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Research Paper

Effect of Counseling on Usage of MDI Preparations in Asthma Patients at the Outpatient Pharmacy Department of Dr. M. Djamil Tertiary Referral Hospital in Padang, Indonesia

Hansen Nasif [1]*, Dwisari Dillasamola[1], Dian Ayu Juwita[1], Yelly Oktavia Sari[1], Adha Giva Sakinah[1], Harisman[2]

[1](*Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Andalas University Indonesia)*
[2](*Department of Pharmacy, Dr. M Djamil Tertiary Referral Hospital, Padang)*
Corresponding Author: Hansen Nasif

ABSTRACT:*The use of Metered Dose Inhaler (MDI) preparations is a therapeutic option for maintenance in asthma patients. The purpose of this study was to study the effect of counseling on the use of MDI preparations in asthma patients at the outpatient pharmacy Departmentof of Dr. M. Djamil Tertiary Referral Hospital. Data was collected from 40 respondents with a purposive sampling method using a questionnaire containing 8 questions on the correct use of MDI. Data collection from respondents was obtained through three stages, in the first stage the respondent was asked to fill out a questionnaire, in the second stage the researcher provided correct information through counseling while directly demonstrating the use of the inhaler, and in the third stage, the patient was asked to return to fill out the same questionnaire after completion of counseling which would be assessed by the researcher. The results show an increase in scores from before counseling, namely 6.1 out of a scale of 8, and after counseling, namely 7.9 out of a scale of 8, which showed a real effect of counseling conducted in this study.*

KEYWORDS: *counseling, MDI, asthma, hospital*

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I. INTRODUCTION

Asthma is a chronic inflammatory airway disorder that involves many cells and elements. Chronic inflammation leads to increased airway hyperresponsiveness resulting in recurrent episodic symptoms of wheezing, shortness of breath, chest heaviness, and coughing especially at night and early morning. These episodic symptoms are associated with airway obstruction that is extensive, variable, and often reversible with or without treatment [1]. The *Global Initiative for Asthma* (GINA) in 2016 explained that asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by a history of respiratory symptoms such as wheezing, shortness of breath, chest tightness, and coughing that vary over time and intensity, together with variable expiratory airflow limitation[2].

One of the treatments for asthma patients is inhalation therapy. Types of inhalation therapy for asthma patients include *a Metered Dose Inhaler* (MDI), *Dry Powder Inhalation* (DPI), and *Inhalation Nebulizer*. The use of inhalation therapy has been widely used but there are several obstacles in its use. The obstacles faced are non-compliance with the use of inhalers, causing therapeutic failure in the use of inhalers. To support success in the use of inhalation, knowledge of optimal inhalation techniques is needed, so that the use of inhalation therapy can be better understood and it is necessary to repeatedly monitor whether the patient is using the inhaler appropriately [3].The use of corticosteroids via inhalation is an appropriate way to treat bronchial asthma. The most important advantages of inhalation therapy are the immediate effect and minimal side effects. However, improper use of inhalers is one of the most common causes that hinder asthma treatment [4]. The effectiveness of inhaled medications such as ß2-agonists, anticholinergic agents, or corticosteroids can be influenced by many factors including age, gender, disease duration, type of inhaler used, and correct inhalation technique. Common errors that occur in patients using MDI are most patients inhaling air too quickly [5], failure to hold their breath for 5-10 seconds about 52.2% and failure to inspire slowly and deeply 46.4% [6]. Failure to exhale before inhaler application, incorrect positioning of the inhaler, and incorrect rotation sequence [7].In

comparison, in America MDI preparations in asthma therapy are found in 45,000 cases per year. Inhaler *misuse* can reduce the maximum benefit to asthma patients regarding the benefits of inhalers on their asthma. Recent studies confirm that patients often make mistakes using inhalers. Patients will use inhalers correctly if they receive correct instructions, the risk of inhaler misuse is high in elderly and frail patients, and correct technique instructions are effective when repeated. Overall, up to 90% of patients demonstrated incorrect techniques in clinical studies of both MDI and DPI [8,9]

Therefore, special techniques are needed in its use and the type of inhalation device that is suitable for the patient. In providing drug information, there is communication between the pharmacist and the patient, and is one form of implementation of *Pharmaceutical Care,* which is called counseling [10,11]. One of the benefits of counseling is to increase patient compliance with the use of drugs. Thus, mortality and losses (both cost and productivity) can be reduced [12]. In addition, through this counseling, patients can obtain additional information about their disease that they did not get from the doctor because they did not have time to ask, were embarrassed to ask, or could not express what they wanted to ask [11].

As evidence of this need, in 2013 a study was conducted on the adequacy of inhaler use techniques in asthma patients at North Shore Pharmacy Community, Auckland. The results showed that there were still patients who made mistakes in inhaler use techniques with 53% of patients using the MDI correctly. Even after training, some patients still have difficulty using the inhalation therapy device [13]. Another study has conducted a comparative evaluation of MDI techniques in several community pharmacies, namely Al Qassim and Al Ahhsa in Saudi Arabia. Based on the evaluation carried out, out of a total of 96 community pharmacies located in five cities in Al Qassim Province, Saudi Arabia, the majority (93%) of patients still cannot use MDI correctly [14].Based on the results of research conducted by Wibowo in 2011 [15], show that as many as 24% of patients make mistakes in the use of MDI. This is the main cause of the failure of inhaler therapy. The main error that occurs is because the patient does not hold the inhaler tube upright and does not shake the inhaler tube. Another study explained that the demonstration of most mistakes made by patients before education occurred at the stage of exhaling slowly and deeply as many as 18 respondents (54.4%). The most mistakes made by patients after education occurred at the stage of holding the inhaler upright shaking the inhaler tube and exhaling slowly and deeply as many as 3 respondents (9%). Based on the t-test, shows that the evaluation and provision of education to patients affects the level of correctness of patients in using inhalation devices [16].

II. RESEARCH METHODS

The study was conducted from February 2017 to April 2017 at the Outpatient Pharmacy Departmentof Dr. M. Djamil tertiary Referral Padang. Data collection was carried out by *purposive sampling* method. using a questionnaire containing eight points of optimal inhaler use techniques [13]. *Data were taken from* patients of Dr. M. Djamil tertiary Referral Hospital who used MDI preparations. Patients whose data were taken were patients who met the inclusion criteria, namely all asthma patients who received MDI preparations for at least the second time using MDI at the Outpatient Pharmacy Departmentof Dr. M. Djamil tertiary Referral hospital with exclusion for patients with a Pharmacy / Doctor education background.

Data were collected at the Outpatient Pharmacy Departmentof Dr. M. Djamil tertiary Referral Hospital when patients received MDI therapy by meeting patients directly one by one. Data collection from respondents was obtained through three stages, in the first stage the respondent was asked to fill out a questionnaire, the second stage the researcher provided correct information through counseling while directly demonstrating the use of the inhaler. In the third stage, the patient is asked to fill out the same questionnaire again after completion of counseling which will be assessed by the researcher. Data analysis was done descriptively by giving a score of 1 (one) to the yes answer and a score of 0 (zero) to the no answer. The highest score that can be obtained is 8 for correct and appropriate use of MDI.

Table 1. Questions asked to respondents

No.	Question	Yes	No
1.	Do you open the inhaler cover before use?		
2.	Do you shake the MDI before using it?		
3.	Are you holding the MDI upright?		
4.	Do you inhale slowly first?		

5.	Did you put the MDI in your mouth without biting it?		
6.	Did you inhale through your mouth at the same time as pressing the medicine tube?		
7.	Do you keep breathing slowly and deeply?		
8.	Do you hold your breath for 5-10 seconds after using MDI?		
	Total Score		

(Bryant, *et al.*, 2013)

III. RESULTS AND DISCUSSION

Results

There were 40 respondents consisting of 27 male patients (67.5%) and 13 female patients (32.5%). Data on the age of respondents are 21 respondents aged >65 years, and 19 patients aged <65 years. From the data on the use of MDI, the following length of use data was obtained, 4 respondents used inhalers for 6-12 months, and 32 respondents who used inhalers> 12 months. From the patient's educational background data, 10 respondents with elementary school education, 6 patient respondents with junior high school education, 16 patients with high school education, 5 respondents with academy / D3 education background, and 3 respondents with college education background.

Figure 1. Graph of Changes in Patient Knowledge Before and After Counseling with 8 Questions (n=40)

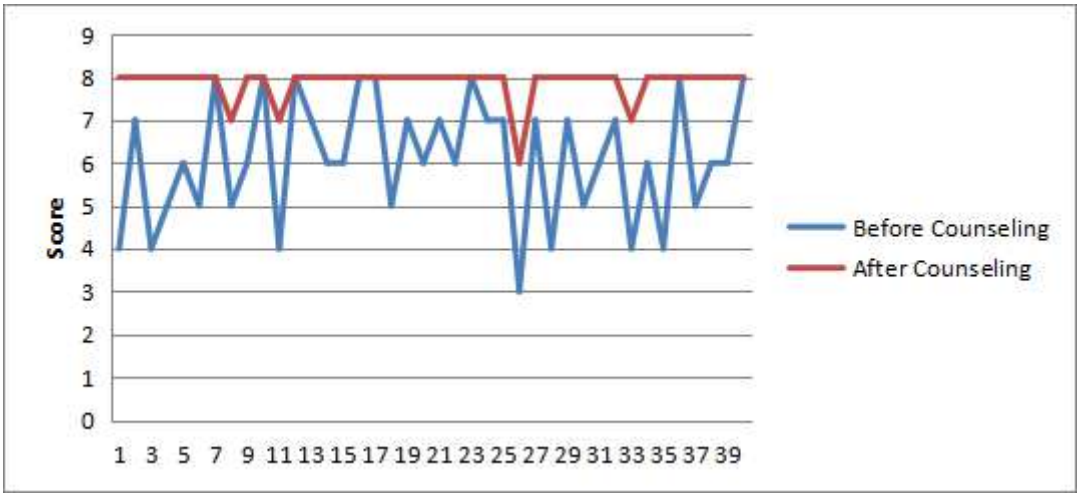

Figure 1 shows that the patient's knowledge and ability to use MDI preparations increased after being given counseling. It can be seen from the increasing number of patients who can answer all questions correctly, from 8 patients to 35 patients (20% to 87.5%). The average score obtained by 40 patients before counseling was 6.1 on a scale of 8. After counseling, the average score obtained by 40 patients increased to 7.9 on a scale of 8. The most common mistake made by patients was not holding their breath for 5-10 seconds after spraying MDI preparations, which was 52.50% of patients. The next most common mistake made and unknown by patients is not inhaling slowly first, which is around 40%. The third error lies in patients who do not shake the MDI before use, which is about 30% of patients.

Discussion

Before counseling, eight patients were found to be able to use MDI correctly, which means that all eight patients had good knowledge about this MDI preparation. These eight patients had previously been given instructions or information by the prescribing doctor on how to use MDI so that when given counseling by researchers, these patients could easily understand and accept the information and directions that researchers

provided. The quality of the MDI use technique shown was also better compared to patients who had never received instructions and training before. The number of patients who were able to use MDI preparations correctly increased significantly after counseling, from 20% to 87.5%.

Based on the scores of each patient before and after counseling, it can be seen an increase in the average patient score before and after counseling. Where before counseling the average patient score was 6.1, while the average patient score after counseling increased to 7.87. The increase in patient knowledge scores that occurred after counseling showed that the purpose of counseling was achieved. The educational theory states that counseling should aim to educate patients so that patient knowledge of drugs will increase and this will lead to behavior change. Through counseling (accompanied by adequate explanation), the patient's wrong assumptions and behavior will be corrected [11].

The increase in knowledge score after counseling shows that counseling is an appropriate method to increase knowledge, according to the theory that states that an increase in a person's knowledge can be used by lecturing, reading, and counseling [11]. Counseling can improve patient knowledge because patients are given information about drugs including drug names, indications, doses, time and schedule for taking drugs, and information about their disease. Individually, the most ignorant patients were in the last step of use, where 52.5% of patients could not hold their breath for 5-10 seconds after using MDI. However, after counseling, the number of patients who performed this step increased to 92.5% as shown in Table 7 and Figure 3. Most respondents were only able to hold 1-3 seconds. If you hold your breath for less than 5-10 seconds, the amount of medicine entering the lungs will decrease. Therefore, the drug effect is not optimal compared to holding the breath for 5-10 seconds because the amount of drug deposited in the lungs is more if holding the breath for 5-10 seconds.

This step is very important because the drug particles must be maximally and optimally deposited in the lungs and holding the breath can give the treatment time to settle or last long in the respiratory tract. Holding the breath for 5-10 seconds is an effective time for drug particles to be deposited in the lungs. If the patient cannot hold their breath for 10 seconds, she is allowed to hold it for less than 10 seconds (eg for 5 seconds or 7 seconds) as long as the patient can do so, the minimum time to hold the breath is 5 seconds. Shaking the inhaler was the third most common error, as many as 13 respondents (32.5%) did not shake the inhaler before use. Not shaking the inhaler when it is used can reduce the effect of the drug, because if the drug used contains a mixture of drugs and is not shaken first, the drug will not be mixed, thereby reducing the effect of the drug. Before using the inhaler what must be done is to shake the inhaler tube, this is very important so that the drug in the tube becomes homogeneous and the drug reaches the lungs to be maximized [9].

Shaking MDI serves to homogenize the suspension formula and homogenize the dose because the main problem that often occurs in patients using MDI is not shaking the inhaler tube or *canister* before use. If the number of particle sizes is not uniform, it will result in large particles sticking or depositing on the palate or inside the mouth, which may increase the risk of side effects, namely oropharyngeal candidiasis. The impact of not shaking the inhaler tube can cause the drug in the tube to be inhomogeneous and the drug that reaches the lungs to be not maximized [9].The next most common error was inhaling slowly and deeply, with as many as 11 respondents (27.5%). Inhaling and exhaling through the mouth is a common problem and error that occurs in the patient's inability to coordinate exhalation and inhalation. This step aims to allow the patient to take a deep breath when the drug dose is released and at the time of exhalation can reach directly into the lungs. The air released after inhalation is the *vital capacity* (VC) while the air remaining after exhalation is the *residual volume* (VR). Warming up before using MDI is also to provide more strength when pulling the drug so that it is deposited in the lungs. However, if this step is not done, the drug will not be deposited in the lungs optimally.

The next error lies in the third step, where 22.5% of patients (9 people) did not hold the MDI upright. Because of this, special techniques are needed in its use and the type of inhalation device that is suitable for the patient. Improper positioning of the inhaler can cause the drug to not enter the respiratory tract so patients often feel that the drug is not enough to enter the lungs. As a result, patients often repeat the use of the drug up to 3-4 inhalations. Excessive use like this is feared to cause damage or disturbance to the target organ of the drug, in this case, the lungs. This was recognized by several patients who did not get directions from either doctors or pharmacists when getting MDI preparations.Stand up and straighten your head then hold the MDI with the *mouthpiece* facing down (*canister position* on top). This is due to the common problem and error that occurs in the wrong position of the inhaler. The importance of this step is to receive the correct dose and to condition the position of the drug to be higher than the exit of the drug. If the position of the *canister is* reversed, what will happen is that it can reduce the effectiveness of the related to the gravitational force which is aerodynamic forces affect the optimum particle size distribution for most inhalation aerosols in general has been recognized as being in the range of 1-5 µm. The impact obtained from positional errors in the use of inhalers is that it can cause the drug to reach the lungs to be not optimal, resulting in therapeutic failure in patients [17].

The errors with the next percentage are the fifth and sixth steps, namely putting the inhaler in the mouth without biting it and inhaling through the mouth at the same time as pressing the medicine tube. Three

respondents (7.5%) experienced errors in the fifth step because they did not close their mouths tightly. The same with the sixth step. A total of three respondents (7.5%) were incorrect in answering the sixth question.Place the *mouthpiece* between the teeth and close the lips tightly (tightly closed mouth condition). This step is closely related to the group used by the patient regarding the position of the *mouthpiece* and the position of the mouth. The effort made in the fifth step is to try so that the airflow is not disturbed by the way the tongue covers the MDI *mouthpiece* and in anticholinergic preparations it is strongly recommended to close the mouth tightly because it can cause glaucoma if it is stuck close to the eye. MDI preparations currently use CFC-free formulations that are replaced with HFA propellants, which have a lower speed of drug delivery to the lungs, for this reason, the pharmaceutical industry recommends using MDI with the mouth closed tightly.

A total of 7.5% of patients in this study did not know that when using MDI, patients must press the *canister* together with inhalation through the mouth. When the canister is pressed, it means that the medicine in aerosol form has come out of the package. If the patient does not inhale at the same time as the *canister is* pressed, the medicine has already come out and is not inhaled by the patient. As a result, the drug may remain in the oral cavity and not reach the target. MDI is a drug preparation whose dose has been measured for each inhalation. If the patient does not inhale along with pressing the canister, it means that the dose that reaches the lungs may be less than the measured dose. By the patients' admission for more than five years of using this dosage form, they did not feel much change in their illness. For this reason, it is very important to teach patients the skills in using MDI to get the maximum effect from the drugs used.

In the first step, 100% of patients, or 40 respondents have carried out correctly the first step, namely opening the inhaler lid. This step aims to open the way for the drug through the inhalation device. If this step is not done, it cannot be used quickly because the drug dose cannot come out of the MDI *mouthpiece*.Factors that influence skills are knowledge, education, environment and facilities, habits, culture, and age. The higher a person's knowledge and education will improve their skills, the more experience a person has will increase their skills, and the older a person gets, the more their skills will increase. According to the researcher, this theory contradicts the patient data obtained, namely of the 8 patients who have a high education, 4 patients cannot answer questions correctly. According to theory, elderly people who experience memory decline dementia, or senility, have difficulty understanding what others say. Based on data obtained in terms of age, patients under 55 years old who could answer questions correctly were only 2 out of 7 patients.

During the research period, during the counseling process, the researcher also asked patients what they thought about the study. Patients thought that activities like this could increase their knowledge about the drugs they were receiving because during treatment patients were rarely able to ask medical personnel about the treatment they were undergoing. In addition, doctors often do not have time to explain how to use drugs to patients. In addition, patients often feel reluctant to ask doctors, nurses, or pharmacists about how to use MDI. As a result, patients only use what abilities they have to use this drug dosage form. So, after receiving counseling on how to use MDI from researchers, patients felt very satisfied and helped. Patients also expressed their hope that the hospital concerned would provide drug counseling services to patients. This is because they feel the benefits of drug counseling. In addition, this service is an obligation of pharmacists which should also be the right of patients, by the standard of pharmaceutical services in hospitals No. 1197/2004.

According to the statement in the book "Guidelines for Pharmaceutical Service Counseling in Health Facilities" published by the Indonesian Ministry of Health [18], the provision of counseling is prioritized for patients who receive drugs with special dosage forms, such as MDI. Here it is illustrated that pharmacists have an important role in providing information and counseling to patients who receive this MDI preparation to improve patient skills and get the maximum therapeutic effect. It is evident from the results of research conducted by researchers that counseling also has a real and significant effect on changes in patient behavior and understanding as well as improving patient skills in using MDI preparations. During the research, other colleagues on duty welcomed the research activities carried out by the researcher. The pharmacists and pharmacist assistants on duty at the pharmacy felt helped by the researcher's activities in providing counseling to patients because so far the pharmacists at this pharmacy were unable to provide counseling services to patients due to the limited number of pharmacists in the installation. According to the researcher's observations, the absence of counseling services in this installation is not only due to the lack of pharmacists in the pharmacy but also because the existing pharmaceutical personnel do not have the confidence to provide counseling to patients. For this reason, it is not known for certain. However, the researcher considers that pharmacists in pharmacies have not been able to carry out their functions optimally.

Inadequate education is strongly associated with an increased likelihood of inhalation therapy device errors. Education can lead to improved inhalation therapy device use and better clinical outcomes. Evidence from several studies suggests that the correct use of inhalation therapy devices can be improved by educating patients with healthcare professionals or others who have been trained in the correct method. However, some studies suggest that around 25% of patients with asthma or COPD never receive verbal instruction on the correct

use of inhalation therapy devices [9]. Only 11% of patients were given follow-up and education on the use of their inhalation therapy device.

IV. CONCLUSIONS

The average score obtained by 40 patients before counseling was 6.1 out of a scale of 8. After counseling, the average score obtained by 40 patients increased to 7.9 out of a scale of 8. This shows that there is an increase in patient knowledge after counseling.

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