



**PATTERN OF DRUG PRESCRIPTION IN ADULT PATIENTS HOSPITALIZED WITH
BRONCHIAL ASTHMA IN DEVELOPING COUNTRY: EXPLORING THE LINK
BETWEEN EVIDENCE AND CLINICAL PRACTICE**

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ABSTRACT

Prescription patterns for bronchial asthma in developing countries are often dynamic and determined more by the socio demographic and financial characteristics of patients than by evidence based guidelines. Within this background we conducted the clinical audit of Adult Patients Hospitalized with Bronchial Asthma by studying the drug prescription pattern and explored the link between the evidence laid down by standard Asthma management guidelines and clinical practice in the specific context. Retrospective study conducted at Division of Pulmonary, Critical Care & Sleep Medicine in the Department of Internal Medicine at B. P. Koirala Institute of Health Sciences (BPKIHS), Dharan, over 3 years from January 2012 to January 2015. Medical records of all the hospitalized adult cases of Bronchial Asthma were reviewed. All the drugs prescribed during the hospital stay and discharges were carefully recorded along with the formulation and duration. The quantitative variables were presented using descriptive statistics. 114 patients with Bronchial Asthma were admitted with 67(58.8%) females and 47(41.2%) males. Beta 2 agonists and corticosteroids were the most frequently prescribed medications in various formulation in 114(100%) and 105(92.1%) patients. Methylxanthines were prescribed in 52(45.6%) case. Antihistamines, Leukotriene inhibitors were prescribed in 60(52%), 27(23.6%) whereas 84(73.6%) patients received antibiotics in either intravenous or oral form. Our study provided evidence for acceptable degree of real-life compliance and linkage with standard international asthma guidelines for treatment of Bronchial Asthma in the specific context. This information might contribute towards improved prescribing decisions in bronchial asthma and care of patients with bronchial asthma.

KEY WORDS: Bronchial Asthma, Clinical audit, Evidence-based Medicine.

INTRODUCTION

Proper record of drug prescription provides a understanding of usage pattern, quality, efficacy and outcome of drug use.^[1,2] It provides feedback on physician performance prescribing attitude and treatment protocol, keeping physician motivated. Studying drug prescription pattern can be a powerful tool in evaluating performance and assisting the healthcare system to design educational programs.^[3] Bronchial asthma is a serious global health problem. Its burden in developing countries is slowly rising.^[4] Fast modernization, increasing air pollution, rapid urbanization, westernized diet and decreased exercise and have modified the traditionally low incidence of bronchial asthma in the developing countries.^[5] Prescription pattern of bronchial asthma vary amongst clinicians. There are more than 40 different guidelines available for Bronchial asthma

Management.^[6] Global Initiative for Asthma, National Asthma Education and Prevention Program and British Thoracic Society guidelines have provided basis for developing these guidelines.^[7,8,9] In developing countries prescription pattern in Bronchial Asthma depends upon the socio-economic conditions rather than evidence based guidelines.^[4] Poor health education, low access to medical facilities, high prices of effective drugs has complicated the magnitude of problem. Hospitalization of bronchial asthma in developing countries is higher than developed countries. Nepal where poverty, poultry, pets and pollutions are present in every household, exacerbation of the disease in asthmatic patients is very frequent. The present study aimed to assess the drug prescription pattern in bronchial asthma therapy so as to know the variability of usage and study the link between the evidence and clinical practice in Nepal.

METHODS

This study is a retrospective analysis of case records from the medical record section of B.P.Koirala Institute of Health Sciences, Dharan, Nepal. All the clinician diagnosed cases of bronchial asthma admitted in the medical ward over the period of three years were reviewed. Complete demographic profile was recorded along with co morbidities in a structured proforma.

Patients were categorized by socio-economic status into low, middle and high. Patients living in mud houses were categorized into low socio economical class, patients living in cemented houses were categorized into middle and administrators and employers were categorized into high class. Patients who had completed primary education were classified as literate.

All the drugs prescribed during the hospital stay and discharge sheets were recorded along with the formulation, date of starting and stopping the drugs. Completed data set was profiled using Microsoft Excel Worksheet 2013, and analyzed by simple descriptive statistics using the SPSS Software 16 version.

RESULTS

There were 114 patients of which 67(58.8%) were female and 47(41.2%) male. Majority of patients were from age group 46 to 55 (24.6%) years and the median age of the patients was 46.48 years. The demographic details of the patients are as shown in table 1 and 2.

39(34.21%) patients had some form of co-morbidity in form of Hypertension, diabetes, Cushing syndrome, Rheumatoid arthritis and Systemic Lupus Erythematosus.

27(23%) patients had history of allergic rhinitis and 19(16%) had family history of bronchial asthma. The average duration of admission of bronchial asthma patients were 5.18 days.

All the admitted patients with bronchial asthma received nebulization with Salbutamol and Ipratropium Bromide. Four patients couldn't tolerate Salbutamol nebulization due to palpitation. Monotherapy with single drug was not prescribed to any patients.

Beta 2 agonists and corticosteroids were the most frequently prescribed medications in all form of formulation during admission and discharge with

114(100%) and 105(92.1%) patients respectively. Salbutamol as a rescue therapy in Metered Dose Inhaler (MDI) form was prescribed in 68(59.6%) patients and in Dry Powder Inhaler (DPI) and tablet form in 22(19.2%) and 8(7%) patients respectively.

Over all Salmeterol was prescribed in 56(49.12%) of the patients. Different formulation of Salmeterol is shown in figure 1.

Single formulation of Formeterol was not used. Formeterol was combined with Budesonide in MDI or DPI form. However Budesonide was prescribed as single molecule also. Overall prescription of Budesonide was in 37(32.45%) patients out of which 16(14%) patients were prescribed along with Formeterol. Different formulation of Budesonide as single and combined therapy is shown in Figure 2.

Beclomethasone was prescribed in 21(18.4%) patients as MDI and 3(2.6%) patients as DPI form.

Out of 44 patients using Fluticasone, 5(4.3%) patients were prescribed single Fluticasone in MDI form rest were in combination with Salmeterol in MDI or DPI.

Different forms and frequencies of systemic steroid are shown in figure 3.

32 (28.07%) patients received oral Prednisolone after intravenous Hydrocortisone and 11(0.9%) patients received oral Prednisolone after intravenous Methylprednisolone. 3(2.6%) patients were prescribed oral Methyl Prednisolone after intravenous Methylprednisolone.

Different Anticholinergic agents in MDI and DPI form are shown in figure 4.

Magnesium Sulphate in intravenous form was used in 7(6.1%) patients. Methylxanthines was prescribed in 52(45.6%) cases, 30(26%) patients with Doxophylline and 22(19.2%) patients in Theophylline form.

Antihistamines and Montelukast were prescribed in 60(52.56%) and 27(23.62%) respectively.

In our study 84(73.6%) patients received antibiotics in either intravenous or oral form.

Table 1: Distribution of patients according to age group.

Age groups (years)	Male N=47(%)	Female N=67(%)	Total N=114(%)
(16-25)	7(6.1)	11(9.6)	18(15.8)
(26-35)	5(4.4)	9(7.9)	14(12.3)
(36-45)	8(7.0)	13(11.4)	21(18.4)
(46-55)	13(11.4)	15(13.2)	28(24.6)
(56-65)	6(5.3)	4(3.5)	19(16.8)
(66-75)	6(5.3)	2(1.8)	10(8.8)
≥76	2(1.8)	2(1.8)	4(3.5)

Table 2: Demographic profile of the patients.

Sex	Education		Marital status		Smoking		Alcohol consumption			Socioeconomical status		
	Literate N=64(%)	Illiterate N=50(%)	Married N=92(%)	Unmarried N=22(%)	Yes N=45(%)	No N=69(%)	Yes N=21(%)	No N=86(%)	Occasional N=7(6.1%)	Low N=53(%)	Middle N=60(%)	High N=1(%)
Male	30(26.3)	17(14.9)	39(34.2)	14(12.3)	25(21.9)	22(19.3)	18(15.8)	24(21.1)	5(4.4)	20(17.5)	27(23.7)	0(0)
Female	34(29.8)	33(28.9)	53(46.5)	8(7)	20(17.5)	47(41.2)	3(2.6)	62(54.4)	2(1.8)	33(28.9)	33(28.9)	1(0.9)

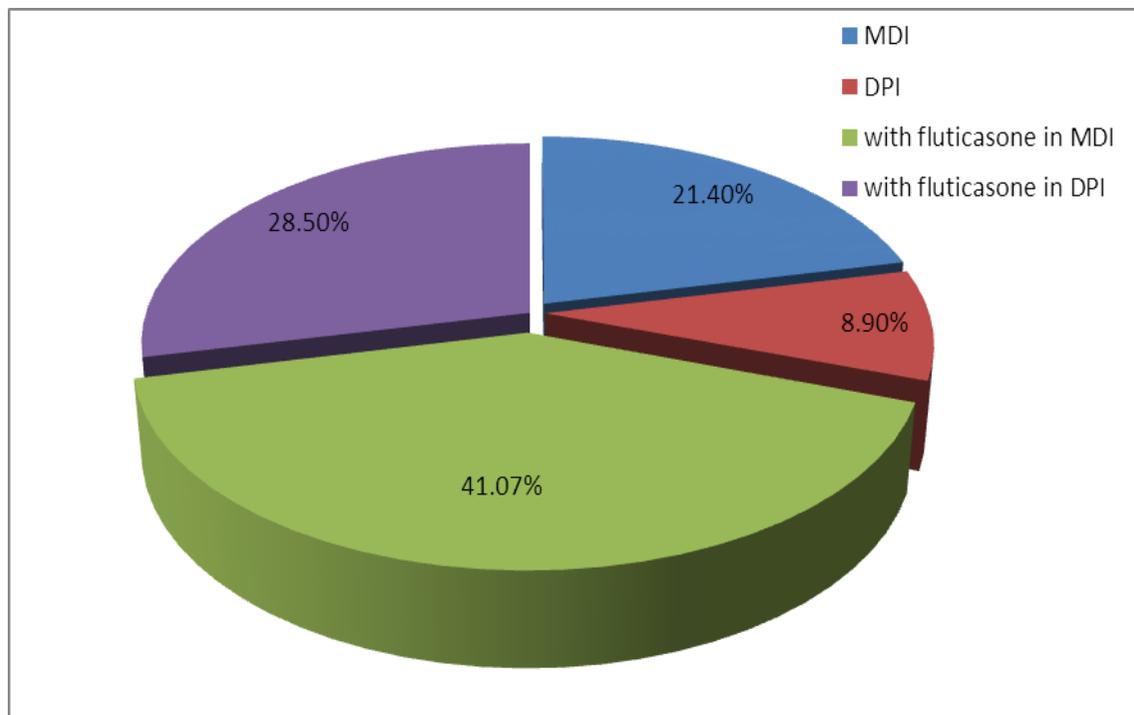


Figure 1: Different formulation of salmeterol Aerosol.

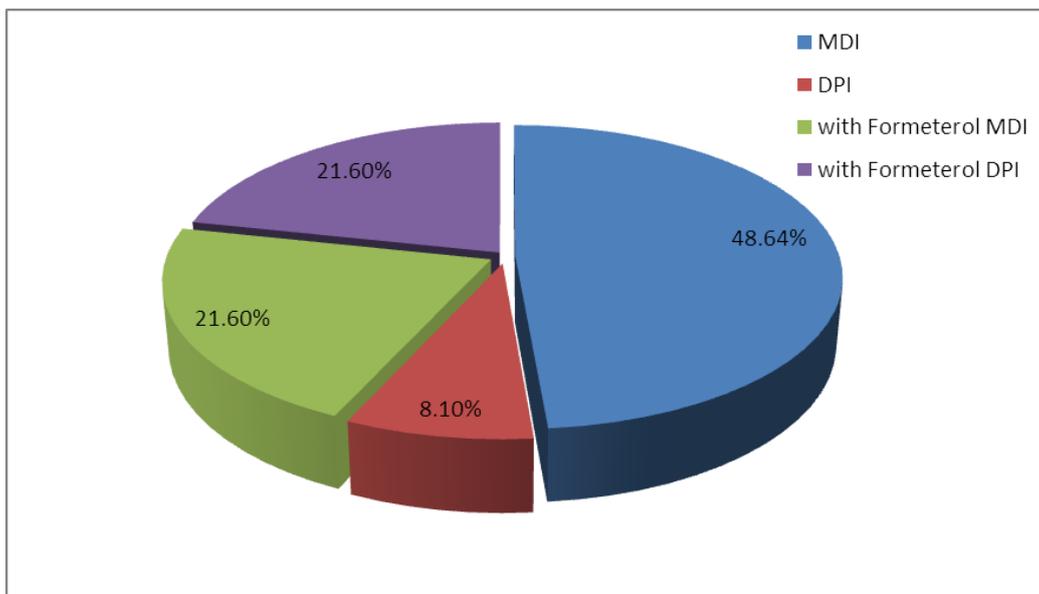


Figure 2: Different Formulation of Budesonide aerosol.

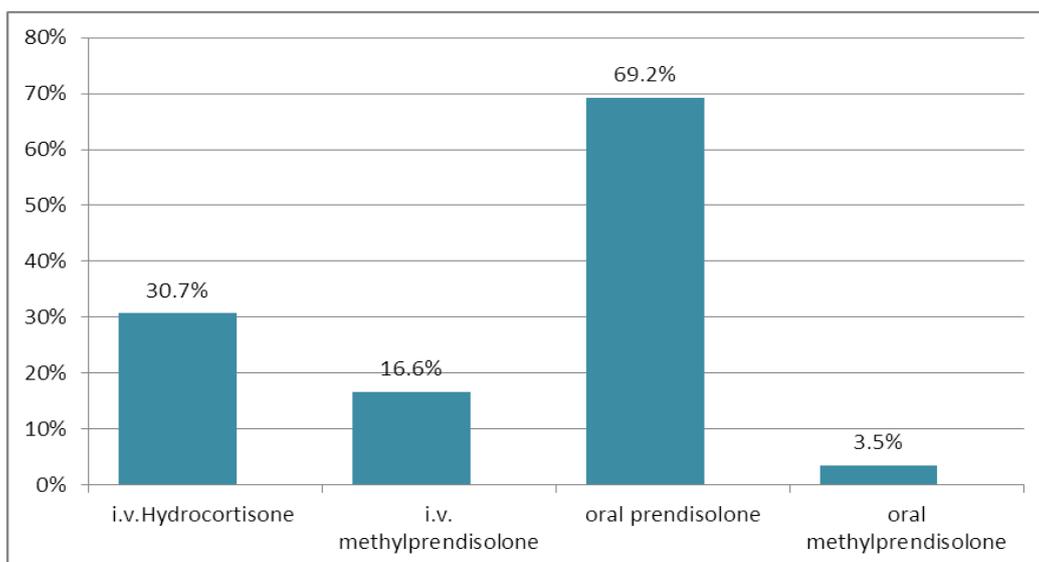


Figure 3: Different forms and frequency of systemic steroids.

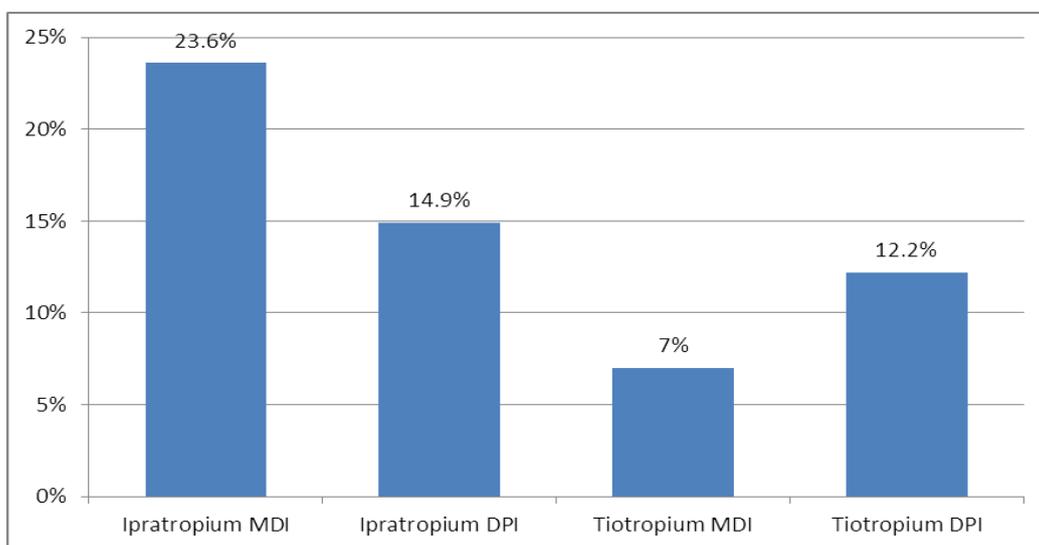


Figure 4: Different Anticholinergic agents in aerosol forms.

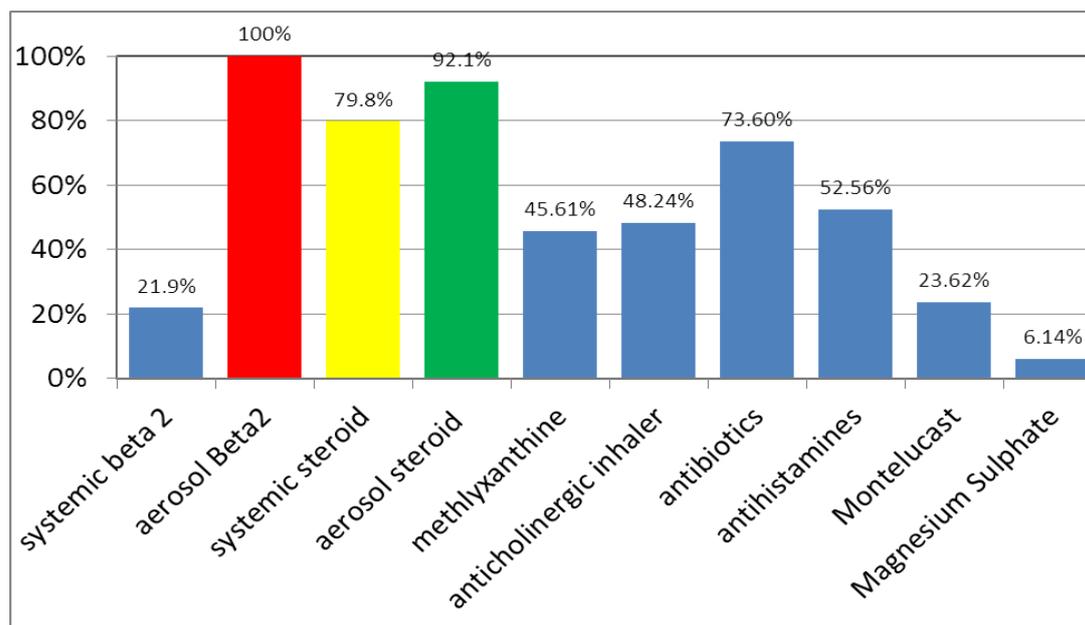


Figure 5: Different classes of drugs prescribed.

DISCUSSION

Short acting beta 2 agonist, Salbutamol combined with Anticholinergic drug, Ipratropium Bromide in nebulized form were used in every patients admitted with Bronchial Asthma in our hospital. Salbutamol when used in nebulized form reaches lung directly and acts within 3-5 minute with a peak at 15-20 minutes so it is used when quick relief of symptomatic breathlessness and wheezing is present.^[7] Combining nebulized Ipratropium Bromide with a nebulized beta 2 agonist produces significantly greater bronchodilation than beta 2 agonist alone.^[9] However Anticholinergic treatment is not necessary and may not be beneficial in milder exacerbations of asthma or after stabilization.^[9] In our study 48.2% of patients were prescribed Anticholinergics in either MDI or DPI forms after the patients were stable. The frequency of Anticholinergic drugs in our study is higher than in other studies.^[10,11,12] The patients requiring Anticholinergics drugs were mostly of older age group and had long history of asthma. 4 of our patients developed palpitation due to beta 2 action in heart so only Ipratropium Bromide was used for nebulization in such patients.^[9]

Our study showed that beta 2 agonist and glucocorticoids were the most commonly prescribed drugs in the management of Bronchial Asthma. Linking the evidence, glucocorticoids are currently the most effective anti-inflammatory mediators for the treatment of asthma.^[7] Studies have demonstrated their efficacy in reducing asthma symptoms, improving quality of life, improving lung function, decreasing airway hyper-responsiveness, controlling airway inflammation, reducing frequency and severity of exacerbations and reducing asthma mortality.^[7] Inhaled steroids should be started and continued as early as possible. Inhaled steroids reduce the requirement of beta 2 agonist and their earlier use have shown better the outcome in acute attacks.^[9] In our

study beta 2 drugs were prescribed along with glucocorticoid aerosols. Only in 8 patients were beta 2 agonists prescribed without glucocorticoids. Currents recommendations of different guidelines have discouraged the use of aerosol beta 2 agonist alone in the long term management of bronchial asthma as they do not influence the airway inflammation in asthma.^[7,8,9]

Another important finding in our study was the frequent use of fixed combination of glucocorticoids and long acting beta 2 drugs as MDI or DPI in 48.2%. Controlled studies have shown that delivering this therapy in combination is as effective as giving each drugs separately.^[7] Fixed combinations drugs are more convenient for patients, helps to increase compliance and ensures that beta 2 agonists are always accompanied by glucocorticoids.

Systemic steroid in either oral or intravenous form were prescribed in 79.8% of patients. Systemic steroid are anti-inflammatory agents used in acute exacerbations and in moderate to severe persistent asthma.^[7] Montelukast was the most common oral drug prescribed in the studies carried out by Mohammed Maazuddin et al,^[2] and T. Rajathilagam et al.^[13] In our study, it was used in 23.6% of patients. This could be because most of the patients admitted were presented in an acute exacerbation and Monlelukast is not recommended in the management of acute exacerbation of asthma besides decreased ability and high cost may be another factor for its infrequent use.

Methylxanthines in our study was used in 45.6% of the patients. In the study carried out by R.D. Shimpi et al.^[3] Methylanthines was the most commonly prescribed drug in bronchial asthma. Methyxanthines are widely available in lower costs. They also have anti-

inflammatory effect on airways for which they can be a suitable add-on drug in bronchial asthma.^[7]

The role of antihistamines in Bronchial Asthma is debatable. No clear conclusion regarding its use in Asthma has been made. Meta-analysis of clinical trials carried out by Van Ganse on "Effect of antihistamines on Asthma" does not support its use.^[14] British Thoracic Society and NAEPP guidelines are also against the use of antihistamines in Asthma. In our study 52.56%, half of the patients had received antihistamines. The use of antihistamines in our patients was not as an add-on therapy for controlling symptoms of Bronchial Asthma but was used for other reasons like concomitant allergic rhinitis or urticarial rashes.

At present Magnesium Sulphate is used only during exacerbations not responding to standard treatments with beta 2 agonists and steroids.^[7] Magnesium Sulphate was used in 7(6.14%) patients with severe bronchospasm and most of the patients were admitted in Intensive Care Unit.

Prescribing antibiotics in asthma is considered to be irrational.^[15] In our study 84(73.68%) patients had received antibiotics in either oral or intravenous form. The use of antibiotics seems to be fully justified in our context in developing country like Nepal where infection is one of the prime cause for exacerbation. Besides Macrolide antibiotics is also found to have anti-inflammatory effect on bronchial asthma.^[16]

The use of Metered Dose Inhaler was more frequently prescribed than Dry Powered Inhalers. Even though there is no clear advantage of one type of device over the other, MDI were preferred because they are small, portable and can be used quickly. There is also greater chance of drug particles aggregation and contamination in the device of DPI.

CONCLUSION

This study thus concludes that the drug prescription pattern in bronchial asthma admitted in BPKIHS was according to the evidence based on various guidelines. However there is still much room for improvement. There is need to encourage physicians to follow strict asthma guideline to bring uniformity and quality in asthma prescription. This study may help to bring awareness by providing feedback to the physicians to adhere to guidelines during prescribing drugs.

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