



Effectiveness of Patient Counselling in the Use of Metered Dose Inhaler

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Abstract

Asthma is a common chronic respiratory disease affecting 1-18% of population in different countries. It can be treated mainly with inhaled medications in several forms, including pressurized metered-dose inhaler (MDI). Incorrect use of inhalers is very common and subsequently leads to poor control of asthma. So pharmacists have a crucial role in

educating Quasi experimental study was carried out in 150 patients diagnosed with asthma and undergoing inhaler therapy in the Pulmonology department of Believers Church Medical College Hospital, Thiruvalla from November 2019 to April 2020. Inhalation technique of MDI was obtained using a standard checklist of steps recommended in American Thoracic

Society guidelines. This study focused on the effectiveness of individualized mentoring of patients as well as their care givers on proper use of MDI through demonstration and face-to-face training by using WHO guidelines. The study showed that, asthma was more prevalent in the age group of 60-80 years (38%) and most of them having poor inhalation technique during before counselling session and also experienced some Adverse drug event associated with inhalational drugs. After counselling session, majority of the population did not experienced any drug related problems and also showed improvement in inhalation technique. Thus counselling of the subjects regarding the proper use of MDI is very important and it made a huge impact on the disease process in asthmatic patients. So that, counselling have a key role in patients diagnosed with asthma using pressurized metered dose inhaler.

Keywords

Asthma Control Test; Adverse Drug Event; American Thoracic Society; Metered Dose Inhaler

Introduction

Metered-dose inhaler is an inhaler device with specified doses that provides a certain dose of the active agent in each puff. MDIs consist of a suspension or dispersion of one or more active ingredient in propellant or a mixture of propellants or a mixture of solvent and propellants. The role of propellant in an MDI system is to provide the required pressure to atomize drug formulation into micron-scaled droplets. Pressurized metered-dose inhalers (MDI) are a type of MDIs that works based on the pressurized propellant in the aerosol chamber. The advantage of MDIs is the accurate and repeatable dosing, which minimizes the errors. 19 The basic advantage of aerosol therapy lies in the delivery of high local concentration of drug directly into the site of action which minimizes the systemic side effects

.This is achieved with a much lower dose compared to what may be required for systemic administration for equivalent therapeutic response 26. High local concentration of these agents in the lung maximizes their intended effects and minimizes systemic absorption and potential local adverse drug reactions. Another advantage of this mode of drug delivery is the rapidity of onset of action after the drug is inhaled as compared to other modes of delivery 19 .Pressurized metered dose inhalers are the most common drug delivery system for aerosolized therapy, providing a cost effective and safe method of drug delivery to the lungs .Therapeutic success depends on adequate lung deposition of drug and this factor is influenced by the technique used by the patient to inhale the aerosol most of the patients do not use their inhaler in the correct fashion and studies have shown that a large percentage of patients have a faulty technique when using the MDI 51

Nowadays, MDIs are commonly used along with spacers. A Spacer device is a tube extension to an MDI or a holding chamber with a port at one end to which an MDI is attached, a mask or mouthpiece is attached to the other end. Patients dispense drugs into the spacer and inhale by breathing normally through the mouthpiece. The use of a spacer reduces both the velocity and size of the aerosol particles and dispenses with the need for patient coordination between actuation of the MDI and inhalation of the aerosol. Also, it reduces the deposition of drugs on the oropharynx and thus reduces the associated side effects. 12 The use of an inhaler device involves a complex series of steps, which need to be performed correctly. Failing to perform one or more steps correctly can reduce delivery and hence effectiveness, and safety of medication. Several studies have demonstrated that 50-

80% of patients fail to use their inhaler devices correctly. Patients are often not aware that they use their inhaled medication inadequately, and overestimate their own abilities. Incorrect use of inhalation devices may lead to uncontrolled disease state, unwanted side effects and can also cause higher treatment cost³⁴. Clinical response to inhaled medication depends on the inhalation technique of the patient. Incorrect technique prevents patient from getting maximal benefit from their medication. As a result, patient education about inhaler technique is very important in the management of airway disease.³⁷ Also, there are some common drug related problems associated with MDIs use, which are, oral thrush, cough, nausea, dysphonia etc.⁴¹

Studies have shown that inhalation technique for the use of MDI used by the patients is in appropriate also improper and inaccurate inhalation technique complicates the management of asthma. Educational interventions, especially demonstration of the technique reduce the errors in inhalation technique for the use of MDI.¹⁵ The practical demonstration is the best method to educate patients about optimum inhaler use.¹⁶ Studies were undertaken to assess the technique of use of MDI using WHO suggested steps and correlate the factors associated with improper use. Only few patients followed all essential steps, they concluded that, this situation can be improved by proper education of the patient by the means of actual demonstration showing pictures, repeated training for the proper inhalation technique.¹⁷ After the initial instruction, however the patient inhaler technique quickly decline in the absence of ongoing instructions. Patients who simply receive further inhaler instruction once after the initial instruction, have the better inhaler technique when compared with those who only received instruction at the time of prescription.³⁸ Many of the patients are not

willing to spend much time with healthcare providers in learning the correct inhaler technique or are least interested in clarifying their doubt about inhaler use.¹⁸ Lots of people do not use their devices correctly. This means that the drug is not delivered properly to the lungs, as a result, asthma may not be as well controlled as it should be. Interventions that provide inhaler training may bring some benefit for quality of life and asthma control among adults. Educational interventions such as multimedia, demonstration, help patients to improve their clinical condition.¹⁹

Other studies include face-to-face training, teach-back and technique reminder label to improve patient adherence towards MDI.²⁰ Predictive attributes that influence patient adherence which HCPs should be aware of include age and disease severity. Modifiable attributes which the HCP can influence include correct inhaler use training, choice of training methods, checking patient inhaler technique at subsequent visits, and device selection.²⁶

Furthermore, it has been established that inhaler technique training must be repeated regularly in order to maintain the correct technique. Also, to acquire the skills for using these devices, patient must be adequately trained, and health care personnel are responsible for training the correct use of inhalation devices. In this way, the costs and mortality rate due to improper usage of MDIs will decrease, as well.³⁰

The objective of the study was to evaluate the impact of patient counselling in improving outcomes and efficacy of metered dose inhaler devices. Many of the patients are having poor knowledge about the proper usage of MDIs, even though the patients were demonstrated good techniques during training, some patients choose to inhale rapidly with MDIs and slowly with dry powder inhalers (DPIs). Others may stop

inhaling when a breath-actuated MDI is triggered with inspiration. In such a situation, a decreased therapeutic efficacy is observed.^{3,8} Poor inhaler technique and non-adherence to inhaled therapy has a marked effect on the therapeutic benefit of medication for asthma, also it can lead to exacerbations and worsening disease⁴². Instability of disease was more frequent in patients with poor inhaler technique than in those with good technique. Poor patient adherence can even lead to delayed clinical recovery. So proper patient education is important to help ensure clinical therapeutic effect and reduce health-care resource use, morbidity, and mortality.^{3,8,11}

Patient education on MDI covers various aspects including

1. How to use MDI along with spacer.
2. Importance of using assisting devices which aim to deliver the drug directly deeper into the lungs.
3. Reason for not sharing the MDI with others.
4. What to be done if a dose is missed.
5. Storage of MDI
6. Proper cleaning of MDI and spacer.

Materials and Methods

Study Site

Study was conducted in Pulmonology Department at BCMCH, Thiruvalla.

Study Design

This study is a Quasi Experimental study.

Study Period

This study was conducted for a period of six months from November 2019- April 2020.

Study Approval

The study was conducted after obtaining the approval from Institutional Ethical Committee, BCMCH Thiruvalla. (IEC STUDY NO: IEC/2020/04/134)

Sample Size

Assuming that the proportion of people with partially or completely controlled asthma before counselling was 48% and 68% after, the minimum sample was 126. The assumed type 1 error was 0.05 and power was 90%. The formula used was SLOVIN'S FORMULA,

$$n = \frac{N}{1 + Ne^2}, \text{ where } n = \text{number of samples}$$

,N=total population ,e=margin of error

Inclusion Criteria

1. Patients(above 18 years) on treatment with Metered dose inhaler device
2. New patients in Pulmonology OPD who were diagnosed with Asthma

Exclusion Criteria

1. Pediatric Patients
2. Patients who were not willing to participate

Source of Data and Materials

1. Patients case sheets
2. Patients prescriptions
3. Pulmonary Function Test Report

Method of Collection of Data

- All patients satisfying the study criteria were enrolled in the study after obtaining a written informed consent printed in patient's understandable language from the patient or caregiver, in case of the patient being unable to give the consent.
- Collected demographics of the patient (name, age, sex, socio-economic status, medical, medication, family and social history etc.)
- Collected data regarding the disease, type of MDI used, mode of administration, dose and frequency.
- Assessed the patient's knowledge about safe and effective use of MDI with the help of questionnaire.

- Estimated of ACT score in patients diagnosed with Asthma.
 - Counseled the patients on safe and effective use of MDI with the help of 12 steps used as per American Thoracic guidelines.
- A. Remove the cap from the mouthpiece of both the MDI and the spacer.
 - B. Insert the MDI mouthpiece in the soft opening of the spacer. The MDI canister needs to be in an upright position.
 - C. Shake the MDI with attached spacer several times.
 - D. Breathe out, away from the spacer, to the end of your normal breath.
 - E. Place the mouthpiece of the spacer into your mouth, past your teeth and above your tongue. Close your lips around the mouthpiece. If you are using a spacer with a mask, place the mask over your nose and mouth. Be sure the mask has a good seal against your cheeks and chin. There should be no space between the mask and your skin.
 - F. Press down on the top of the metal canister once, to release the medicine into the spacer.
 - G. Breathe in deeply and slowly through your mouth. If the spacer makes a “whistling” sound, you are breathing in too fast. You should NOT hear a whistle.
 - H. Hold your breath for 5 to 10 seconds.
 - I. Breathe out slowly.
 - J. If you are instructed to take more than one puff (spray), wait about 15 to 30 seconds (or as directed by the package insert) before taking the next puff. Then repeat steps 4-10.
 - K. Replace the cap on the mouthpiece of the MDI inhaler and spacer after you have finished.
 - L. If you are inhaling a steroid, rinse your mouth out with water, swish, gargle and spit.

Upon the patient’s revisit, their knowledge about safe and effective use of MDI was accessed with the help of a questionnaire or telephonic interview with the patient would be conducted in case of the patient being unable to visit the OPD.

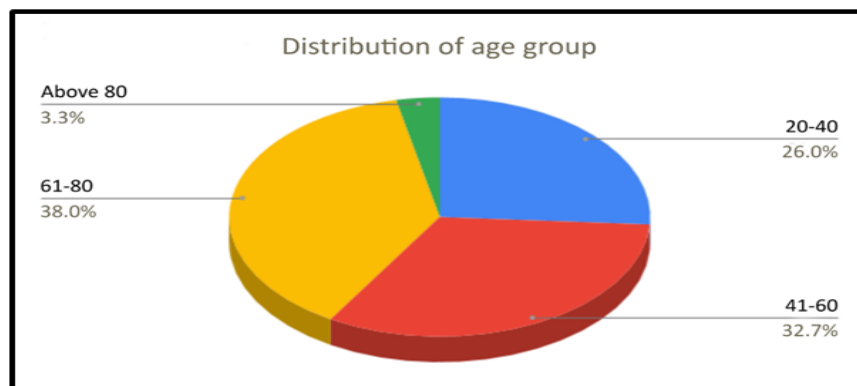
The collected data was analyzed by using descriptive statistical method.

Statistical Analysis

The study was analyzed by using Microsoft Excel 2007.

Results and Discussion

Figure No 1. Distribution of the Patients Based On Age Group



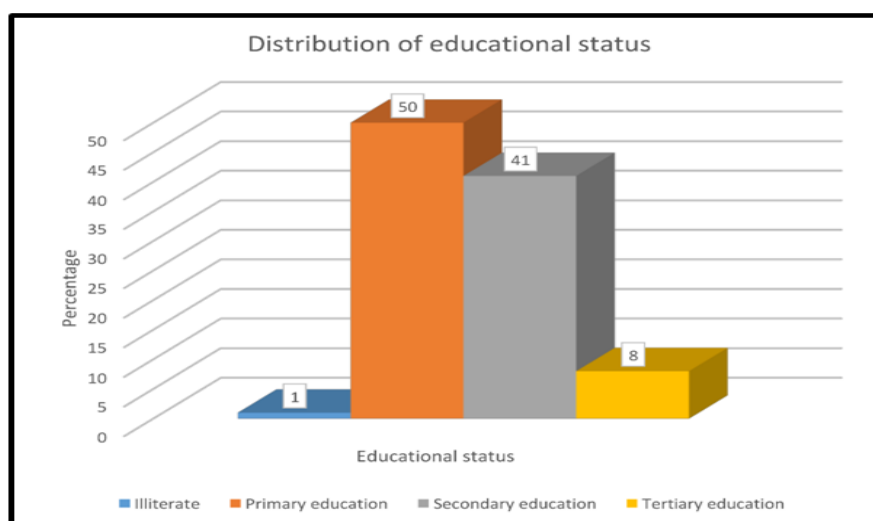
Among 150 study population enrolled in the study, the majority of the subjects belongs to the age group of 60-80 years (38%) followed by 40-60 years (33%), 20-40 (26%) and 3% of the subjects belongs to the age group >80 years.

Table No 2. Distribution of Gender

Sl. No.	Gender	Frequency	Percentage
1	Male	58	39
2	Female	92	61
Total		150	100

Among 150 study population enrolled in the study, the majority of subjects were females which were about 61% (92 subjects) and 39% were males (58 subjects).

Figure No 3. Distribution of Patient’s Educational Status



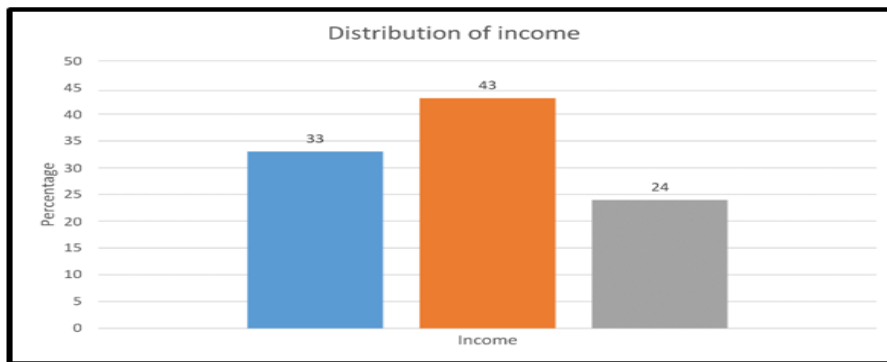
Among 150 study population enrolled in the study, the majority of study population had primary education (50%), followed by 61 subjects had secondary education (41%), followed by 12 subjects had tertiary education (8%) and 1% of the subjects were illiterate.

Table No 4. Distribution of Work Status

Sl. No.	Work Status	Frequency	Percentage
1	Student	8	5
2	Unemployed	91	60
3	Self-employed	16	11
4	Private employed	32	21
5	Government employed	1	1
6	Retired	2	2
Total		150	100

Among 150 subjects enrolled in the study, the majority of study population (60%) was unemployed, followed by 32 subjects were private employed (21%), followed by 16 subjects were self- employed (11%), followed by 8 subjects were students (5%). The least observed in our study was government employed(1%).

Figure No 5. Monthly Income of the Subjects



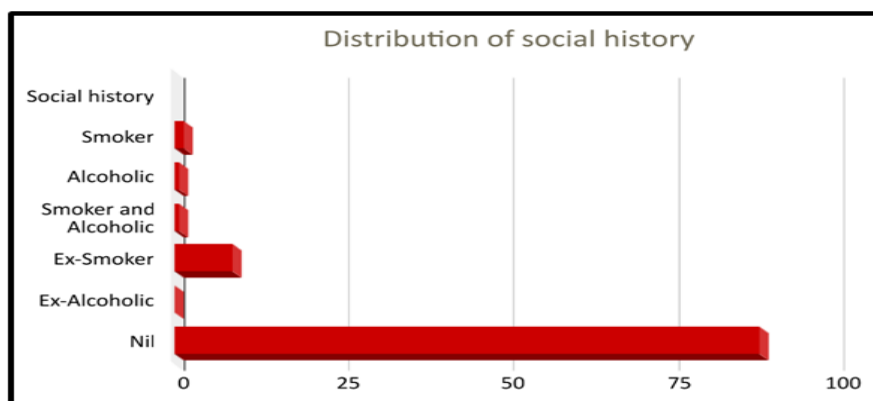
Among 150 subjects enrolled in the study, the majority of the subject’s monthly income was 10,000-20,000 (43%) followed by 33% of subjects had monthly income of <10,000 and 24% of subject’s monthly income is >20,000.

Table No 6. Distribution of Place of Residence

Sl. No.	Place of Residence	Frequency	Percentage
1	Rural	125	83
2	Urban	25	17
Total		150	100

Among 150 study population enrolled in the study, majority of the population were from rural areas which was about 125 subjects (83%) and rest of the population were from urban areas (25 subjects).

Figure No 7. Distribution of the Social Habits of the Patients



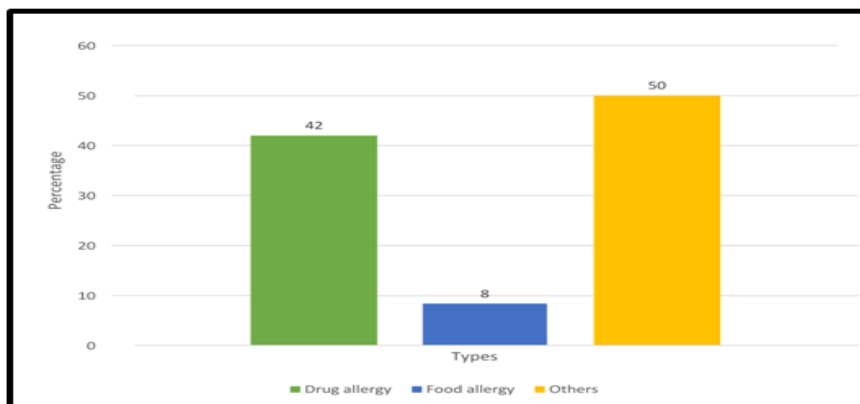
Among the 150 study population enrolled in the study, 133 subjects did not have any social habits (89%) followed by 13 subjects were ex-smokers (9%), 2 subjects had smoking as their social habit followed by 1 subject had alcoholism and 1 subject with both alcoholism and smoking as their social habits.

Table No 8. Distribution of Allergy Status

Sl. No.	Allergy Status	Frequency	Percentage
1	Yes	24	16
2	No	126	84
Total		150	100

Among 150 study population enrolled in the study, majority of the study population, 126 subjects (84%) did not have any allergic status and 24 subjects (16%) showed some sort of allergies.

Figure No 9. Distribution of Type of Allergy



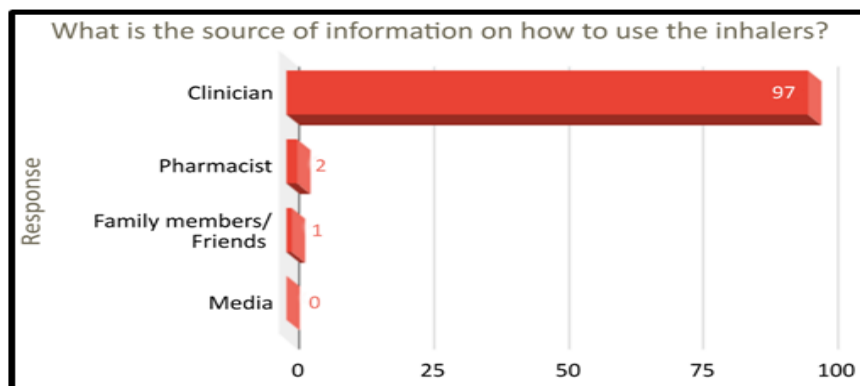
Among the 24 subjects who had allergy, 12 subjects had other types of allergy such as dust, pollen grains, animal fur etc. (50%) followed by 10 subjects had drug allergy (42%) and 8 subjects had food allergy (8%).

Table No 10. Regular Exercise

Sl. No.	Response	Frequency	Percentage
1	Yes	147	98
2	No	3	2
Total		150	100

Among the 150-study population enrolled in the study, 98% of subjects exercised on regular basis.

Figure No 11. Source of Information of Inhaler Use



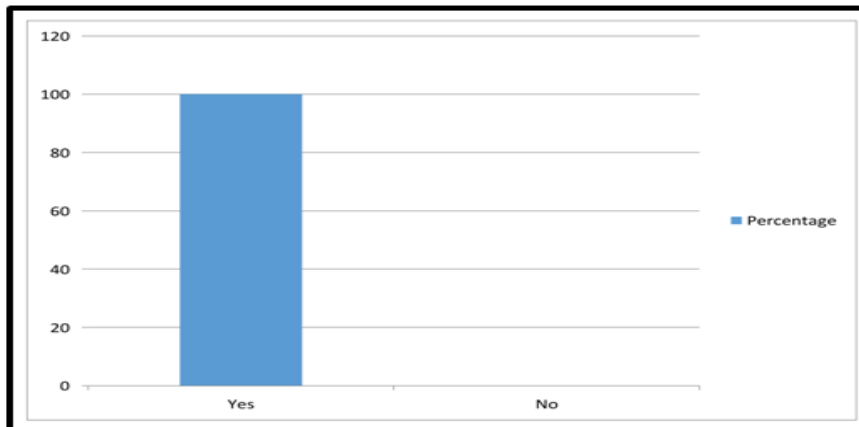
Among 150 study population enrolled in the study, majority of the subjects obtained knowledge regarding the use of inhaler from clinician (97%), followed by 2 subjects gained knowledge from pharmacist and 1 subject from family member.

Table No 12. Use of Assisting Device

Sl. No.	Response	Frequency	Percentage
1	Yes	142	95
2	No	8	5
Total		150	100

Among 150 study population enrolled in the study, majority of the study population used spacer along with MDI (95%) and rest of the population used MDI without spacer (5%).

Figure No 13. Regular Use of Spacer with MDI



Among the 150 study population, all the subjects used spacer along with MDI (100%)

Table No 14. Way of Using Inhaler

Sl. No.	Response	Before Counselling	After Counselling
1	By self	150	150
2	Others	0	0

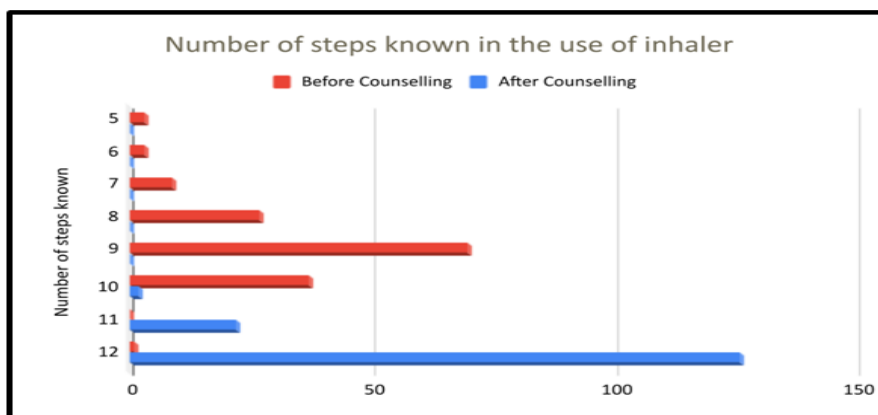
Among 150 study population, all the subjects used inhaler by self in before counselling and after counselling.

Table No 15. Knowledge About the Use of MDI

Sl. No.	Response	Frequency	Percentage
1	Yes	150	100
2	No	0	0
Total		150	100

Among the 150 study population enrolled in the study, 100 % of subjects had proper knowledge about the use of MDI device.

Figure No 16. Number of Steps Known in the Use of Inhaler



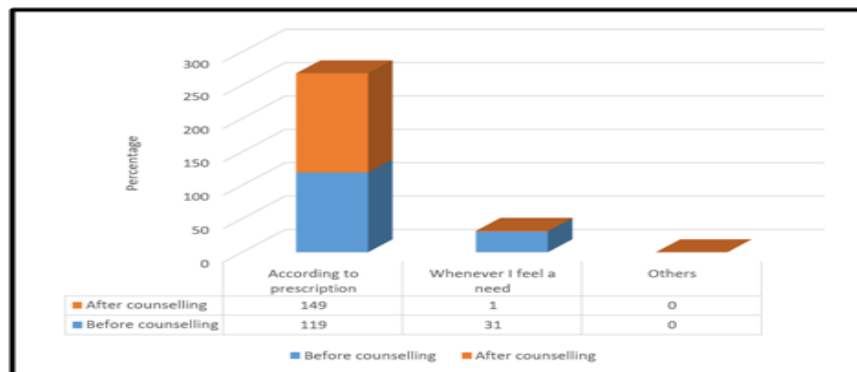
When all subjects enrolled in the study were asked to demonstrate 12 steps of use of MDI, majority of the subjects (70subjects) knew 9 steps out of 12 in the proper use of MDI followed by 37 subjects knew 10 steps out of 12 ,27 subjects knew 8 step out of 12, 9 subjects knew 7 steps out of 12, 3 subjects knew 6 out of 12, 3 subjects knew 5 out of 12 and 1 subject knew 12 out of 12 in before counselling. But after counselling, majority of subjects were able to demonstrate 12 steps (126 subjects) followed by 22 subjects knew 11 out of 12 and 2 subjects knew 10 out of 12.

Table No 17. Sharing of Inhaler with Anyone

Sl. No.	Response	Frequency	Percentage
1	Yes	0	0
2	No	150	100
Total		150	100

Among the 150 study population enrolled in the study, 100 % of subjects did not share their inhalers with others.

Figure No 18. Time When Inhaler Used



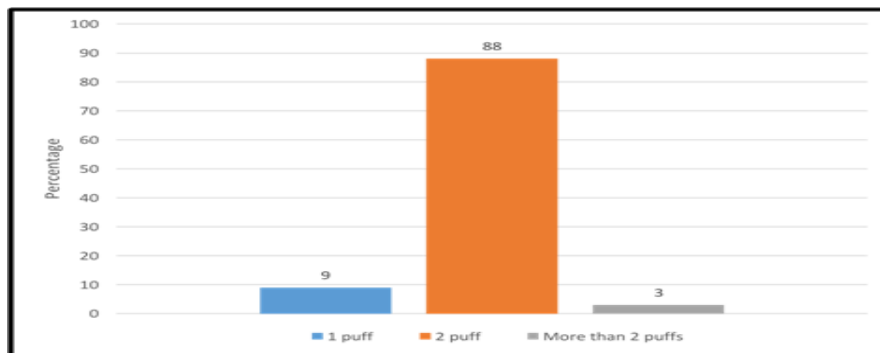
Among the 150 study population enrolled in the study, in before counselling, 119 subjects took inhaler according to the prescription and 31 subjects took inhaler whenever they felt a need. But after counselling, 149 subjects took inhaler according to prescription and 1 subject took inhaler whenever the subject felt a need.

Table No 19. Response When Missed a Dose

Sl. No.	Response	Before Counselling	After Counselling
1	Skip it and continue with dose	85	149
2	Take immediately when I remember	64	1
3	Take double dose	1	0

Among the 150 cases evaluated in the study, in before counselling session, 85 subjects skipped the dose of inhaler and continued with the next dose, followed by 64 subjects took the inhaler when they remembered and only 1 subject took double the dose. But after- counselling, 149 subjects followed the correct method, that is to skip and continue with next dose when they missed a dose of inhaler and only the remaining 1 subject took inhaler immediately when the subjects remembered.

Figure No 20. Number of Puffs Taken



Among 150 study population enrolled in the study, majority of the subjects took 2 puff (88%), followed by 14 subjects (9%) took 1 puff at a time (9%) and the rest 4 subjects (3%) took more than 2 puffs at a time.

Table No 21. Use of More Puffs Than Advised

Sl. No.	Response	Before Counselling	After Counselling
1	Yes	35	2
2	No	115	148

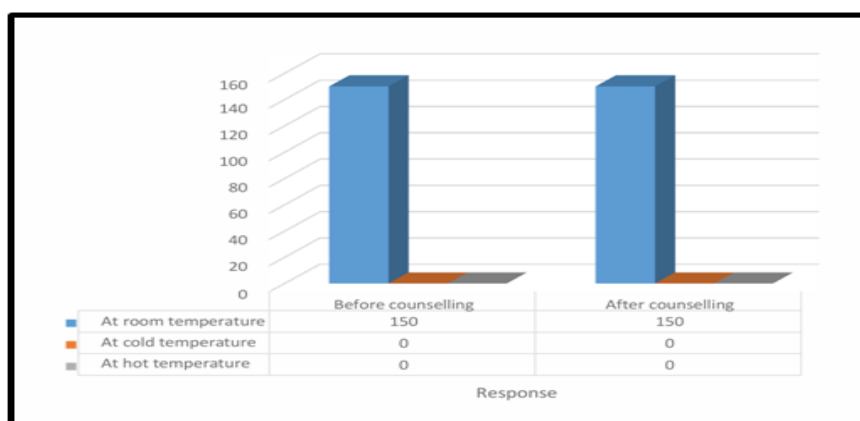
Among 150 study population enrolled in the study, majority of the subjects did not take more puff than advice (115 subjects) in the before counselling and 35 subjects took more puff than advice. But after counselling, 148 subjects followed the correct use, that is taking 2 puff and 2 subjects took more than advice.

Table No 22. Time Gap between Each Puff

Sl. No.	Response	Before Counselling	After Counselling
1	Immediately	54	1
2	30 seconds	12	0
3	1 minute	84	149

Among the 150 study population enrolled in the study, in before counselling session, 84 subjects had taken the puff within 1-minute time gap, 54 subjects had taken each puff immediately one after the other and rest of the 12 subjects had taken the drug within 30 seconds time gap. But after patient counselling, 149 subjects followed the correct method of taking each puff 1 minute apart and only the remaining 1 subject had taken each puff immediately one after the other.

Figure No 23. Types of Storage Condition



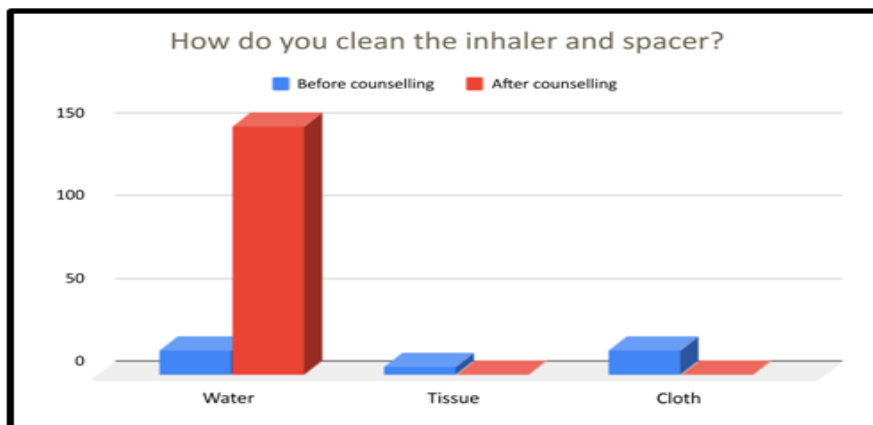
Among the 150 cases evaluated in the study, in both before and after counselling, all the 150 subjects followed the correct technique of storing the MDI at room temperature.

Table No 24. Regular Cleaning of Inhaler and Spacer Before and after Counselling

Sl. No.	Response	Before Counselling	After Counselling
1	Yes	35	150
2	No	115	0

Among 150 study population, 35 subjects cleaned their inhaler and spacer regularly before attending the counselling. But after- counselling, all subjects followed the instruction of regular cleaning their inhalers and spacers.

Figure No 25. Method of Cleaning Of Inhaler and Spacer



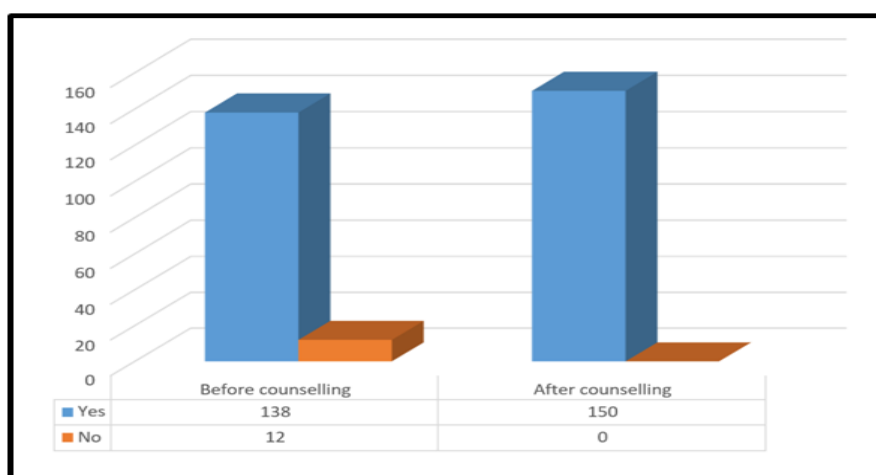
Among the 35 subjects who cleaned their inhaler and spacer regularly before attending the counselling, majority of them cleaned their inhaler and spacer using water and cloth (15 subjects each) and 5 subjects used tissue cleaned their inhaler. But after- counselling, all the subjects were using water to clean their inhaler and spacer.

Table No 26. Drying Technique after Cleaning The Inhaler And Spacer

Sl. No.	Response	Before Counselling	After Counselling
1	By cloth	22	0
2	Air dry	13	150
3	Sun dry	0	0

Among 35 subjects who cleaned their inhaler and spacer before counselling, 22 subjects dried their inhaler after cleaning using cloth and 13 subjects used air dry. But after counselling, 150 subjects who cleaned their inhaler and spacer, dried it using air.

Figure No 27. Rinsing of Mouth After Taking Inhalers



Among the 150 study population enrolled in the study, in before counselling session, 138 subjects were rinsing their mouth after taking inhaler. But, after-counselling all the 150 subjects were rinsing their mouth after taking inhaler.

Table No 28. Mouth Washing Technique Used

Sl. No.	Response	Before Counselling	After Counselling
1	Warm water	29	5
2	Saline water	2	0
3	Normal water	105	145
4	Mouth wash	2	0
5	Others	0	0

Among 150 study population enrolled in the study, in before counselling session, majority of subjects washed their mouth after using inhaler by using normal water (105 subjects), followed by 29 subjects used warm water, followed by 2 subjects used saline water and 2 subjects used mouth wash. But after counselling, 145 subjects used normal water to rinse their mouth and 5 subjects used warm water.

Discussion

Metered dose inhalers (MDIs) are commonly used these days and this has led to the fast recovery of disease as well as the decreased incidence of ADRs. The desired effect of the drug is gained only if its use is in the right manner. As explained in the study done by Purohit. A.N et.al, most of the people worldwide are not having the proper knowledge regarding the use of MDIs especially with spacers. If the MDI device is not used properly, the desired therapeutic benefit is not acquired. Many of the patients start to think that the problem lies in the medication and they are not benefited with the treatment. If the patient is adherent to the therapy and is prescribed with the right drug, the next step is proper administration and handling of medications. Errors in administration and handling of medications can be rectified by proper patient counselling and this study aims at providing adequate patient knowledge on MDI use to help patient to attain the target of asthma control. Among the 150 study subjects enrolled in the study, 62% were females and were within the age group of 40-80 years, which is contradictory to the study done by Kakkanattu. T.J. et.al, where majority of the study samples were male and were between the age group of 13-40 years. Unlike the olden scenario, women are

coming forward to get better treatments. Women seek medical help only, if their physical/mental state is that much worsened. This trend has been changed as women began to break the barriers in all the senses. Increasing age becomes a factor for decreased lung function. So patients under the age group of 40-80 years are more prone to lung diseases.

About 50% of the patients enrolled in the study achieved primary education and about 60% of the study samples were unemployed. This is similar to that of the study done by Chauhan et.al, in which primary education was the educational status of majority of the population under study and most of them were unemployed. Majority of the study population (43%) had a monthly income of 10,000-20,000 rupees. About 83% of the study population was from rural areas and majority of the study samples (89%) had no social habits like alcoholism, smoking, ex-alcoholism or smoking. Place of residence and social habits can influence disease like asthma. Alcohol contains substances that known to trigger asthma, like histamine and sulphur dioxide. Also cigarette smoke acts as an airway irritant. When a person inhales tobacco smoke, irritating substances settle in the moist lining of the

airways and can set off asthma episodes. Often, the lungs of people with asthma who smoke are in a constant state of poor asthma control. These people often have ongoing symptoms of asthma. Tobacco smoke also damages tiny hair-like projections in the airway called cilia. Normally, cilia sweep dust and mucus out of the airways. The cigarette smoke damages cilia so they are unable to work. Cigarette smoke make more mucus than normal. As a result, when cilia do not work, mucus and other irritating substances build up in the airways. Unlike urban areas, the extend of pollution is less in rural areas. In rural area people depend more on fire wood than other cooking methods. Smoke from burning wood contains small airborne particles that contribute to indoor air pollution. Small particles in the air can pass through your nose or mouth and get into the lungs. This may cause or worsen asthma. As majority of the population is females, their exposure to fire wood may be the reason for their disease even though they had no history of social habits and exposure to urban pollution. While assessing the allergic status, only about 16% of the study population presented with allergies in which 50% of the allergies were dust /pollen/animal fur allergies followed by 42% of the study samples had drug allergy and 8% had food allergy. As explained in a study done by **Mathur. S.K et.al**, the presence of allergic sensitivity is a clear risk for development of respiratory disorders, especially asthma in childhood or even in adulthood. When people with allergies come in contact with allergens, their immune systems attack the allergens the same way they would a bacteria or virus. This would often leads to watery eyes, runny nose, coughing and also flare-up asthma symptoms. Majority of the study population (about 90%) used spacers along with inhalers and all the study subjects used it regularly. A study done by **Vincken. W. et.al** explained that the

regular use of spacer along with inhalers is essential to deliver the drugs correctly to the lungs with no systemic effects but only the desired local effects. Also healthcare professionals should be empowered and motivated to impart this knowledge in a uniform, systematic way as a part of routine management of airway diseases. All of the 150 patients enrolled in the study used their inhalers by self before and after counselling as they were able to follow the instructions of inhaler use. According to **Ho. S.F et.al**, patient perception of their own inhaler skills correlates poorly with actual performance, hence their inhaler technique should be checked at every opportunity. If required, in the case of elderly patients, their care givers can help them in using the inhaler devices. About 88% of the patients took two puffs. Before the counselling session, 54 patients took 2 puffs with no time gap and only 84 patients among the 150 study samples gave a time gap of 1 minute between the two puffs. According to **D. Price. et.al**, there should be a time gap of 1 minute between the two puffs of an inhaler. After the counselling session, it was observed that 149 patients followed this instruction. . According to **National Asthma Council Australia**, cleaning spacers /inhalers using water and allowing parts to air dry without drying with cloth or paper is encouraged. Otherwise, it will result in static building up on the inside of the spacer, which makes the medication stick to the sides. All the subjects under the study stored their MDI devices in room temperature. **Lewis. D.A et.al** suggests that transition between warm and cool environment can have a detrimental effect on dose drainage from MDI. So temperature fluctuations have to be avoided and it is better to keep MDIs at room temperatures.

Conclusion

This Quasi-Experimental study was conducted among 150 subjects on the topic “Effectiveness of patient counselling in the use of metered dose inhaler” at Believers Church Medical College Hospital, Thiruvalla. The study was primarily focused on to the improvement of inhaler use in all the study subjects through proper counselling. Main strategies adopted were assessing the patient’s knowledge about safe and effective use of MDI with the help of questionnaire, followed by patient counselling. It includes, proper use of MDI along with spacer, importance of the assisting device, cleaning of inhaler device, storage of inhaler devices, drug related problems associated with MDI use etc. Upon patient's revisit, their knowledge about safe and effective use of MDI was assessed with the help of the same questionnaire. By comparing these two sessions, level of improvement of each subject on inhaler use after proper counselling session was analysed.

In the study conducted by **Molimard. M et.al**, inhalation technique of MDI by patients is inappropriate so proper patient counselling is needed. Taking more puff than advised, non-adherence in the technique of MDI use etc. lead to precipitation of ADR thus it complicates the management of asthma so proper counselling regarding the use of MDI is important in patients with asthma in order to improve their disease condition and reduce the risk of adverse drug reaction. This study focuses on mentoring the patients as well as their caregivers on proper use of MDI.

From The Study, majority of the study population(38%)wereintheagegroupof60-80years, 33% of subjects were in 40-60 age group and 26% were in the age of 20-40 years. Majority of study population (61%) were females. That means, majority of our study

subjects were elderly and females too. As majority of the population is elderly, they may experience physical challenges, impairment in hearing, loss of memory etc. which may impede device instruction and they may be unable to learn or retain techniques necessary for effective administration of MDI. So, it is necessary to counsel the caregivers too. Among 150 Subjects enrolled in the study,50%had primary education and majority of our study population(60%) were unemployed. About 43% had a monthly income of Rupees 10000-20000.About 83% of study subjects were from rural areas,

Social history such as smoking and alcoholism are some of the contributory factors for asthma symptoms but in our study, majority did not have such social history (89%) but 9 % were ex-smokers, followed by smoking, alcoholic and smoking + alcoholic to 3%. These could be the contributing factors to developed asthma. While assessing the allergic status,

16% of the study population presented with allergies in which 50% of allergens were dust, pollen grain and animal fur which are some of the common risk factor in asthmatics. About 42% had drug allergy and 8% had food allergy. During the counselling session, impact of exercise in controlling asthma were discussed, thus 98% of subjects exercised on a regular basis. About 97% gained information from clinician regarding the proper use of MDI and only few gathered information from other sources such as friends, relatives etc. Majority of the study subjects(90%) used inhaler with the help of spacer devices and used it on a regular basis. While assessing the knowledge of study subjects on the 12 steps to be followed regarding the use of inhaler device, in the before counselling session, out of 12 steps, 70 subjects knew 9 steps, 37 subjects knew10

steps and 27 subjects knew 8 steps correctly and 1 subject knew all 12 steps. But after counselling session, 126 subjects knew all 12 steps. This 12 steps instruction are very essential part of the study because majority of our subjects were elders and so there is an increased chance for these subjects to forget on the ways to use inhaler and so mentoring the patients and caregivers would help to attain optimum therapeutic outcome and thereby achieve the prime goal of the present study. Most of the subjects were already aware of the problems while sharing an inhaler device such as infection, not all inhaler works in the same way for all people. Thus, all subjects did not share their inhaler with anyone. In the before counselling session, only 119 patients took their medication according to the prescription and 31 patient took their medication whenever they needed. But after the counselling session, 149 subjects followed the instruction of taking the medication only according to prescription.

Taking medication according to the prescription is one of the crucial factors to avoid the deterioration of disease and occurrence of side effects. About 41% of the study population was taking the medication for less than 6 months and 34% of the study subjects were on therapy for more than 1 year. During the before counselling session, when a dose was missed, 85 patients skipped that dose and continued with the next dose and 64 patients took the medication immediately as they remembered, but after the counselling session, 149 patients followed the instruction of taking the missed dose by maintaining a gap of 12 hours. It is important to maintain a gap of 12 hours between 2 doses.

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mouth after using the inhaler. In the before counselling session, among 138 subjects who washed their mouth after using inhaler, only 105 subjects used normal water but after counseling all subjects followed the instruction no fusing normal water to wash their mouth. Absence of gargling or mouth washing after inhaler use can be associated with topical adverse symptoms such as nausea, bad taste, oral candidiasis etc. that can reduce the adherence to treatment.

It can be concluded that, all strategies such as demonstration of technique, teach back method, counselling the caregivers, explaining the technique with pictures and videos, gathering feedback and enquires using telephone and above all mentoring the subjects and caregivers is a new approach. Therefore, patient counseling plays a major role in increasing the effectiveness in the use of metered dose inhaler by reducing drug related problem, healthcare cost and also by improving the quality of life of the patient.

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