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A Prospective Study on Prescribing Pattern of Pulmonary Inhalers in Obstructive Lung Disease and Assessment of Common Errors in Inhalation Techniques in A Tertiary Care Hospital

			
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ABSTRACT

Background: The errors in inhalational technique and poor adherence has led to the rise and recurrence of obstructive lung disease. This project aims at studying the prescribing pattern of pulmonary inhalers in obstructive lung disease and assessment of common errors in inhalation techniques in a tertiary care hospital. **Objectives:** To study the prescribing pattern of pulmonary inhalers in obstructive lung disease, To assess the errors in inhalation techniques, To evaluate the adherence to inhalers in pulmonary patients, To assess patient acceptance. **Methods:** A prospective observational 6 month study was conducted after obtaining approval from IEC, various checklist and questionnaire were used to conduct the study in patients selected on the basis of inclusion and exclusion criteria. **Results;** COPD patients were more prescribed with formoterol+fluticasone MDI with spacer and asthmatics with salmeterol + fluticasone MDI with spacer. Comparing to users of MDI with spacer, multi dose dry powder inhaler and single dose dry powder inhaler, patients using MDI with spacer more often showed an incorrect inhalation technique 86%(43/50) followed by patients using multi-dose dry powder inhaler 60%(12/20) and single dose dry powder inhaler users 34%(10/30). There was marked improvement in number of patients who have corrected inhalation technique after pharmacist intervention. On comparing the adherence to these inhalers, patients on multiple-dose dry powder inhaler showed good adherence. number of patients showing good adherence increased to (100%) in all inhaler types after the pharmacist intervention. On comparing the level of satisfaction to inhalers, multi-dose dry powder inhaler users showed high level of satisfaction. **Conclusion:** Most of the patients were unable to use the MDI with spacer correctly. Thus there is a need of increased awareness among all health care personnel, on the correct inhaler techniques and also routine checkup of inhaler technique should be done during subsequent patient visits. Adherence to inhalers can be improved by proper counselling by the pharmacist.

INTRODUCTION

Obstructive lung diseases or conditions may be described by onset (acute or chronic), severity (mild, moderate, or severe), and location. Obstructive pulmonary patterns are characterized by decreased airflow out of the lungs as a result of narrowing of the airway lumen. This causes increased dead space and decreased surface area for gas exchange.^[1]

It includes asthma, COPD, bronchiectasis and cystic fibrosis. Inhaled medications are major therapy for bronchial asthma and chronic obstructive pulmonary disease (COPD)^[2,3]. Inhaled therapy has a major advantage where medications are delivered directly into the airways and produces a high local concentration^[4]. It has less risk of systemic adverse effects^[5]. It allows smaller dose to be administered, has faster onset of action^[6,7]. The deposition of the inhaled drug in the lung dependent on the particle size, inhalation technique and the type of the inhaler device ^[8]. Correct inhaler technique is important for the most effective delivery of inhaler drugs. A major limitation to the effective use of inhaled medications is that inability of patients to use inhaler devices correctly^[9]. Patient require appropriate education in the correct handling of inhaled medications. Prescribing physicians, pharmacists, other clinicians, nurses has the responsibility to check and recheck the correctness of the technique during patients initial and follow up visits^[10].

Adherence is defined as “the extent to which a person’s behaviour (in terms of taking medications, following diets, or executing lifestyle changes) coincides with medical or health advice”^[11]. There are three classic types of no adherence to therapy: underuse, overuse, and improper use. Factors related to adherence with inhaled therapy include complexity of the inhalation regimen, peculiarities of inhaler devices, type of inhaled agent, and a variety of patient beliefs and sociocultural and psychological factors^[12]. TAI is a new questionnaire specifically designed to establish self-reported adherence to inhaler devices. Patient satisfaction to inhalers can be determined by FS-I 10 questionnaire.

MATERIALS AND METHODS

A prospective observational 6 month study was conducted in the Department of ENT, Pushpagiri Medical College Hospital, Thiruvalla. The patients with obstructive lung disease who were on inhalers were the study subjects. They were selected on the basis of inclusion and exclusion criteria.

INCLUSION CRITERIA

- IP/OP patients.
- Both male and female patients.
- Those who are able to give informed consent.
- Patients with obstructive lung disease
- Patients on inhalers not less than 2 weeks
- AGE: 18 yrs -70 years

EXCLUSION CRITERIA

- Paediatric patients.
- Patients with psychiatric illness
- Those who are unable to give informed consent.
- The study started after obtaining Institutional Ethics Committee clearance, a written consent taken from the patient in a prescribed format for the patients who met inclusion criteria for the study. The study was implemented by direct interview with the patients. The data are analyzed through patients prescription records and using a patient data collection performa.
- A specially designed patient data collection Performa, standard checklist to assess the inhalation techniques for the MDI with spacer and DPI. Adherence to inhalers are determined through TAI (Test of Adherence to inhalers) 12 item questionnaire. Patient satisfaction with the inhalers are also determined by use of FS-I (Feeling of Satisfaction) -10item questionnaire.
- Patient data collection Performa mainly includes the demographic details of the patient, prescription details, details regarding the inhalers. All necessary and relevant baseline information was collected on a patient data collection Performa. Prescriptions and treatment chart of inpatients were reviewed prospectively for prescribed patterns of inhalers. The

prescription guidelines, therapeutic guidelines and reference books will be used as tools to review the prescription.

- To assess the errors in inhalation technique, the patient using inhalers were asked to take their inhaler device out to show his own technique of inhaler use. Every step and noted the errors according to standard checklist (referred to annexure). Scores 1 and 0 were given for correct and incorrect step. After completion, training and counselling was given to each participant. At the end of the assessment, patients were asked whether they satisfied with their inhaler. Then inhalation technique is assessed again in their follow up visit.
- Adherence to inhalers were assessed by TAI -12 item questionnaire, there are 12 questions, for first 10 questions, there were 5 possible answers. Scores for each response assigned are 1,2,3,4,5 for last 2 questions (11,12), there are only 2 responses which should be answered by checking medical record and inhalation technique. Scores are 1 and 2 respectively, adherence is calculated on the basis of total score of questionnaire. After completion counselling were given and reassessed again in their follow up visit.

50 points - Good Adherence
46- 49 points- intermediate adherence
≤ 45 points - poor adherence

- Patient satisfaction to inhalers are determined by FS-I 10 questionnaire, having 5 responses very, fairly, somewhat, not very, hardly at all of scores 5,4,3,2,1 respectively. The satisfaction is calculated on the basis of the total score.
- 40-50 points = high level
- 10-40 points=intermediate
- Below 10= low level
- The study design selected was an observational prospective study of one month interval follow up. At the beginning of study (1st visit), assessed the inhalation technique, medication adherence and patient satisfaction. During the second visit reassessed the inhalation technique and noted the changes from the first visit. Improvement are determined by comparing the scores obtained using checklist, before and after pharmacist intervention. Also, know which inhalation device users shows more error compared the other.

- The obtained clinical data's statistically analysed through SPSS software version significance was determined using paired T test and chi-square tests.

RESULTS

In the six month study, 100 patients were enrolled as per the inclusion exclusion criteria. The results are as follows.

DEMOGRAPHIC DETAILS

TABLE NO. 1 DISTRIBUTION OF PATIENTS ACCORDING TO AGE

Age	Frequency	Percent	Mean	SD	Minimum	Maximum
20 - 40	19	19.0	54.31	13.76	20	70
41 - 60	38	38.0				
Above 60	43	43.0				
Total	100	100.0				

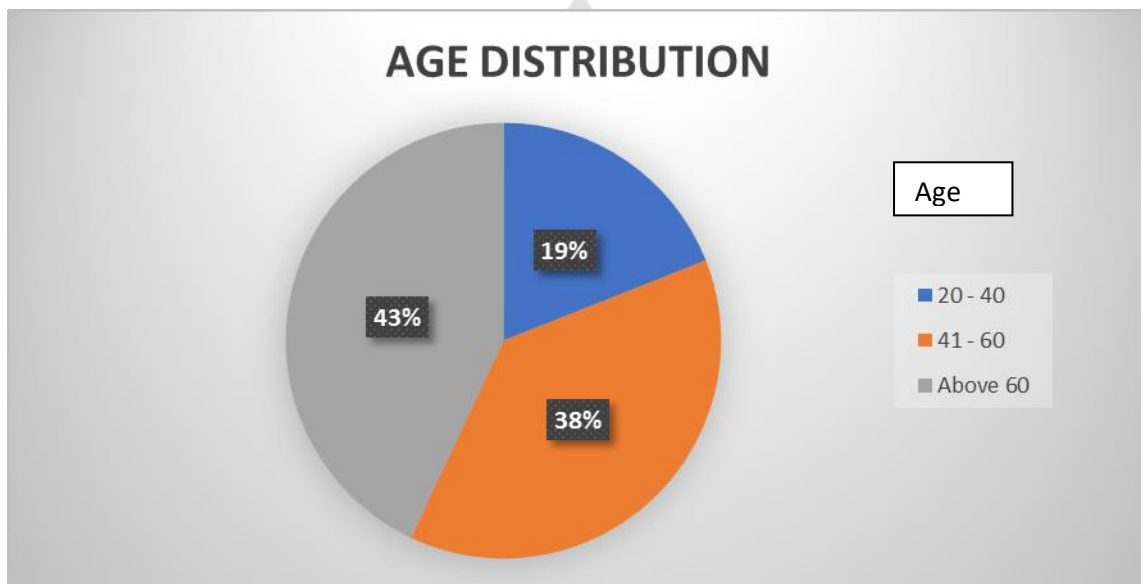


FIGURE NO. 1 DISTRIBUTION OF PATIENTS ACCORDING TO AGE

Table 1 & figure 1 shows majority of patients were in the age group above 60 (43%). The mean age was found to be 54. The maximum and minimum ages included in the study were 70 and 20 respectively.

TABLE NO. 2 DISTRIBUTION OF PATIENTS ACCORDING TO GENDER

Sex	Frequency	Percent(%)
Male	41	41.0
Female	59	59.0
Total	100	100.0

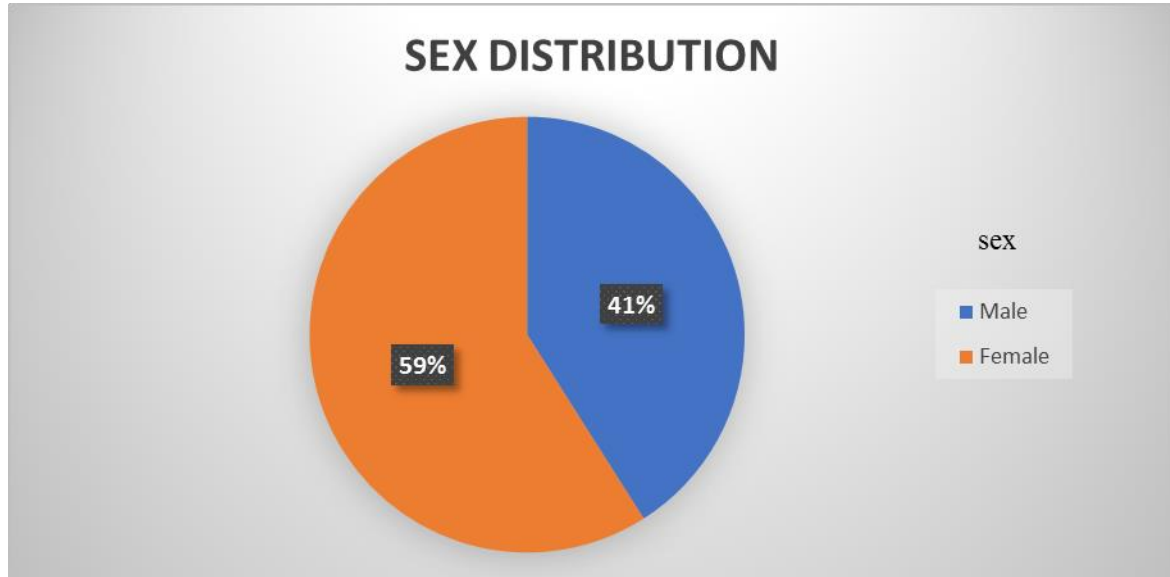


FIGURE NO. 2 DISTRIBUTION OF PATIENT ACCORDING TO GENDER

- In this study, among enrolled patients more number of females 59% were present than males 41%.

TABLE NO. 3 DISTRIBUTION OF PATIENTS ACCORDING TO EDUCATION LEVEL

Education level	Frequency	Per cent (%)
Graduates	66	66.0
Basic education	34	34.0
Total	100	100.0

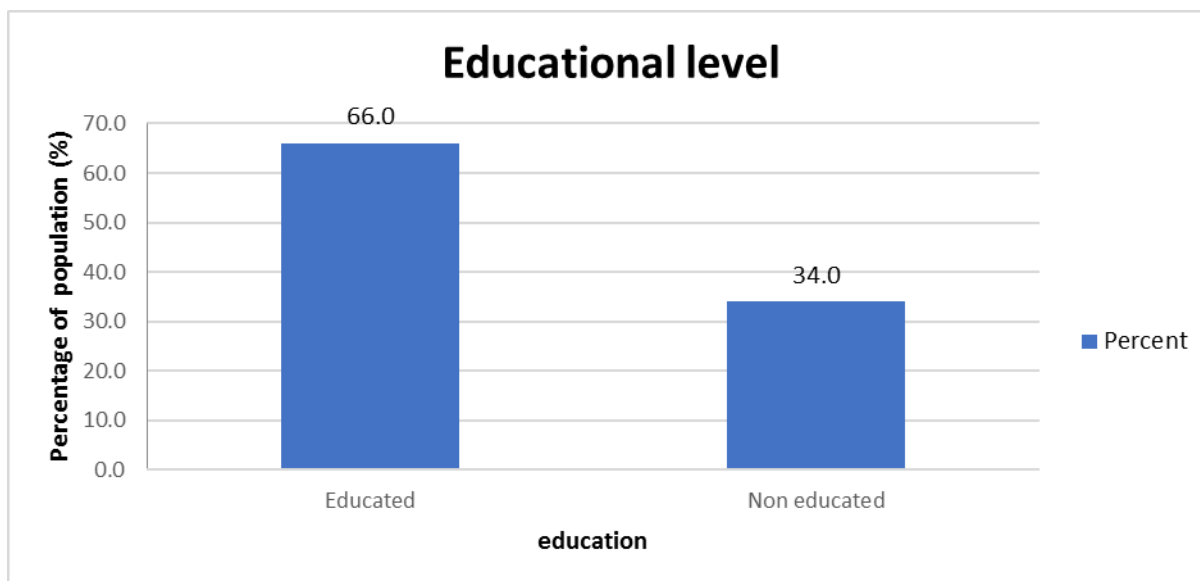


FIGURE NO. 3 DISTRIBUTION OF PATIENT ACCORDING TO EDUCATION LEVEL

- In case of educational level, majority of patients (66%) were educated and the remaining 34% had poor educational qualification

TABLE NO. 4

DISTRIBUTION OF PATIENTS ACCORDING TO ECONOMIC STATUS

Economic status	Frequency	Per cent (%)
Lower middle	10	10.0
Upper middle	90	90.0
Total	100	100.0

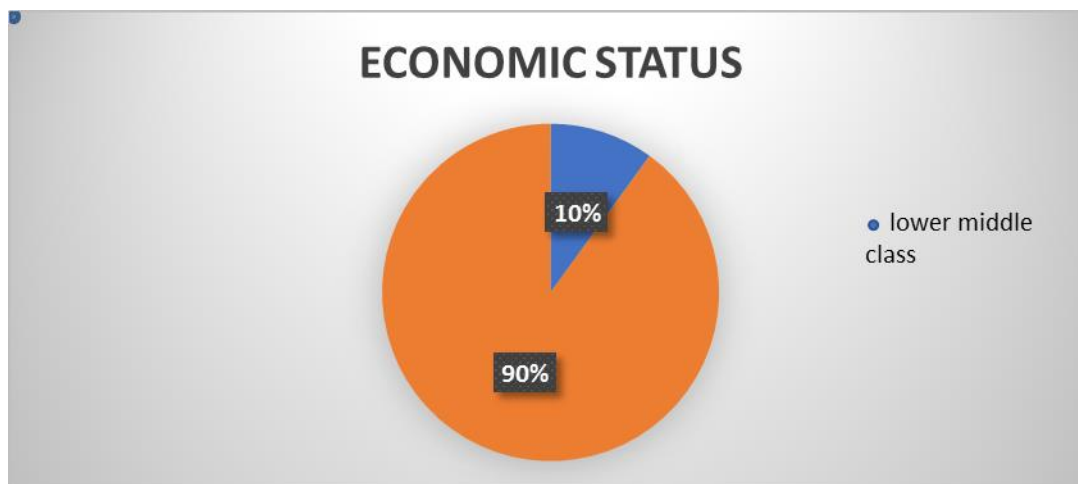


FIGURE NO. 4 DISTRIBUTION OF PATIENT ACCORDING TO ECONOMIC STATUS

- Out of 100 patients, 90% were belonging to upper middle class and remaining 10% fall under lower middle class.

TABLE NO. 5 DISTRIBUTION OF PATIENTS ACCORDING TO DISEASE

Disease	Frequency	Per cent (%)
ASTHMA	55	55.0
COPD	40	40.0
BRONCHITIS	5	5.0
Total	100	100.0

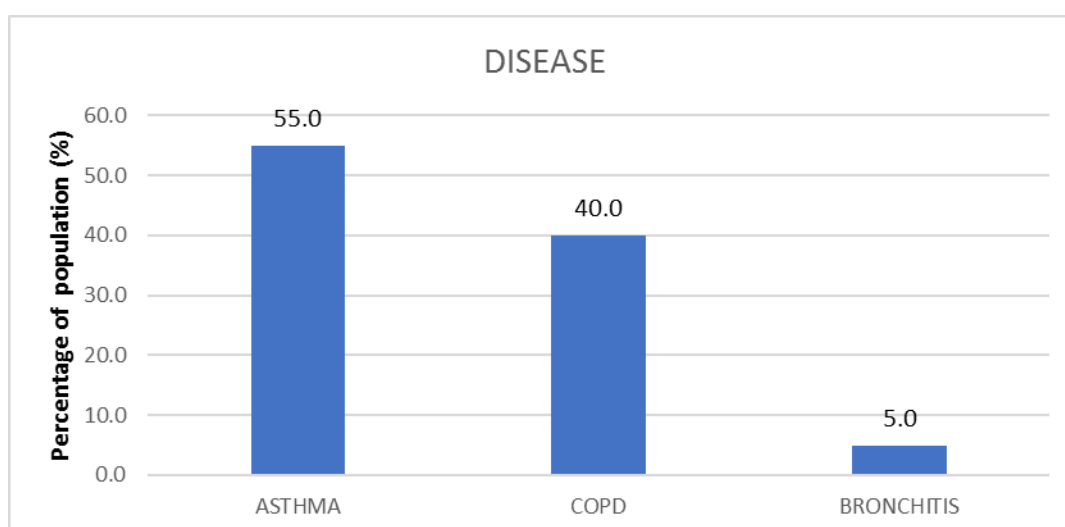


FIGURE NO. 5 DISTRIBUTION OF PATIENT ACCORDING TO DISEASE

- In this study out of 100 patients, 55 % were diagnosed with asthma, 40% with COPD & remaining 5% with bronchitis

TABLE NO. 6 DISTRIBUTION OF PATIENTS ACCORDING TO EXPERIENCE IN USING INHALERS

Experience in using inhalers	Frequency	Per cent (%)
Below 1 year	10	10.0
1 - 2 years	50	50.0
3 - 4 years	27	27.0
5 years or more	13	13.0
Total	100	100.0

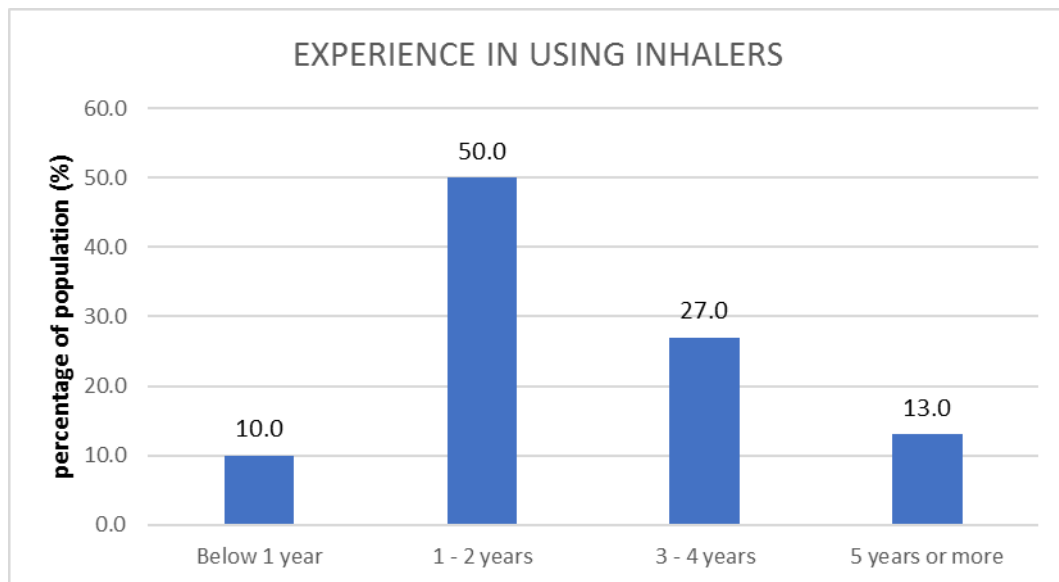


FIGURE NO. 6 DISTRIBUTION OF PATIENT ACCORDING TO EXPERIENCE IN USING INHALERS

- In this study, most patients 50 were using device for 1-2 years. while 27 patients were using it for 3-4 years, 13 patients were using device for more than 5 years and 10 for less than or equal to one year.

TABLE NO. 7 DISTRIBUTION OF PATIENTS ACCORDING TO THE INSTRUCTOR

Instructor	Frequency	Per cent (%)
Physician	9	9.0
Nurse	88	88.0
Junior doctor	3	3.0
Total	100	100.0

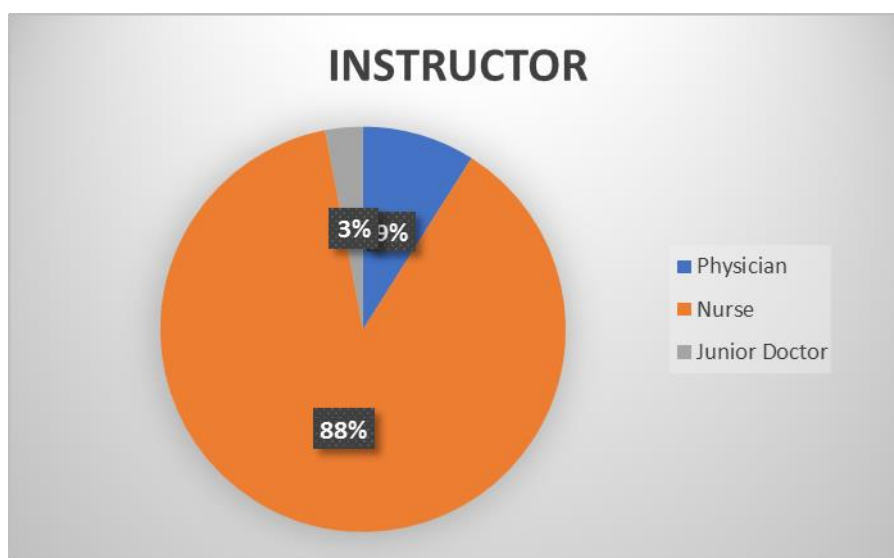


FIGURE NO. 7 DISTRIBUTION OF PATIENT ACCORDING TO THE INSTRUCTOR

- Instruction on inhaler technique was received predominantly from nurse, which account for 88% of patients and about 9% of patients obtained instruction from physician and the remaining 3% from junior doctor

TABLE NO. 8 DISTRIBUTION OF PATIENTS ACCORDING TO MODE OF INSTRUCTION

Mode of instruction	Frequency	Per cent (%)
Oral	55	55.0
Practical Demonstration	45	45.0
Total	100	100.0

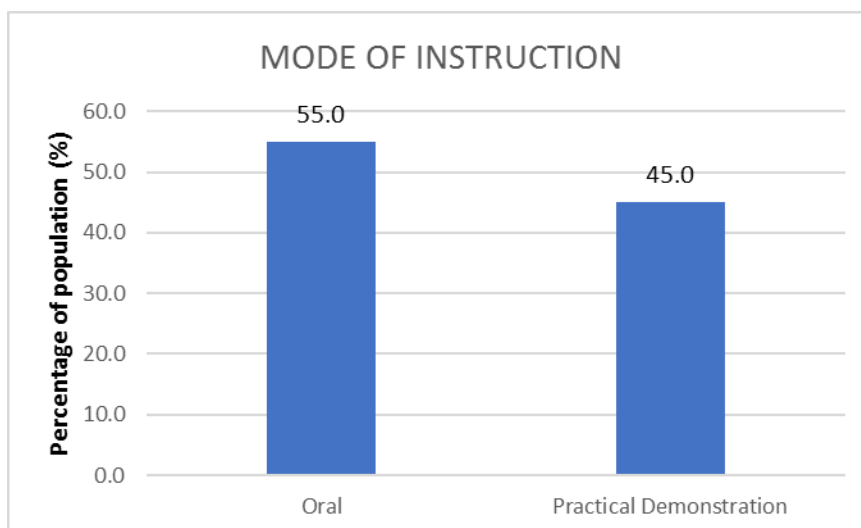


FIGURE NO. 8 DISTRIBUTION OF PATIENT ACCORDING TO MODE OF INSTRUCTION

- On the whole 55% of patients obtained information orally and the remaining 45% by practical demonstration

TABLE NO. 9 DISTRIBUTION OF PATIENTS ACCORDING TO THE FREQUENCY OF INSTRUCTIONS

Frequency instruction	Frequency	Per cent (%)
Once	73	73.0
Twice	27	27.0
Total	100	100.0

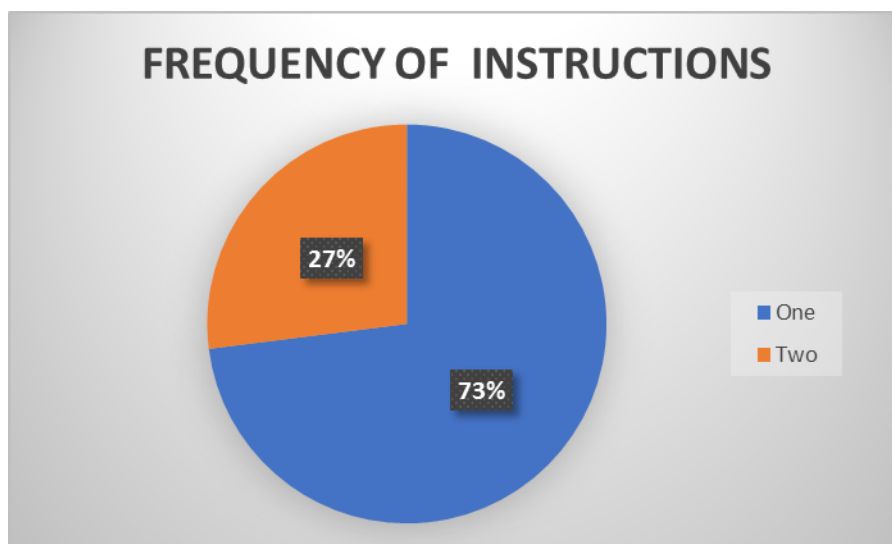


FIGURE NO. 9 DISTRIBUTION OF PATIENT ACCORDING TO THE FREQUENCY OF INSTRUCTIONS

- The data showed that 73% of patients received instructions once and 27% of patients received twice.

TABLE NO. 10 DISTRIBUTION OF PATIENTS ACCORDING TO NUMBER OF INHALATIONAL MEDICATIONS

Number of inhalational medications	Frequency	Per cent (%)
One	85	85.0
Two	12	12.0
Three	3	3.0
Total	100	100.0

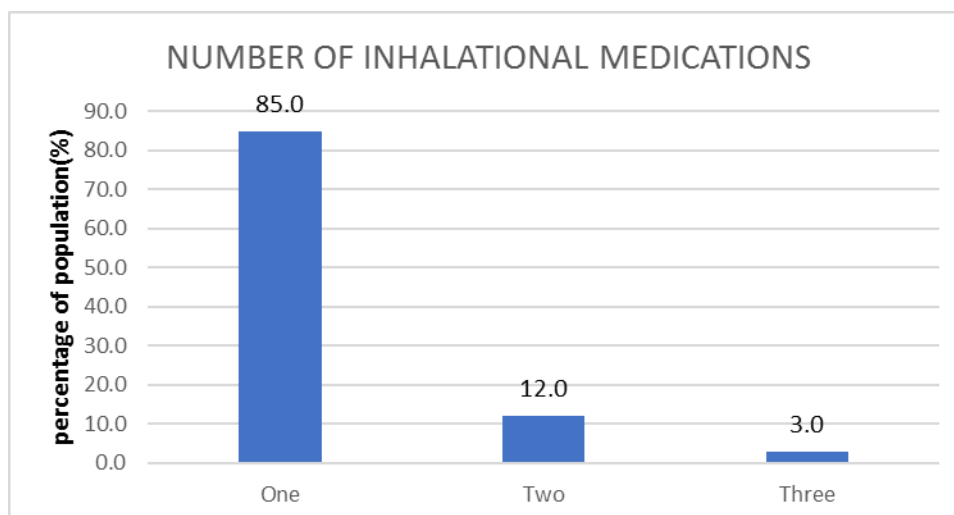


FIGURE NO. 10 DISTRIBUTION OF PATIENT ACCORDING TO NUMBER OF INHALATIONAL MEDICATIONS

- In our study population, 85% of patients were on one inhaler while 12% were on two inhalers and the remaining 3% were on 3 inhalers.

TABLE NO. 11 DISTRIBUTION OF PATIENTS ACCORDING TO TYPE OF INHALATION DEVICE

Type of inhalation device	Frequency	Per cent (%)
MDI with spacer	50	50.0
Type single dose dry powder inhaler	30	30.0
Type multi-dose dry powder inhaler	20	20.0
Total	100	100.0

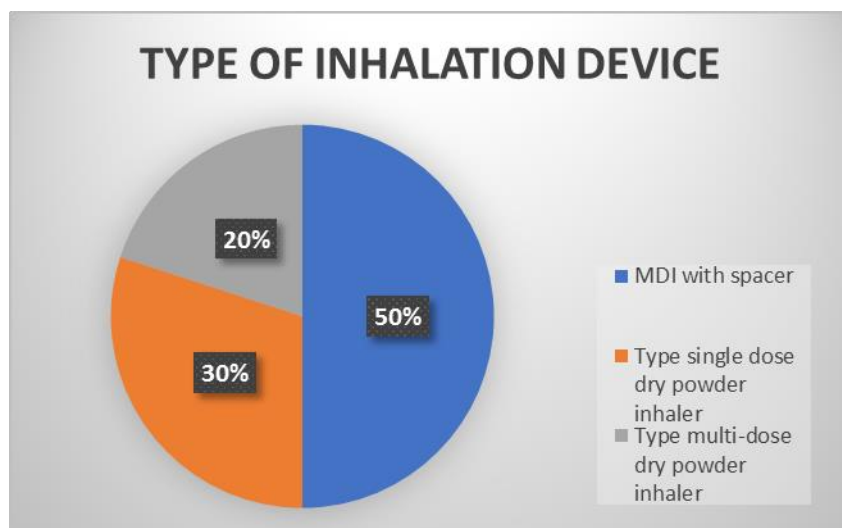


FIGURE NO. 11 DISTRIBUTION OF PATIENT ACCORDING TO TYPE OF INHALATION DEVICE

- MDI users (50%) were the highest among the enrolled population followed by single dose dry powder inhaler users (30%) and multidose dry powder users (20%).

TABLE NO. 12 DISTRIBUTION OF PATIENTS ACCORDING TO SATISFACTION WITH USE OF INHALER

Satisfied with inhaler	Frequency	Per cent (%)
Yes	81	81.0
No	19	19.0
Total	100	100.0

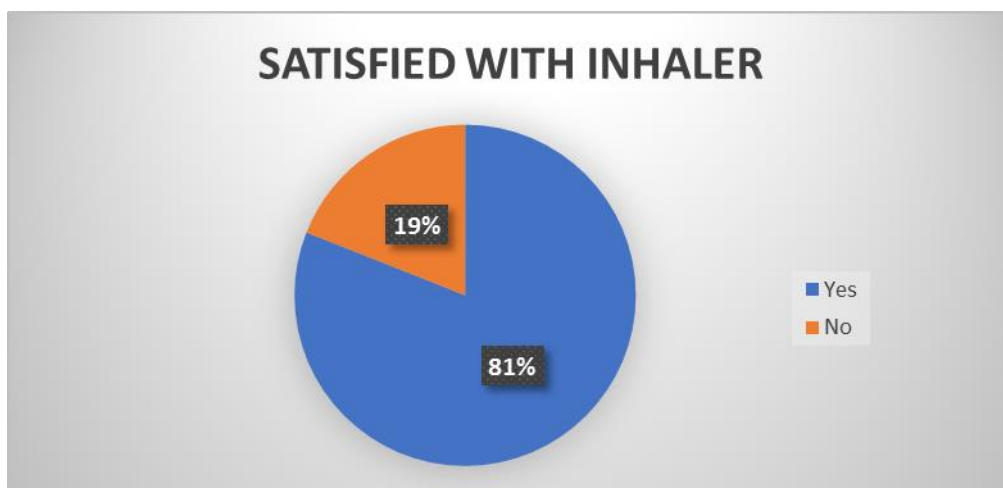


FIGURE NO.12 DISTRIBUTION OF PATIENT ACCORDING TO SATISFACTION WITH USE OF INHALER

- Out of 100, 81% were satisfied with their inhalers and remaining 19% were not.

TABLE NO. 13 DISTRIBUTION OF PATIENTS ACCORDING TO INHALERS PRESCRIBED

SI No	Inhalers prescribed	Frequency	Per cent (%)
1	Formoterol+Budesonide	38	32.48
2	Salmeterol+Fluticasone	31	26.50
3	Formoterol+Fluticasone	28	23.93
4	Tiotropium Bromide	12	10.26
5	Salbutamol+Ipratropium Bromide	5	4.27
6	Salbutamol	2	1.71
7	Fluticasone	1	0.85

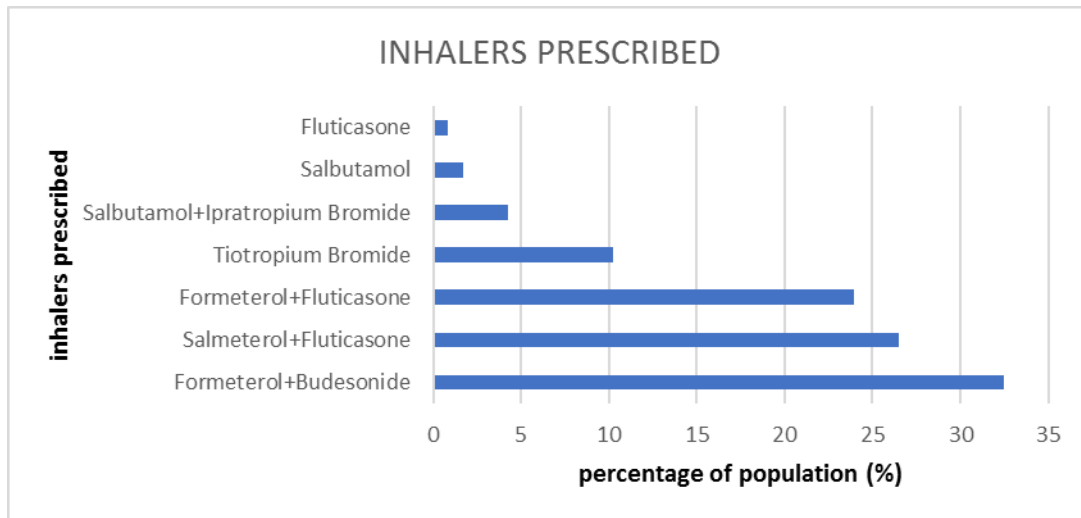


FIGURE NO. 13 DISTRIBUTION OF PATIENT ACCORDING TO INHALERS PRESCRIBED

- Formoterol + budesonide is more frequently prescribed in obstructive lung disease.

TABLE NO. 14; DISTRIBUTION OF PATIENTS ACCORDING TO INHALERS PRESCRIBED AND DISEASE

Sr. No.	INHALERS PRESCRIBED	ASTHMA	COPD	BRONCHITIS
1	Formoterol+Budesonide	19	15	4
2	Salmeterol+Fluticasone	21	9	1
3	Formoterol+Fluticasone	12	13	0
4	Tiotropium Bromide	3	1	0
5	Salbutamol + Ipratropium Bromide	1	3	0
6	Salbutamol	1	1	0
7	Fluticasone	1	0	0

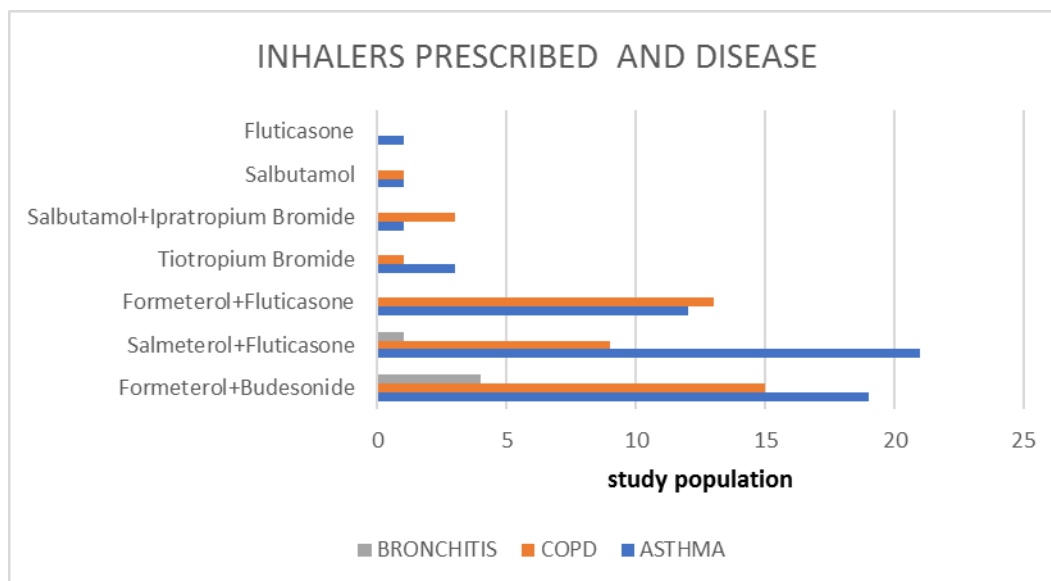


FIGURE NO. 14 DISTRIBUTION OF PATIENT ACCORDING TO INHALERS PRESCRIBED AND DISEASE

- About 34% asthmatics and 37% COPD patients were prescribed with formoterol+budesonide MDI with spacer. About 42% asthmatics and 22% COPD patients were prescribed with salmeterol +fluticasone MDI with spacer. About 24% asthmatics and 32% COPD patients were prescribed with formoterol+fluticasone MDI with spacer

TABLE NO. 15 DISTRIBUTION OF WRONGLY AND CORRECTLY DONE STEPS AMONG MDI USERS BEFORE AND AFTER COUNSELLING

STEPS	MDI WITH SPACER COUNSELLING			
	PRE		POST	
	Incorrect technique	Correct technique	Incorrect technique	Correct technique
STEP 1	11	39	0	50
STEP 2	7	43	1	49
STEP 3	19	31	2	48
STEP 4	8	42	2	48
STEP 5	12	38	3	47
STEP 6	38	12	19	31
STEP 7	9	41	3	47
STEP 8	43	7	2	48
STEP 9	3	47	2	48
STEP 10	39	11	21	29
STEP 11	6	44	6	44
STEP 12	28	22	2	48
STEP 13	9	41	4	46

MDI with spacer score	Mean	Std. Deviation	Mean difference	95% of confidence interval	Paired t value	Df	P value
PRE	8.36	2.46	3.3	2.77 - 3.83	12.509	49	0.001
POST	11.66	1.06					

- Since P-value is less than 0.01, the post score value is significantly increased.
- Mean score of correct inhaler steps of individual patients increased from 8.36 to 11.66 after effective counselling.
- only 14 % (7/50) patients completed correctly the thirteen steps, it increased to 58% (29/50) after effective counsel

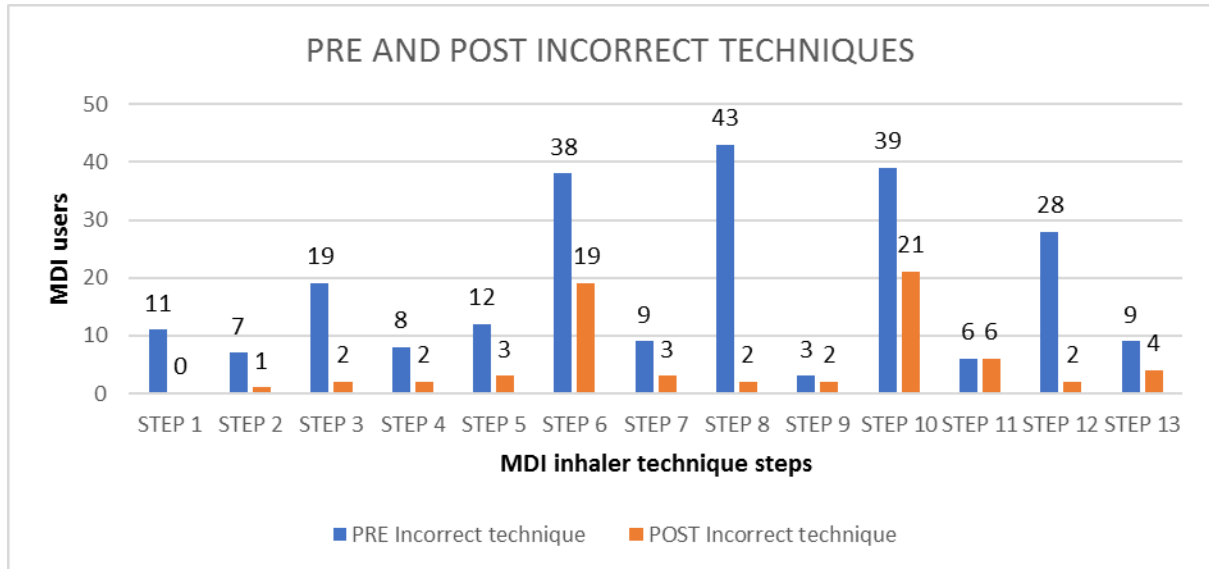


FIGURE NO. 15 DISTRIBUTION OF WRONGLY DONE STEPS AMONG MDI USERS BEFORE AND AFTER COUNSELLING

Figure 15 shows the use of inhaler technique was improved (58%) in MDI users when Compare to the precounselling

TABLE NO. 16 DISTRIBUTION OF WRONGLY AND CORRECTLY DONE STEPS AMONG MULTI-DOSE DPI USERS BEFORE AND AFTER COUNSELLING

STEPS	TYPE MULTI-DOSE DRY POWDER INHALER COUNSELLING			
	PRE		POST	
	Incorrect technique	Correct technique	Incorrect technique	Correct technique
STEP 1	1	19	0	20
STEP 2	0	20	0	20
STEP 3	0	20	0	20
STEP 4	12	8	1	19
STEP 5	0	20	0	20
STEP 6	0	20	0	20
STEP 7	9	11	0	20
STEP 8	4	16	0	20
STEP 9	2	18	2	18
STEP 10	0	20	0	20
STEP 11	0	20	0	20

Type multi-dose dry powder inhaler	Mean	Std. Deviation	Mean difference	95% of confidence interval	Paired t value	df	P value
PRE	9.60	1.09	1.25	0.77-1.73	5.483	19	0.001
POST	10.85	0.37					

- Since P-value is less than 0.01, the post-score value is significantly increased.
- Mean score of correct inhaler steps of individual patients increased from 9.6 to 10.85 after effective counselling.
- only 40% (8/20) patients completed correctly the eleven steps, it increased to 90% (18/20) after effective counselling

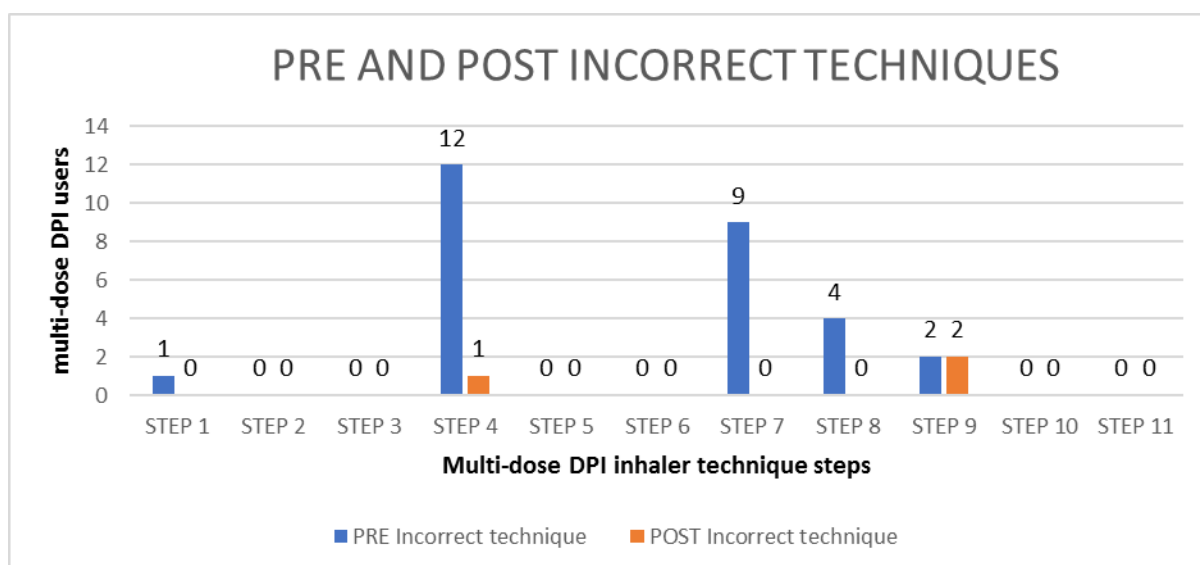


FIGURE NO. 16 DISTRIBUTION OF WRONGLY DONE STEPS AMONG MULTI-DOSE DPI USERS BEFORE AND AFTER COUNSELLING

Figure 16 shows the use of inhaler technique was improved(90%) in multi-dose DPI users When compare to the precounselling.

TABLE NO. 17 DISTRIBUTION OF WRONGLY AND CORRECTLY DONE STEPS AMONG SINGLE- DOSE DPI USERS BEFORE AND AFTER COUNSELLING

STEPS	TYPE SINGLE DOSE DRY POWDER INHALER COUNSELLING			
	PRE		POST	
	Incorrect technique	Correct technique	Incorrect technique	Correct technique
STEP 1	0	30	0	30
STEP 2	5	25	0	30
STEP 3	5	25	0	30
STEP 4	0	30	0	30
STEP 5	0	30	0	30
STEP 6	0	30	0	30
STEP 7	10	20	0	30
STEP 8	3	27	0	30
STEP 9	0	30	0	30

Type single dose dry powder inhaler	Mean	Std. Deviation	Mean difference	95% of confidence interval	Paired t value	Df	P value
PRE	8.23	0.82	0.77	0.46-1.07	5.139	29	0.001
POST	9.00	0.01					

- Since P-value is less than 0.01, the post-score value is significantly increased.
- Mean score of correct inhaler steps of individual patients increased from 8.23 to 9 after effective counselling
- Only 66 % (20/30) patients completed correctly the nine steps, it increased to 100% (30/30) after effective counselling

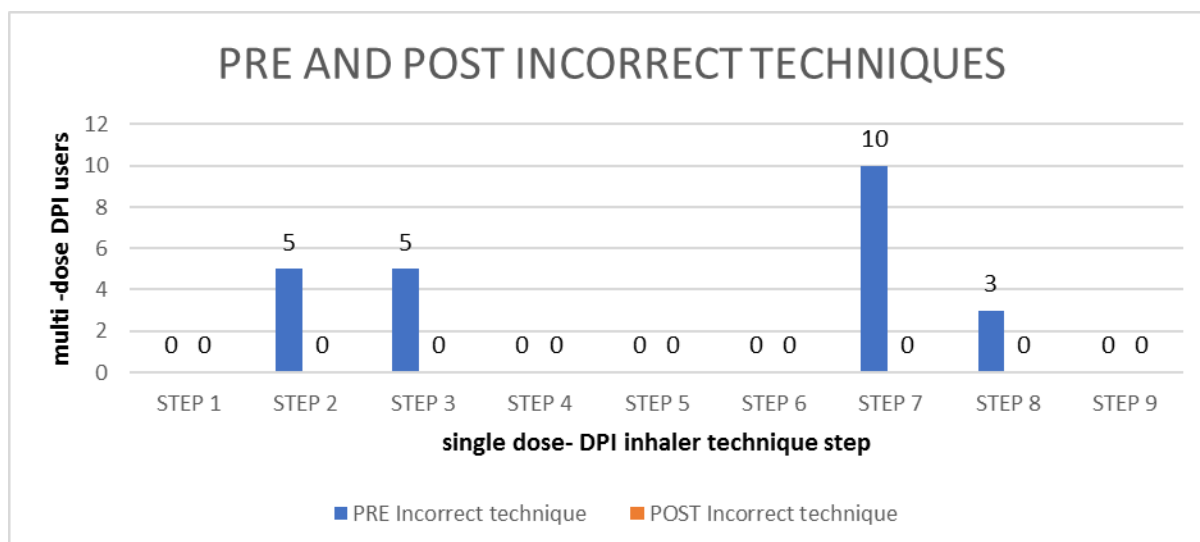


FIGURE NO. 17 DISTRIBUTION OF WRONGLY DONE STEPS AMONG SINGLE -DOSE DPI USERS BEFORE AND AFTER COUNSELLING

Figure 17 shows the use of inhaler technique was improved(100%) in single –dose DPI users when compared to the precounselling

TABLE NO. 18 COMPARISION OF PERCENTAGE OF PATIENTS PERFORMED INCORRECTLY AMONG THREE INHALERS BEFORE COUNSELLING

Type of inhaler device	Percentage (%)
MDI with spacer	86%
Multi-dose DPI	60%
Single dose DPI	34%

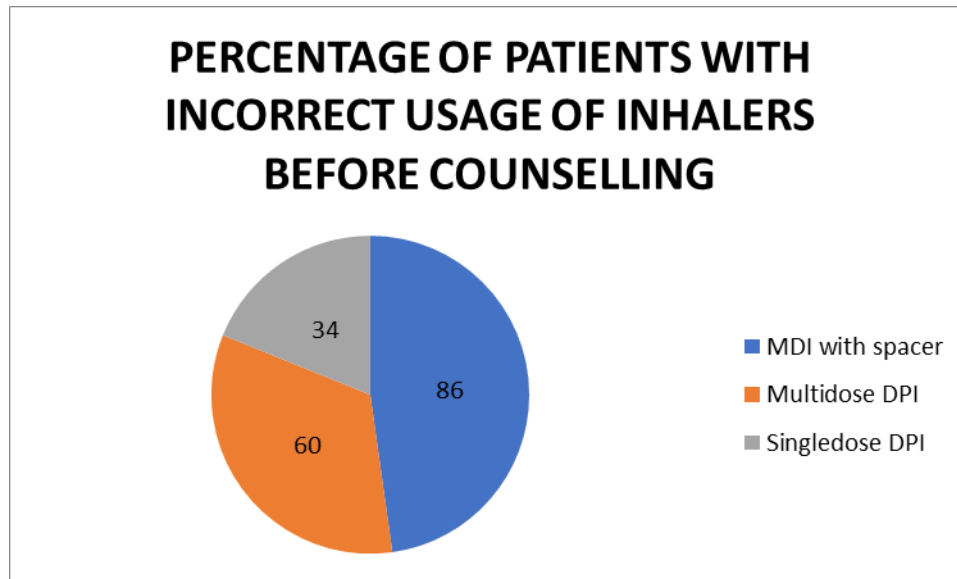


FIGURE NO. 18 COMPARISION OF PERCENTAGE OF PATIENTS WITH INCORRECT USAGE OF THREE INHALERS (BEFORE COUNSELLING)

- Patients using MDI with spacer more often showed an incorrect inhalation technique 86% (43/50) followed by patients using multi-dose dry powder inhaler 60% (12/20) and single dose dry powder inhaler users 34% (10/30)

TABLE NO. 19 COMPARISION OF PERCENTAGE OF PATIENTS WITH INCORRECT USAGE OF THREE INHALERS (AFTER COUNSELLING)

TYPE OF INHALER DEVICE	PERCENTAGE
MDI with spacer	42 %
Multi-dose DPI	10 %
Single dose DPI	0 %

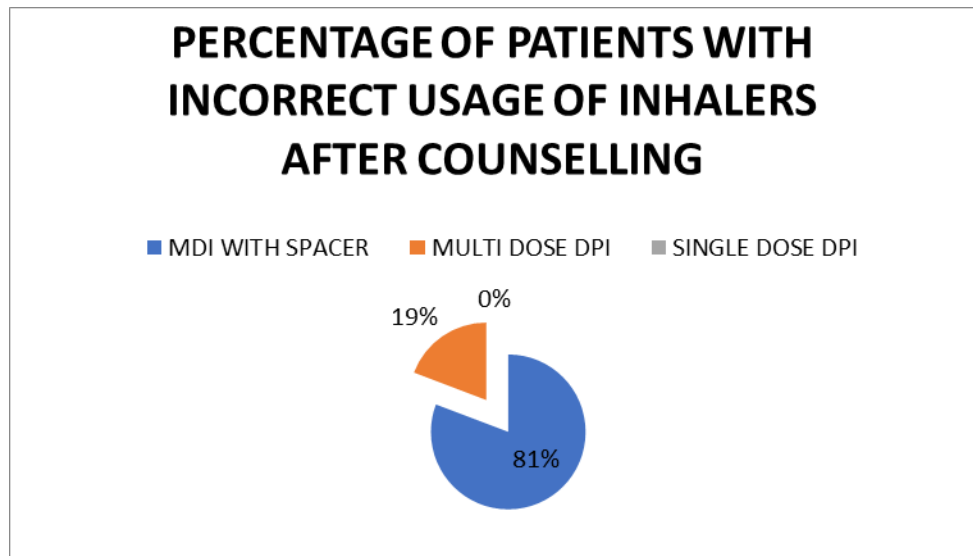


FIGURE NO. 19 COMPARISION OF PERCENTAGE OF PATIENTS PERFORMED INCORRECTLY AMONG THREE INHALERS AFTER COUNSELLING

- Patients using MDI with spacer more often showed an incorrect inhalation technique 42% (21/50) followed by patients using multi-dose dry powder inhaler 10% (2/20) and single dose dry powder inhaler users 0% (0/30).

TABLE NO. 20 DISTRIBUTION OF PATIENT BASED ON ADHERENCE TO INHALERS (BEFORE COUNSELLING)

Level of Adherence	MDI WITH SPACER	Type multi-dose dry powder inhaler	Type single dose dry powder inhaler	TOTAL	CHI-SQUARE	DF	P-VALUE
Good Adherence	8	15	9	32	42.77	4	0.001
	16.0%	75.0%	30.0%	32.0%			
Intermediate adherence	11	4	17	32			
	22.0%	20.0%	56.7%	32.0%			
Poor adherence	31	1	4	36			
	62.0%	5.0%	13.3%	36.0%			
TOTAL	50	20	30	100			
	100.0%	100.0%	100.0%	100.0%			

- Since P-value is less than 0.01, there is a significant association between adherence and the three groups. From the above table, the Type multi-dose dry powder inhaler group shows 75.0% Good adherence.

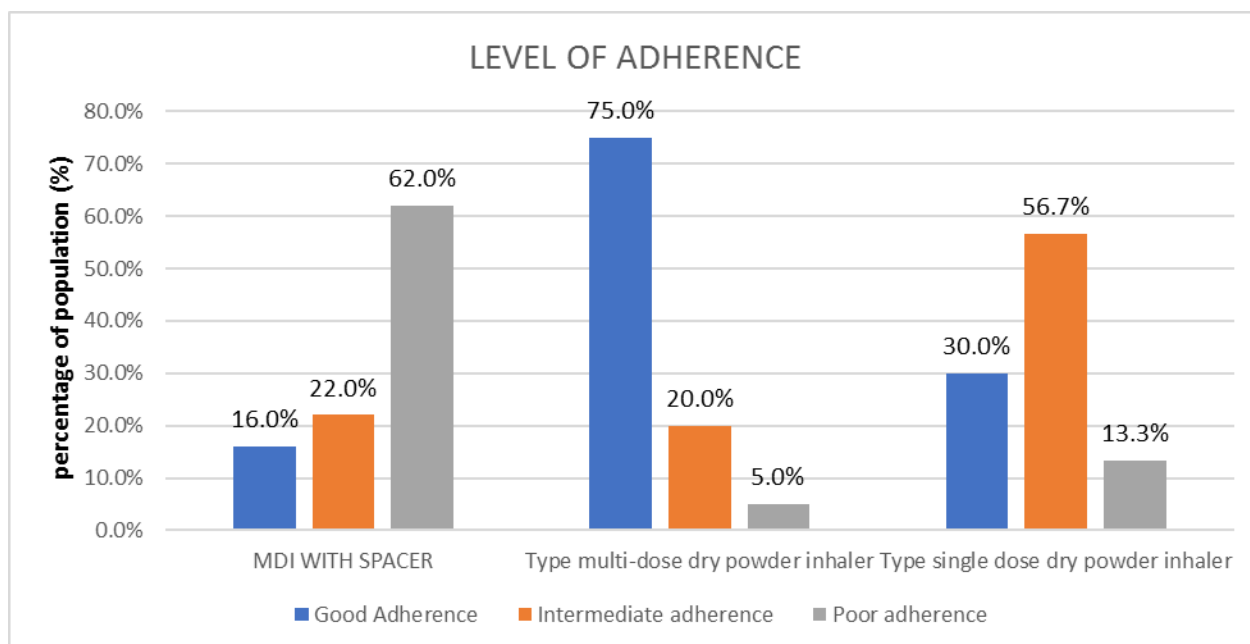


FIGURE NO. 20 DISTRIBUTION OF PATIENT BASED ON MEDICATION ADHERENCE (BEFORE COUNSELLING)

- Out of 50 MDI with spacer users, Majority of patients 31(62%) showed poor adherence to inhalers. Majority of multi-dose DPI users 15/20 (75%) showed good adherence to inhalers. In case of single-dose DPI users, most of the patients 17/30 (56.7%) showed intermediate adherence

TABLE NO. 21 COMPARISON OF PATIENT ADHERENCE TO INHALERS (BEFORE & AFTER COUNSELLING)

MDI with spacer score	Mean	Std. Deviation	Mean difference	95 % of confidence interval	Paired t value	Df	P value
PRE	41.46	7.546	12.540	14.68- 10.39	11.750	49	0.000
POST	54.00	0.00					

Since P-value is less than 0.01, the post-score value is significantly increased

Type multi-dose dry powder inhaler	Mean	Std. Deviation	Mean difference	95 % of confidence interval	Paired t value	df	P value
PRE	50.30	2.452	3.700	4.847- 2.55	6.749	19	0.000
POST	54.00	0.00					

Since P-value is less than 0.01, the post-score value is significantly increased

Type single dose dry powder inhaler	Mean	Std. Deviation	Mean difference	95 % of confidence interval	Paired t value	Df	P value
PRE	48.70	3.303	5.300	6.53- 4.067	8.790	29	0.000
POST	54.00	0.00					

Since P-value is less than 0.01, the post-score value is significantly increased.

Post adherence score to all inhalers are increased after counselling.

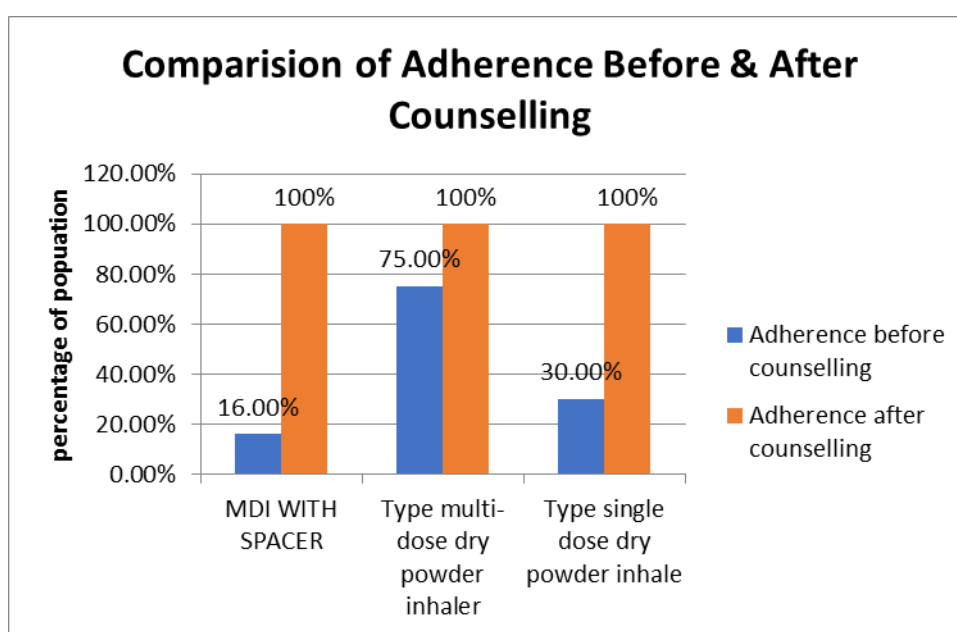


FIGURE NO. 21 COMPARISION OF PATIENT ADHERENCE TO INHALERS (BEFORE & AFTER COUNSELLING)

Figure shows the number of patient showing good adherence to inhalers increased to 100% after effective counselling.

TABLE NO. 22 DISTRIBUTION OF PATIENT BASED ON PATIENT SATISFACTION WITH INHALERS

Level of satisfaction	MDI with spacer	Type multi-dose dry powder inhaler	Type single dose dry powder inhaler	Total	Chi-square	Df	P value
High	5	19	21	45	52.525	2	0.001
	10.0%	95.0%	70.0%	45.0%			
Intermediate	45	1	9	55			
	90.0%	5.0%	30.0%	55.0%			
TOTAL	50	20	30	100			
	100.0%	100.0%	100.0%	100.0%			

- Since P-value is less than 0.01, there is a significant association between the level of satisfaction and the three groups. From the above table, the Type multi-dose dry powder inhaler group shows 95.0% high level of satisfaction.

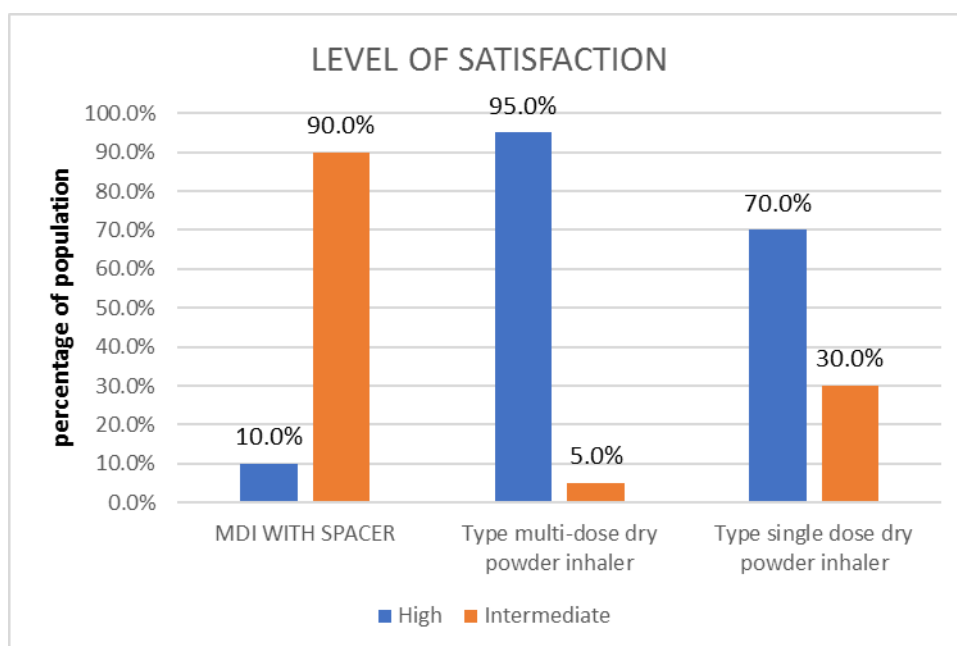


FIGURE NO. 22 DISTRIBUTION OF PATIENT BASED ON PATIENT SATISFACTION WITH INHALERS

- Most of the MDI with spacer users, 45/50 (90%) showed intermediate level of satisfaction to inhalers. But in case of multi-dose DPI users majority, 19/20 (95%) showed high level of satisfaction to inhalers. Most of 21/30 (70%) single-dose DPI users showed high level of satisfaction to inhalers.

SUMMARY

A prospective Observational study was conducted in the department of pulmonology, Pushpagiri Medical College Hospital, Thiruvalla and Pushpagiri College of Pharmacy, Thiruvalla to find to assess the prescribing pattern of pulmonary inhalers in obstructive lung disease and common errors in inhalation techniques along with patient adherence and satisfaction with inhalers. The sample size were 100 patients. Patient's demographic details were collected, the inhalation technique was assessed using standard checklist. Adherence to inhalers was assessed using TAI -12 item questionnaire. Patient satisfaction to inhalers was assessed using FSI-10 questionnaire.

- The majority of patients were in the age group above 60.
- Predominance was more seen in females (out of 100,59% patients were females and remaining 41% were males).
- In the study majority of patients(66%) were educated and the remaining 34% had poor educational qualification.
- Economic status – majority of patients 90% were belonging to upper middle class and remaining 10% fall under lower middle class.
- Out of 100 patients 55 % were diagnosed with asthma,40% with COPD & remaining 5% with bronchitis.
- Out of 100 MDI users (50%) were the highest among the enrolled population followed by single dose dry powder inhaler users (30%) and multidose dry powder users(20%).
- Most patients(50%) were using device for 1-2 years. while 27% patients were using it for 3-4 years, 13% patients were using device for more than 5 years and 10% for less than or equal to one year.
- Instruction on inhaler technique was received predominantly from nurse, which account for 88% of patients and about 9% of patients obtained instruction from physician and the remaining 3% from junior doctor.
- On the whole 55% of patients obtained information orally and the remaining 45% by practical demonstration.

- In case of number of instructions received, 73% of patients received instructions once and 27% of patients received twice.
- In our study population, 85% of patients were on one inhaler while 12% were on two inhalers and the remaining 3% were on 3 inhalers.
- Satisfaction -81% were satisfied with their inhalers and remaining 19% were not.
- About 34% asthmatics and 37% COPD patients were prescribed with formoterol+budesonide MDI with spacer. About 42% asthmatics and 22% COPD patients were prescribed with salmeterol +fluticasone MDI with spacer. About 24% asthmatics and 32% COPD patients were prescribed with formoterol+fluticasone MDI with spacer.
- The inhaler technique used by patients were not proper at the first time. Comparing to users of MDI with spacer, multi dose dry powder inhaler and single dose dry powder inhaler, patients using MDI with spacer more often showed an incorrect inhalation technique 86%(43/50) followed by patients using multi-dose dry powder inhaler 60%(12/20) and single dose dry powder inhaler users 34%(10/30). There was marked improvement in number of patients who have corrected inhalation technique after pharmacist intervention. Mean score of correct inhaler steps of individual patients increased after effective counselling. **The P value was found to be ≤ 0.01 , which means that there was significant improvement.**
- ‘Test of the Adherence to inhalers- 12 item’ questionnaire was used to assess the adherence to inhalers. Out of 50 MDI with spacer users, Majority of patients 31(62%) showed poor adherence to inhalers. Majority of multi-dose DPI users 15/20 (75%) showed good adherence to inhalers. In case of single dose DPI users, most of the patients 17/30 (56.7%) showed intermediate adherence on comparing the adherence to these inhalers, patients on multiple-dose dry powder inhaler showed good adherence. **The P value is ≤ 0.01 , shows that the study was significant.** After counselling score to adherence to inhalers increased. **Since P-value is less than 0.01, the post-score value is significantly increased.** That is, the number of patients showing good adherence increased to (100%) in all inhaler types after the pharmacist intervention.
- “The feeling of satisfaction with inhaler (FSI-10 questionnaire” was used to assess the feeling of satisfaction. Most of the MDI with spacer users, 45/50 (90%) showed intermediate level of satisfaction to inhalers. But in case of multi-dose DPI users majority, 19/20 (95%)

showed high level of satisfaction to inhalers. Most of 21/30 (70%) single-dose DPI users showed high level of satisfaction to inhalers. On comparing the level of satisfaction to inhalers, multi-dose dry powder inhaler users showed high level of satisfaction. **P value is ≤ 0.01** , shows that the study was significant. The factors determining patient satisfaction are ease of use of inhalers, comfort of patient, patient's knowledge on inhalers.

CONCLUSION

Our study showed that majority of the patients using inhalers, used their inhaler inaccurately. Most of the patients were unable to use the MDI with spacer correctly, whereas correct handling of DPI devices are variable. But MDI with spacer continues to be the most commonly prescribed. There is a need of increased awareness among all health care personnel, especially the pharmacist should ensure they know the correct inhaler technique whereas the most patients enrolled in our study were actually taught by nurses on the use of inhalers. Routine checkup of inhaler technique should be done during subsequent patient visits. From our study, we understood that COPD patients are more prescribed with formoterol + fluticasone MDI with spacer and asthmatics with salmeterol + fluticasone MDI with spacer.

The present results shows that pharmacist counselling can improve adherence to inhalers in obstructive lung disease patients since there were an significant improvement in adherence to inhalers after pharmacist intervention in our study. The major reasons for poor adherence to inhalers were forgetfulness, felt better and cessation of administration due to improvement of symptoms, fear of side effects, false beliefs, interruption for their daily activities and cost of inhaler devices and medications.

The patients are more often satisfied with multi-dose dry powder inhalers, because of its ease of use. The higher level of satisfaction indicates that they are comfortable with their inhaler devices.

Study concluded that effective counselling by pharmacist improved the patient inhalation technique and adherence to inhalers. Improvement in inhalation technique plays a great role in improvement in disease.

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