less than 18 years; patients not willing to participate or give consent; those patients who are not able to give interview; patients with associated co- morbidities such as hypertension(HTN), diabetes, heart diseases, tuberculosis(TB), HIV–AIDS; concurrent major psychiatric illness and/or concurrent major medical illness; patient with chronic illness and terminally end stage patients were excluded.

The procedure followed in this observational study was in agreement with the ethical standards of the authority committee on human experimentation (Institutional or national). Detailed history, signs and symptoms, physical examination and investigations like pulmonary function tests -spirometry, absolute eosinophilic count (AEC) and serum IgE levels were done to confirm the diagnosis of asthma. Data from the records were entered into a specially designed case report from (CRF) which included patients demographic details (patients name, age, sex, occupation, residence, OPD registration number), presenting complaints and their duration, history of cigarette smoking, family history of asthma, any previous treatment history or current treatment, associated comorbidities (such as HTN, Diabetes, TB, AIDS, heart disease etc), investigations related to diagnosis(mainly spirometry which was performed using spirometer (pulmonary function equipment) of Cosmed company for evaluation of forced vital capacity (FVC), forced expiratory volume at 1 minute (FEV1), FEV1/FVC ratio.

Drugs prescribed for asthma along with dosage, duration, frequency and route of administration. On confirming the diagnosis of asthma, the prescriptions forms were collected from the patient and relevant information satisfying the objective of the study were noted on the CRF. The patients were followed up at 4thweek (1month) and 12thweek (3 month) and 6 months for clinical improvement and for any additional medication. The data obtained from the prescription regarding prescription of anti-asthmatic drugs was assessed and evaluated using appropriate statistical tests on completion of the study.

Pattern of anti-asthmatic drugs used in the study was analyzed using WHO core prescribing indicators. These indicators were adopted and modified as per the objectiveof the study.

Statistical analysis
Data were analyzed using Statistical Package for Social Sciences (SPSS) version 21.0. Categorical variables are presented in number and percentages(%) and mean±SD. Data and results were represented in suitable graphical and tabular forms.

RESULTS

The study included 180 asthma patients, of whom 107 (59.4%) were female and 73 (40.6%) were male, with a female-to-male ratio of 1.47:1. Age distribution showed that 16.7% were between 18-30 years, 45.6% between 33-46 years, and 37.7% between 47-60 years, with a mean age of 43.95 ± 10.62 years. Among the risk factors, 10.6% of patients were smokers, while 28.3% had an allergic predisposition. Regarding comorbidities, 23.9% had hypertension, 21.1% had diabetes mellitus, 12.8% had dyslipidemia, 8.9% had hypothyroidism, and 6.7% had coronary artery disease. Additionally, 2.2% had a history of tuberculosis, and 21.1% had respiratory infections. The drug prescription pattern revealed a total of 547 drugs prescribed across 180 prescriptions,

with a mean of 3.04 ± 1.52 drugs per prescription, ranging from a minimum of 1 to a maximum of 8. Drug administration routes included oral (54.66%), inhalation (43.34%), and other routes (2.0%). The most commonly used anti-asthmatic drug classes included short-acting β2 agonists (Salbutamol), long-acting β2 agonists (Formoterol, Salmeterol), corticosteroids (Budesonide, Fluticasone, Prednisolone, Methylprednisolone), methylxanthines (Doxophylline, Acebrophylline, Etofylline, Theophylline), anticholinergics (Tiotropium Bromide, Ipratropium Bromide), leukotriene modifiers (Montelukast), and antihistamines (Levocetirizine, Fexofenadine, Desloratadine, Azelastine).

Table 1: Demographic and Clinical Characteristics of Asthma Patients

Characteristic	Frequency (n=180)	Percentage (%)
Gender		
Female	107	59.4
Male	73	40.6
Female to Male Ratio	1.47:1	

Table 2: Age Distribution (Years)

Age Group (Years)	Frequency (n=180)	Percentage (%)
18-30	30	16.7
33-46	82	45.6
47-60	68	37.7
Mean Age (Mean ± SD)	43.95 ± 10.62	
Minimum Age	18	
Maximum Age	60	

Table 3: Risk Factors

Risk Factor	Frequency (n=180)	Percentage (%)
Smokers	19	10.6
Allergic Predisposition	51	28.3

Table 4: Comorbidities

Condition	Frequency (n=180)	Percentage (%)
Hypertension	43	23.9
Diabetes Mellitus	38	21.1
Dyslipidemia	23	12.8
Hypothyroidism	16	8.9
Coronary Artery Disease	12	6.7
History of Tuberculosis	4	2.2
Respiratory Infection	38	21.1

Table 5: Drug Prescription Pattern

Prescription Characteristic	Value (n=180)
Total Number of Drugs	547
Number of Prescriptions	180
Minimum Drugs per Prescription	1
Maximum Drugs per Prescription	8
Mean Drugs per Prescription	3.04 ± 1.52
Median Drugs per Prescription	3

Table 6: Drug Administration Route

Route	Frequency (n=180)	Percentage (%)
Oral	299	54.66
Inhalation	237	43.34
Other	11	2.0

Table 7: Class of anti-asthmatic drugs used.

Class of Drug	Drugs Used
Short-acting ß2 agonist (SABA)	Salbutamol
Long-acting ß2 agonist (LABA)	Formoterol, Salmeterol
Corticosteroids	Budesonide, Fluticasone, Prednisolone, Methylprednisolone
Methylxanthines	Doxophylline, Acebrophylline, Etofylline, Theophylline
Anticholinergics	Tiotropium Bromide, Ipratropium Bromide
Leukotriene Modifiers	Montelukast
Antihistamines	Levocetirizine, Fexofenadine, Desloratadine, Azelastine

DISCUSSION

The rationality of the prescription can be assessed and evaluated using a prescription-based study, one of the methods available for such purpose. Recommendation of the various international bodies on asthma has enhanced the prescribing practice of the physicians.[11] moreover, clinical standards are also now available In this study, the analysis showed that asthma occur more in men than in women, which is confirmed by demographic characteristics showing men (66%) to suffer more from asthma than women (34%). Asthma is mostly diagnosed by history and patient examination by the physician.[12]

Drummond et al.[13] suggested that increase in spirometry access in primary care improves diagnosis and compliance with guidelines.[14] Most of the general practitioners (GPs), mainly from rural areas, considered spirometers to be expensive and lacked confidence in their use. This study suggested a significant divergence between the recommendation of using spirometry and GPs confidence to perform and interpret the tests.[15]

In this study, all patients were on multiple drug therapy, and no patients were on single drug therapy. Because patients with asthma mostly require more than one drug to control the symptoms, hence, combination therapy is often required to treat it. Multidrug

therapy in this study reveals the awareness seen among the physicians. Overall, drug utilization showed the combination of beta agonist and corticosteroids (78%) was used in majority of the patients. The symptomatic relief agents seem to be prescribed more than the controlling agents in the treatment of asthma, as shown by this analysis. This finding was not in agreement with those reported by Kumar et al.[16] Our study suggested that only 34% of patients received drugs from essential drug list.[17] More drugs should be prescribed from essential drug list. This indicates that the prescribers were less aware of the drugs listed in the essential drug list. The essential drug list does not contain many important drugs used in asthma such as montelukast, budesonide, salmeterol, formoterol, and levocetirizine.[18]

The inhalational route of drug delivery is used in 60% patients. The inhalational route delivers more drugs locally in the respiratory tract with less side effects.[19] The dose of drug used by inhalational route is also less. This is in accordance to treatment guidelines: inhalational therapy for asthma should be the first choice of treatment.[5–7] This indicates awareness among prescribers and patients education about inhalational therapy.[20] Antibiotics, expectorant, antitussive, and antihistaminics were less prescribed compared with asthma controllers. This suggests awareness among physicians toward the standard treatment guideline of Global Initiative for Asthma (GINA).

CONCLUSION

Drug prescriptions for asthma patients were rational regarding theirdoses, duration and route of administration. Further efforts must be made to encourage more and more prescription of generic drugs according to guidelines for asthma management. In government set up patient load is very high, so there is a need to sensitize health professionals to promote judicious use of different classes of drugs to avoid un-necessary use as well as drug interactions. Based on the results, it was observed that most of the patients were prescribed with multiple (two, three, four) drug therapy, out of which inhalational route was the most preferred one. Anti-asthmatic drugs given as inhalational therapy are more beneficial to the patients than systemic therapy. Most frequently prescribed single class anti-asthmatic drug was levosalbutamol (SABA). Combination (FDCs) of ICS and LABAwas the most commonly prescribed FDC. In the present study there is enormously higher use of antibiotics (81.4%) which raises serious concern regarding its judicious use.

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