STUDY ON PRESCRIBING PATTERN OF PULMONARY INHALERS IN INPATIENTS AT TERTIARY CARE TEACHING HOSPITAL, INDIA

Bita Bagheri *[1], Dr.s.Ramachandran [2], Vida Bagheri [3], Mobina dokhaei [4]

Abstract

Objective: The study aimed to study on prescribing pattern of pulmonary inhalers in inpatients at Tertiary Care Teaching Hospital, India.

Methodology: It is a prospective observational study conducted in the inpatient department at a Tertiary Care Teaching Hospital. Asthma or COPD patients were randomly recruited over six months from the ward's clinics. The inhalation technique was assessed utilizing the questionnaires there were 11 steps for MDI and 12 steps for MDI + spacer each correct technique conveyed a score of 1 and the wrong technic conveyed 0. The adherence to the inhaler technique was assessed utilizing the recipe correct dose/incorrect dose*100 and the purposes behind nonadherence were additionally noted.

Result: In our study out of 120 patients 53.3% were diagnosed with COPD and 46.7% were asthmatic 10.8% aas theremmatrics and 20% of COPD patients were endorsed with budesonide MDI. About 10% of asthmatics and 9.1 COPD patients have endorith budesonide MDI+ spacer. About 4.1% of asthmatics and 2.5% COPD patients were endorsed with salbutamol MDI. About 17% of asthmatics and 10% Cof OPD patients were endorsed with MDI ipratropium and 8% of asthmatics and 12.5% of COPD patients were recommended with ipratropium MDI+ spacer. At the point when the knowledge concerning the use of inhalers was surveyed utilizing a standard questionnaire, which had 11 steps for MDI and 12 steps for MDI+ spacer every questionnaire had scoring of 0 addressing not playing out the progression, 1 addressing following the progression of the scores were high after pharmacist intervention when contrasted with before pharmacist intervention

Conclusion: The current outcomes feature the requirement for pharmacist interventions pointed toward improving adherence to inhalers in COPD and asthmatic patients.

Keywords: adherence, chronic obstructive pulmonary disease, Inhalers, Asthma

[1,3,4] Doctor of Pharmacy, Department of Pharmacy Practice, GIET School of Pharmacy, Andhra University, India

[2] Professor and Head, Department of Pharmacology, GIET School of Pharmacy, Andhra University, India

[1*] Email: *Bitabagheri37@yahoo.com*

2 Email: *ramachandran@giet.ac.in*

3Email: *vida.bagheri18@gmail.com*

4Email: *Mobina.do1998@gmail.com*

https://orcid.org/my-orcid?orcid=0009-0001-8524-5511

https://orcid.org/my-orcid?orcid=0009-0004-4116-3436

https://orcid.org/my-orcid?orcid=0009-0004-9014-1989

https://orcid.org/0000-0002-4474-8964

Eur. Chem. Bull. 2022, 11(12), 3049 - 3056

3049

Introduction

asthma is maybe the most well-known continuous disorder in the world. Asthma repulsiveness and mortality are increasing in different created countries. In light of the American Health Interview Survey sample (2009), it has been tracked down that 39.9 million Americans and including 7.1 million children were diagnosed with asthma. Asthma is moreover ordinary in industrialized countries, for instance, Canada, Britain, Australia, Germany, and New Zealand with higher information of prevalence rate goes from 2% to 10% of asthma assembled from these countries. Factors influencing this illness incorporate urbanization, air contamination, inactive smoking, and allergens. [1] As accounted for in Malaysia's Service of Health Second Public Health and Bleakness Survey (1997), the prevalence of asthma among grown-ups is 4.1% in the populace. In a similar report, it was likewise revealed that asthma prevalence is higher in rustic regions (4.5%) than in metropolitan regions (4.0%). WHO announced that COPD positioned fourth from 136 illnesses being surveyed with 3 million deaths that year.[2] This measurement incorporates 6 WHO areas including Africa, America, East Mediterranean, Europe, South-East Asia, and Western Pacific locale, WHO additionally assessed around 64 million individuals have moderate to serious COPD. 3,000,000 individuals died from COPD in 2005 and this added to 5% of all death all through the world. In 2006, COPD is the fourth driving reason for death in the U.S., with a death rate of 39.9 per 100,000. It was additionally tracked down that more women (63,006) than men (57,970) died because of COPD. [3]

Patient adherence can be defined as the extent to which an individual's conduct concurs with health-related exhortation and the capacity of the patient to go to facility arrangements as scheduled, accept meds as endorsed, make conceivable lifestyle changes, and complete prescribed investigations.[4] Adherence to pharmacologic therapy has been accounted for to be low among patients with Chronic Obstructive Pulmonary Disease (COPD) and related to helpless guess. At present, little is thought about the extent and management of adherence problems among patients with constant bronchitis and emphysema.[5] In persistent wind current deterrent various classes of medications are regularly utilized in combination, and regimens requiring different everyday doses of every agent. The subsequent dose schedules are frequently very complex. It has been viewed as that complex treatment regimens should bring about helpless compliance.[6] Asthma is a common and chronic condition characterized by reversible airflow obstruction, airway inflammation, and increased airway responsiveness to a variety of stimuli. Poor asthma control is responsible for a large proportion of the total cost of the disease, and both indirect and direct costs would decrease if control were improved. Poor compliance with prescribed therapy leads to increased morbidity and mortality. Studies have announced that half of the patients with persistent sickness including asthma don't utilize their medicine or don't utilize it as prescribed.[7] There is a checked variety in remedial compliance from complete adherence to not exactly a fourth of the recommended doses of breathed-in prophylactic agents in asthma.[8]

METHODOLOGY

a hospital-based prospective interventional study is conducted in the Pulmonology department at tertiary care hospital, India. Patients diagnosed with COPD/Asthma. The patient demographics and all therapeutically relevant information is noted in a predefined data assortment structure. A sum of 150 inpatients was remembered for this study. Prescriptions and treatment graphs of inpatients were

explored tentatively for endorsed patterns of inhalers and anti-asthmatic and COPD drugs. The prescription guidelines, restorative guidelines, Micromedex, Medscape, and reference books will be utilized as devices to audit the prescription and case diagram. The confirmation register will be explored for the prescription of any inhalers and anti-asthmatic and COPD drugs. The case sheet, treatment graph, and physician notes will be oppressed for catching any information related to the study. All restoratively relevant information was noted in a predefined data assortment structure. On the other hand, these case outlines were investigated for the prescription of inhalers and anti-asthmatic medications. The demographic data and the nitty-gritty history of the patient in regards to past, present, family, individual, and medication history were taken. Different subtleties like the current finding, justification for the current confirmatiand on, and any examiare done to affirm the determination were likewise noted. Additionally, discovered medication associations of inhalers and anti-asthmatic medications and medication choice, measurement structures, course, recurrent and ceand ,

Eur. Chem. Bull. 2022, 11(12), 3049 - 3056

3050

indicwasn were likewise contemplated. The legitimate inhalation techniassessedas assed utilizing the questionnaires there were 11 steps for MDI and 12 steps for MDI + spacer each correct technique conveyed a score of 1 and the wrong technic conveyed. The adherence to the inhaler technique was assessed utilizing the equation correct dose/incorrect dose*100 and the explanations behind nonadherence were additionally noted. The helpful unseemliness of recommended inhalers and antiasthma spasm drugs is byrmined with standard guidelines. The progressions and the daily notes in the case sheets were followed until the patient is discharged. The cost involved in the use of inhalers in therapeutic inappropriateness is also considered. All data was timely updated and analyzed by using suitable software.

RESULT 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% were guys and 5% female were of COPD. 14.1% guys and 7.5% female asthmatics were of the age bunch 46-64 years. 19.1% guys and 0.8% females with COPD were of the age bunch 46-64 years. The highest number of patients for example 18.3% male, 9.1% female asthmatics, 23.3% male, and 3.3% female asthmatics had the illness going from 1-10 years. Among asthmatic patients, 7.5% male were smokers, and 3.3% of men were heavy drinkealcoholole. Among COPD patients 26.6% of men were smokers and 5.8% of men were alcoholics. Table 1

Table 1: Demographics characteristics of enrolled asthma and COPD patients

Basic variables	Asthma						COPD					
	Male	(%)	Female	(%)	Total	(%)	Male	(%)	Female	(%)	Total	(%)
No. of patients enrolled in the study	38	(31.6)	18	(15)	56	(46.7)	58	(48.3)	6	(5)	64	(53.3)
No. of patients completed a study	38	(31.6)	18	(15)	56	(46.7)	58	(48.3)	6	(5)	64	(53.3)
Age in years 18-45 46-64 >65 Subtotal	8 17 13 38	(6.6) (14. 1) (10.8) (31.66)	3 9 6 18	(2.5) (7.5) (5) (15)	11 26 19 56	(9.1) (21.6) (15.8) (46.6)	16 23 19 58	13.3) (19.1) (15.8) (48.3)	2 1 3 6	(1.6) (0.8) (2.5) (5)	18 24 22 64	(15) (20) (18.3) (53.3)
Duration of disease(year) <1 1-10 ≥11 Subtotal	7 22 5 34	(5.8) (18.3) (4.1) (28.3)	6 11 1 18	(5) (9.1) (0.8) (15)	13 33 6 52	(10.8) (27.5) (5) (43.3)	11 28 19 58	(9.1) (23.3) (15.8) (48.3)	21 4 1 26	(17.5) (3.3) (0.8) (21.6)	32 32 20 84	(26.6) (26.6) (1.6) (70)

Eur. Chem. Bull. 2022, 11(12), 3049 - 3056

3051

Social habits											
Smoker	9	(7.5)	0	(0)	9	(7.5)	32	(26.6)	0		32	(26.6)
alcoholic	4	(3.3)	0	(0)	4	(3.3)	7	(5.8)	1	(0.8)	8	(6.6)

Table 2: Usage pattern of inhalers in the study population

Class of drug	Name of the drug	Dosage form	Asthma (n=56)						COPD (n=64)					
			M	(%)	F	(%)	Total	(%)	M	(%)	F	(%)	Total	(%)
corticosteroids	budesonide	MDI	12	(10)	1	(0.8)	13	(10.8)	23	(19.1)	1	(0.8)	24	(20)
		NEBULIZER	4	(3.3)	0	(0)	4	(3.3)	2	(1.6)	0	(0)	2	(1.6)
		MDI+SPACER	9	(7.5)	3	(2.5)	12	(10)	7	(5.8)	4	(3.3)	11	(9.1)
Beta 2 agonists	salbutamol	MDI	4	(3.3)	1	(0.8)	5	(4.1)	3	(2.5)	0		3	(2.5)
Leukotriene modifiers	Montelukast	Tablet	36	(30)	9	(7.5)	45	(37.5)	7	(5.8)	2	(1.6)	9	(7.5)
Methyl xanthanes	Theophylline	Tablet	86	(7.16)	5	(4.1)	91	(0.7)	30	(25)	4	(3.3)	34	(28.3)
Mucolytics	Guaifenesin	Syrup	2	(1.6)	4	(3.3)	6	(5)	5	(4.1)	2	(1.6)	7	(5.8)
Antihistamine	Cetirizine	Tablet	12	(10)	1	(0.8)	13	(10.8)	2	(1.6)	1	(0.8)	3	(2.51)
Anticholinergics	Ipratropium bromide	MDI	17	(14.1)	0	(2.5)	17	(14.1)	10	(8.3)	2	(1.6)	12	(10)
		MDI+SPACER	5	(4.1)	3		8	(6.6)	14	(11.6)	1	(0.8)	15	(12.5)

In our study populace, about 10.8% of asthmatics and 20% COPD patients were prescribed with budesonide MDI. About 10% of asthmatics and 9.1 COPD patients have been endorsed with budesonide MDI+ spacer. About 4.1% of asthmatics and 2.5% of COPD patients were endorsed salbutamol MDI. About 17% of asthmatics and 10% COPD patients were prescribed MDI ipratropium and 8% of asthmatics and 12.5% COPD patients were endorsed with ipratropium MDI+spacer.table2

Table 3: Study of inhalers adherence among the study population

Type of inhalers	The recommended dose per day	Asthma (adherence %)		COPD (Adherence %)	
		Male (%)	Female (%)	Male (%)	Female (%)
Budesonide *MDI*	0.5-1mg 2 times	(80)	(80	(86)	(55)
Ipratropium bromide *MDI*	34mcg 4 times	(52.9)	(26.4	(58.6)	(56.1)

Eur. Chem. Bull. 2022, 11(12), 3049 - 3056

3052

O2 inhaler **MDI**	1 puff	(100	(96)	(94)	(100)
Salbutamol **MDI**	180-216mcg	(92.5)	(86.3)	(95	(91.2)
Salmeterol **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 evaluated by utilizing the equation correct dose/incorrect dose*100 and coming up next were the adherence % for the inhaler drugs budesonide mdi80% among both male and female asthmatics 86% male and 55% females were endorsed with budesonide MDI among COPD. 76.7% of male and 83.4% of female asthmatics are endorsed with budesonide MDI+ spacer 86% of male and 84.9% of females COPD patients are prescribed with MDI+ spacer. table 3

Table 4: Self-reported reasons for non-adherence to inhalers

Reasons	Number of patients	(%)
High cost of medication	8	(6.6)
Lack of access to the hospital drugstore	1	(0.8)
Fear of side effects	5	(4.1)
Felt better and stopped	12	(10)
Nonbeneficial	0	
Forgotten/occupational problems	2	(1.6)
Lack of family support/motivation	4	(3.3)
Fear of becoming dependent on treatment	6	(5)

The reasons for non-adherence were noted where 6.6% were not a follower because of significant expense of medication 0.8% because of the absence of admittance to clinic pharmacy, 4.1% because of dread of results, 10% felt much improved and halted, 1.6% neglected/word related problems, 3.3% absence of family support, 5% didn't cling because of dread of getting reliant upon treatment. table 4

Adherence to the drug in COPD is vital for advancing clinical results, and nonadherence brings about significant health and financial weight. Imperfect adherence is basic among COPD patients and results from a complex transaction of prescription, patient, and supplier factors. Adherence could be improved by utilizing worked-on treatment regimens, increasing patient knowledge about self-management, and upgrading supplier abilities in patient education, communication, and adherence advising. The challenge of adherence is determining acceptable levels of adherence and simple, but reliable devices to measure adherence. Given the various inhalers accessible to treat COPD, electronic screens to assess these drugs have not at this point been developed. Clinical preliminaries utilizing electronic checking, along these lines, should be directed to examine the achievability of adherence interventions, their impacts on clinical results, and the solidness of results[10, 12].

Table 5: Assessment of information on inhaler use in the examinatof ion asthma and COPD patients

Eur. Chem. Bull. 2022, 11(12), 3049 - 3056

3053

before pharmacist intervention

No. of patients preferred correctly						
Questionnaire	**Male (n=96)**	**(%)**	**Female (n=24)**	**(%)**	**Total**	**(%)**
Shake vigorously	88	(73.3)	17	(14.1)	105	(90.8)
Remove cap	92	(76.6)	19	(15.8)	111	(92.5)
Hold upright	95	(79.1)	17	(14.1)	112	(93.3)
Breathe out gently	86	(71.6)	16	(13.3)	102	(85)
Start breathing in slowly and deeply	77	(64.1)	16	(13.3)	93	(77.5)
Actuate during inspiration	89	(74.1)	20	(16.6)	109	(90.8)
Continue slow inhalation	89	(74.1)	19	(15.8)	108	(90)
Release in spacer and inhale	85	(70.8)	19	15.8)	104	(86.6)
No aerosol loss is visible	82	(68.3)	19	(15.8)	101	(84.1)
Hold your breath for 10 seconds	78	(65)	15	(12.5)	93	(77.5)
Next dose after 1 minute	89	(74.1)	17	(14.1)	106	(88.3)
` Rinse out mouth after using	22	(18.3)	7	(5.8)	29	(24.1)

Table 6: Assessment of information on inhaler use in examination of asthma and COPD patients after pharmacist intervention

No. of patients preferred correctly						
Questionnaire	**Male (n=96)**	**(%)**	**Female (n=24)**	**(%)**	**Total**	**(%)**
Shake vigorously	97	(80.8)	22	(18.3)	119	(99.1)
Remove cap	97	(80.8)	23	(19.1)	120	(100)
Hold upright	94	(78.3)	23	(19.1)	117	(97.5)
Breathe out gently	95	(79.1)	23	(19.1)	118	(98.3)
Start breathing in slowly and deeply	91	(75.8)	21	(17.5)	112	(93.3)
Actuate during inspiration	95	(79.1)	19	(15.8)	114	(95)
Continue slow inhalation	94	(78.3)	23	(19.1)	117	(97.5)
Release in spacer and	92	(76.6)	22	(18.3)	114	(95)

Eur. Chem. Bull. 2022, 11(12), 3049 - 3056

3054

inhale						
No aerosol loss is visible	88	(73.3)	20	(16.6)	108	(90)
Hold your breath for 10 seconds	90	(75)	21	(17.5)	111	(92.5)
Next dose after 1 minute	95	(79.1)	22	(18.3)	117	(97.5)
` Rinse out mouth after using	39	(32.5)	11	(9.1)	50	(41.6)

In our study adherence to inhaler therapy was evaluated by utilizing the equation correct dose/incorrect dose*100 and coming up next were the adherence % for the inhaler drugs budesonide mdi80% among both male and female asthmatics 86% guys and 55% females were endorsed with budesonide MDI among COPD. 76.7% of male and 83.4% of female asthmatics are endorsed with budesonide mdi+spacer 86% mof ale and 84.9% of females COPD patients are prescribed with mdi+spacer(Table 5). In a review study by Thamby SA et al. on drug utilization patterns in asthmatics, it is seen that the study zeroed in on both smoker and nonsmoker asthmatics. It was seen that salbutamol was most generally prescribed, trailed by montelukast and prednisolone. In the combination therapy, the most regularly prescribed was Symbicort, trailed by Seretide and Combivent. Corticosteroids comprised the most predominant class, trailed by beta-2 agonists, leukotriene modifiers, and methylxanthines. The study introduced the latest situation onthe drug utilization pattern of asthmatics in Kedah state11.

The reasons for non-adherence were noted where 6.6% were not disciple because of significant expense of medication 0.8% because of the absence of admittance to emergency clinic pharmacy, 4.1% because of dread of results, 10% felt much improved and halted, 1.6% neglected/word related problems, 3.3% absence of family support, 5% didn't hold fast because of dread of getting dependent on treatment (Table 6). 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 feeling better and stopped (64.81%) because asthma and COPD have 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 nonbeneficial. The same reasons were reported in the previous studies[9].

CONCLUSION

The present outcomes feature the requirement for pharmacist interventions pointed toward improving adherence to inhalers in COPD and asthmatic patients. By and large drug adherence and inhaler technique improvement were discovered to be measurably significant in asthma and COPD patients in the wake of directing by a pharmacist. The huge reasons for medication rebelliousness were feeling good and halted, the significant expense of medication, absent-mindedness, and absence of admittance to the pharmacy/emergency clinic.

REFERENCES

1) Melani, A. S. (2021). Inhaler technique in asthma and COPD: challenges and unmet knowledge that can contribute to suboptimal use in real life. Expert Review of Clinical Pharmacology, (just-accepted).

2) World Health Organization. Geneva, Switzerland: World Health Organization; 2008. The global burden of disease: 2004 update. Tech.

3) Foley, D. A., Yeoh, D. K., Minney-Smith, C. A., Martin, A. C., Mace, A. O., Sikazwe, C. T., ... & Blyth, C. C. (2021). The Interseasonal Resurgence of Respiratory Syncytial Virus in Australian Children Following the Reduction of Coronavirus Disease 2019–Related Public Health Measures. Clinical irresistible illnesses: an authority distribution of the Infectious Diseases Society of America.

4) Mahesh, P. A., Parthasarathi, G.,

Eur. Chem. Bull. 2022, 11(12), 3049 - 3056

3055

Parthasarathi, G., Hansen, K. N., & Nahata, M. C. (2004). Medication adherence, Textbook of clinical pharmacy practice, essential concepts and skills. Parthasarathi G, Hansen KN, Nahata MC, Orient Longman, Pvt Ltd, 54-71.

5) Dolce, J. J., Crisp, C., Manzella, B., Richards, J. M., Hardin, J. M., & Bailey, W. C. (1991). Medication adherence patterns in chronic obstructive pulmonary disease. Chest, 99(4), 837-841.

6) James, P. N., Anderson, J. B., Prior, J. G., White, J. P., Henry, J. A., & Cochrane, G. M. (1985). Patterns of drug taking in patients with chronic airflow obstruction. Postgraduate Medical Journal, 61(711), 7-10.

7) Lindberg, M., Ekström, T., Möller, M., & Ahlner, J. (2001). Asthma care and factors affecting medication compliance: the patient's point of view. International Journal for Quality in Health Care, 13(5), 375-383.

8) Yeung, M., O'Connor, S. A., Parry, D. T., & Cochrane, G. M. (1994). Compliance with prescribed drug therapy in asthma. Respiratory medicine, 88(1), 31-35.

9) Fugate, A. R., Kadam, A. M., & Ganachari, M. S. (2015). Prospective study of medication adherence pattern in chronic obstructive pulmonary disease and asthma patients in a tertiary care teaching hospital. Indian Journal of pharmacy practice, 8(2), 79.

10) Lareau, S. C., & Yawn, B. P. (2010). Improving adherence with inhaler therapy in COPD. International journal of chronic obstructive pulmonary disease, 5, 401.

11) Thamby, S. A., Juling, P., Xin, B. T. W., & Jing, N. C. (2012). Retrospective studies on drug utilization patterns of asthmatics in a Government hospital in Kedah, Malaysia. International Current Pharmaceutical Journal, 1(11), 353-360.

12) Arab, A., Thomas, S. M., Koneri, D. R., & Talank, N. (2016). A prospective study on prescribing pattern of pulmonary inhalers in inpatient at a tertiary care hospital, case study Baptist hospital, Bangalore, Karnataka. Int. J. Adv. Multidiscip. Res, 3(6), 117-121.

Eur. Chem. Bull. 2022, 11(12), 3049 - 3056

3056