Research Article

A prospective study on prescribing pattern of pulmonary inhalers in inpatient at a tertiary care hospital, case study Baptist hospital, Bangalore, Karnataka

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Abstract

Keywords

Inhaler usage,
Steps for inhaler usage,
adherence.

Objective: To study on prescribing patterns of pulmonary inhalers in inpatient at a tertiary care hospital. **Methods:** The proper inhalation technique was assed using the questionnaires, there were 11 steps for MDI and 12 steps for MDI + spacer each correct technique carried a score of 1 and wrong technic carried. The adherence to the inhaler technique was assed using the formula correct dose/incorrect dose*100 and the reasons for non adherence was also noted. The therapeutic inappropriateness of prescribed inhalers and antiasthmatic drugs is determined with standard guidelines. The cost involved in use of inhalers in therapeutic inappropriateness also considered. **Results:** In our study population about 10.8% asthmatics and 20% COPD patients were prescribed with budesonide MDI. About 10% asthmatics and 9.1 COPD patients were prescribed with budesonide MDI+spacer. About 4.1% asthmatics and 2.5% copd patients were prescribed with salbutamol MDI. About 17% asthmatics and 10% copd patients were prescribed with mdi ipratropium and 8% asthmatics and 12.5% copd patients were prescribed with ipratropium MDI+spacer. When the knowledge regarding the usage of inhalers was assed using standard questionnaire which had 11 steps for MDI and 12 steps for MDI+spacer each questionnaire had scoring of 0 representing not performing the step, 1 representing following the step the scores were high after pharmacist intervention when compared to before pharmacist intervention. **Conclusion:** The present results highlight the need for pharmacist interventions aimed at improving adherence to inhalers in copd and asthmatic patients.

Introduction

Asthma is one of the most common chronic diseases in the world. Asthma morbidity and mortality is increasing in a number of developed countries. Based on American Health Interview Survey sample (2009), it has been found that 39.9 million Americans and including 7.1 million children were diagnosed with asthma. Asthma is also common in industrialized nations such as Canada, England, Australia, Germany and New Zealand with higher data of the prevalence rate ranges from 2% to 10% of asthma collected from these countries. Factors affecting this disease include urbanization, air pollution, passive smoking, and also allergens. As being reported in a Malaysia's Ministry of Health Second National Health and Morbidity Survey (1997), the prevalence of asthma among adults is 4.1% in the population. In the same study, it was also reported that asthma prevalence is higher in rural area (4.5%) than in urban areas (4.0%). Both the Global initiative for Asthma (GINA) and the Global Initiative for Chronic Obstructive Lung Disease(GOLD) suggest that the correct use of inhalers

is an important feature in preventing exacerbations of both asthma and COPD. Several studies have shown that poor use of the inhaler device is a main feature in poorly controlled disease. The pMDI is one of the most commonly used devices in management of asthma and COPD. This can unfortunately be difficult for patients to use and even with repeated demonstration and assessment some patients will still find co-ordination of the whole technique challenging, failing to master it despite repetition. A study performed locally states that 244 asthmatic patients (from a population of >400,000) presented to the emergency department with an acute exacerbation of asthma over a 10 month period, from January to October, of which 51.6% needed medical admission and8.6% discharged themselves against medical advice. Sub-optimal disease control has a negative impact on patient's quality of life, health care costs and a burden on society. [15]

Materials and Methods

The case charts from inpatient department receiving inhalers will be randomly selected on daily basis and will be reviewed for inhaler therapy. Methods:

A hospital based prospective interventional study is conducted in the Pulmonology department of Bangalore Baptist hospital. Patients diagnosed with COPD/Asthma. The patient demographics and all medically relevant information is noted in a predefined data collection form.

A total of 150 inpatients were included in this study. Prescriptions and treatment chart of inpatients were reviewed prospectively for prescribed patterns of inhalers and anti- asthmatic and COPD drugs. The prescription guidelines, therapeutic guidelines, Micromedex, Medscape and references books will be used as tools to review the prescription and case chart. The admission register will be reviewed for prescription of any inhalers and antiasthmatic and COPD dugs. The case sheet, treatment chart, physician notes will be subjected for capturing any information related to the study.

All medically relevant information were noted in a predefined data collection form. Alternatively, these case charts were reviewed for prescription of inhalers and antiasthmatic drugs. The demographic data and the detailed history of patient regarding past, present, family, personal and drug history was taken. The other details like the present diagnosis, reason for the present admission, any investigations done to confirm the diagnosis were also noted.

Also found drug interactions of inhalers and antiasthmatic drugs and drug selection, dosage forms, route, frequency, indication were also studied. The proper inhalation technique was assed using the questionnaires there were 11 steps for MDI and 12 steps for MDI + spacer each correct technique carried a score of 1 and wrong technic carried.

The adherence to the inhaler technique was assed using the formula correct dose/incorrect dose*100 and the reasons for nonadherence were also noted.

The therapeutic inappropriateness of prescribed inhalers and antiasthmatic drugs is determined with standard guidelines. The changes and the daily notes in the case sheets were followed until the patient is discharged. The cost involved in use of inhalers in therapeutic inappropriateness also considered. All data was timely updated and analysed by using suitable software.

Results and Discussion

In our study out of 120 patients 53.3% were diagnosed with COPD and 46.7% were asthmatic, out of which 31.6% were men 15% females were asthmatics and 48.3% males and 5% female were of COPD. 14.1% males and 7.5% female asthmatics were of the age group 46-64 years. 19.1% males and 0.8% females of COPD were of the age group 46-64 years. Highest number of patient's i.e. 18.3% males, 9.1% female asthmatics, 23.3% males and 3.3% female asthmatics had the disease ranging from 1-10 years. Among asthmatic patients 7.5% male were smokers and 3.3% men were alcoholic. Among COPD patients 26.6% men were smokers and 5.8% men were alcoholics.In our study population about 10.8% asthmatics and 20% COPD patients were prescribed with budesonide MDI. About 10% asthmatics and 9.1 COPD patients were prescribed with budesonide MDI+spacer. About 4.1% asthmatics and 2.5% COPD patients were prescribed with salbutamol MDI. About 17% asthmatics and 10% COPD patients were prescribed with mdi ipratropium and 8% asthmatics and 12.5% COPD patients were prescribed with ipratropium MDI+spacer.

There were 77 drug interactions which were come across in our study population out of 8.3% males and 2.5% females are found to have interaction with theophylline+azithromycin which leads to QT prolongation which was highest.

In our study adherence to inhaler therapy was assessed by using the formula correct dose/incorrect dose*100 and the following were the adherence % for the inhaler drugs budesonide mdi80% among both male and female asthmatics 86% males and 55% females were prescribed with budesonide mdi among COPD. 76.7% males and 83.4% female's asthmatics are prescribed with budesonide MDI+spacer 86% males and 84.9% females COPD patients are prescribed with MDI+spacer.

The reasons for non-adherence were noted where 6.6% were not adherent due to high cost of medicine 0.8% due to lack of access to hospital drug store, 4.1% due to fear of side effects, 10% felt better and stopped, 1.6% forgotten / occupational problems, 3.3% lack of family support, 5% didn't adhere due to fear of becoming dependent on treatment.

When the knowledge regarding the usage of inhalers was assessed using standard questionnaire which had 11 steps for MDI and 12 steps for MDI+spacer each questionnaire had scoring of 0 representing not performing the step, 1 representing following the step the scores were high after pharmacist intervention when compared to before pharmacist intervention.

The cost burden of Asthma and COPD on patients is assessed where budesonide MDI costs around 350-450 INR, ipratropium bromide MDI around 50-100 INR, o2 inhaler 500-900 INR. Salbutamol+ipratropium MDI 200-300INR, salmeterol MDI 100-200 INR. Among MDI+spacer budesonide costs 400-500 INR, ipratropium bromide 250-350 INR, salbutamol 250-350 INR.

When the knowledge regarding the usage of inhalers was assed using standard questionnaire which had 11 steps for MDI and 12 steps for MDI+spacer each questionnaire had scoring of 0 representing not performing the step, 1 representing following the step the scores were high after pharmacist intervention when compared to before pharmacist intervention (Table 1).

Table 1: Study of inhalers adherence among the study population

Type of inhalers	Dose recommended per day	Asthma (adherence %)		COPD (Adherence %)	
		Male (%)	Female (%)	Male (%)	Female (%)
Budesonide *MDI*	0.5-1mg 2times	(80)	(80	(86)	(55)
Ipratropium bromide *MDI*	34mcg 4 times	(52.9)	(26.4	(58.6)	(56.1)
O2 inhaler *MDI*	1 puff	(100	(96)	(94)	(100)
Salbutamol *MDI*	180-216mcg	(92.5)	(86.3)	(95	(91.2)
Salmetrol *MDI*	50-250mg 2 times	(90)	(89.7)	(98.2)	(93.6)
Budesonide *MDI+spacer*	0.5mg 2 times	(76.7)	(83.4)	(86)	(84.9)
Ipratropium bromide *MDI+spacer*	34mcg 4 times	(54.8)	(56.1)	(48.3)	(33.6)
salbutamol *MDI+spacer*	180-216mcg	(95.6)	(93.8)	(91.6)	(96.1)

In our study adherence to inhaler therapy was assessed by using the formula correct dose/incorrect dose*100 and the following were the adherence % for the inhaler drugs budesonide mdi80% among both male and female asthmatics 86% males and 55% females were prescribed with budesonide mdi among copd. 76.7% males and 83.4% female's asthmatics are prescribed with budesonide mdi+spacer 86% males and 84.9% females COPD patients are prescribed with mdi+spacer(Table 6, Fig 2). In a retrospective study by thamby SA et al. on drug utilization pattern in

asthmatics it is seen that the study focused on both smoker and non smoker asthmatics. It was observed that salbutamol was most commonly prescribed, followed by montelukast and prednisolone. In the combination therapy, the most commonly prescribed was Symbicort, followed by seretide and combivent. Corticosteroids constituted the most prevalent class, followed by beta-2 agonists, leukotriene modifiers and methylxanthines.The study presented the most recent scenario on drug utilization pattern of asthmatics in Kedah state10.

The reasons for non-adherence were noted where 6.6% were not adherent due to high cost of medicine 0.8% due to lack of access to hospital drug store, 4.1% due to fear of side effects, 10% felt better and stopped, 1.6% forgotten / occupational problems, 3.3% lack of family support, 5% didn't adhere due to fear of becoming dependent on treatment (Table 7, Fig 3). In a similar study by Fugate AR on medication adherence in COPD and asthma patients it was found that The major reported reasons to stop/miss medication were felt better and stopped (64.81%) because asthma and COPD has symptomatic treatment, so whenever feel better they stop the medicine, forgetfulness (55.55%), expensive (42.59%) and lack of access to drug store/hospital (31.48%). Other minor reasons were lack of family support/Motivation, fear of side effects, feel non beneficial. The same reasons were reported in previous studies[6].

The cost burden of Asthma and COPD on patients is assessed where budesonide MDI costs around 350-450 INR, ipratropium bromide MDI around 50-100 INR, o2 inhaler 500-900 INR. Salbutamol+ipratropium MDI 200-300INR, salmeterol MDI 100-200 INR. Among MDI+spacer budesonide costs 400-500 INR, ipratropium bromide 250-350 INR, salbutamol250-350 INR (Table 8). In a study by sakan S et al on inhaler used in hospitalized COPD and asthma patients it was found that The majority of patients were receiving a short-acting beta2 agonist inhaler, a long-acting beta2 agonist inhaler, and an ICS prior to admission. Also, 60% of patients were receiving a long-acting anticholinergic inhaler at home prior to hospitalization. One third of patients were reported as current smokers. The mean length of hospital stay was 5 days. Per their hospital formulary, inhalers are dispensed as multidose MDI/DPI as follows: albuterol = 60 inhalations; ipratropium = 120 inhalations; tiotropium = 5 inhalation capsules; formoterol =12 inhalation capsules; fluticasone = 120 inhalations; budesonide/formoterol = 60 inhalations; fluticasone/salmeterol = 14 inhalations. The majority of patients (97%) included in the study received nebulized albuterol (total doses = 8,081) } ipratropium (total doses = 6,755). Our results show that the percentage of wasted doses was remarkable. Of the total MDI or DPI doses dispensed, 87% were wasted, at an estimated hospital cost of $86,973. For example, 93% of budesonide/ formoterol doses were wasted, resulting in an estimated hospital cost of $41,021. Also, 98% of the dispensed doses of MDI albuterol and fluticasone were wasted[13].

Conclusion

The present results highlight the need for pharmacist interventions aimed at improving adherence to inhalers in COPD and asthmatic patients.
Overall medication adherence and inhaler technique improvement was found to be statistically significant in asthma and COPD patients after counseling by pharmacist.
The major reasons for medication non-compliance were felt better and stopped, high cost of medication, forgetfulness and lack of access to drug store/hospital.

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