

EVALUATION OF THE RATIONALITY OF THE USE OF CORTICOSTEROID MEDICATIONS IN OUTPATIENT ASTHMA PATIENTS AT THE JATI KUDUS DISTRICT HEALTH CENTER

Heni Setyoningsih^{1*}, Ahmad Zaifal Khoirul Amin² Siti Nurbaiti³

^{1,2}Institut Teknologi Kesehatan Cendekia Utama Kudus

³Tokubetsu Ryojingu Home Midori no Kaze. Jepang

*Corresponding Author: henisetyo82@gmail.com

Abstract. Asthma is a chronic inflammatory disorder of the airways that involves many cells and elements. Corticosteroids are effective drugs to prevent the onset of asthma. The aim of this research is the use of corticosteroid drugs and the rationality of using corticosteroid drugs in outpatient asthma patients at the Jati Kudus District Health Center in 2019. The results of research regarding the evaluation of rationality in asthma patients at the Jati Kudus District Health Center data obtained that the patients who most often suffer from asthma are female, 31 patients (52%), the age range that most suffer from asthma is 53-65 years old, 23 patients (38%), the drug most prescribed is methylprednisolone, 25 (42%), the most widely used drug preparation was oral with 60 drugs (100%), the correct drug for 60 patients (100%), the correct indication for 60 patients (100%), the correct drug for 58 patients (97%) and the correct dose is 60 patients (100%). The types of corticosteroids most commonly prescribed were methylprednisolone with 25 prescriptions (42%), prednisone with 23 prescriptions (38%), and dexamethasone with 12 prescriptions (20%). The rationality of using corticosteroids in outpatient asthma patients at the Jati Kudus District Health Center was getting the right indication (100%), the right drug (100%), the right patient (97%), and the right dose (100%).

Keywords: [Asthma, Corticosteroids, Rationality.]

INTRODUCTION

Asthma is a chronic inflammation of the airways. Various inflammatory cells play a role, especially mast cells, eosinophils, T lymphocytes, macrophages, neutrophils, and epithelial cells. Environmental factors and various other factors act as causes or triggers of airway inflammation in asthma patients (Ministry of Health RI, 2007). Asthma sufferers have respiratory tracts with unique characteristics, namely being very sensitive to various stimuli (bronchial hyperreactivity) which is characterized by shortness of breath, chest pain, and coughing, especially at night or in the morning. Inflammation causes an increased response of the bronchi to various stimuli. The airflow area of some asthma patients may not be the same (Sundaru in Hidayah & Prasetyo, 2011).

Asthma is a serious health problem in the world. Asthma can affect people of all age groups in all regions throughout the world. The WHO Health Agency estimates that 100-150 million people in the world suffer from asthma. This number is estimated to continue to increase until it reaches 180,000 people every year (Ministry of Health of the Republic of Indonesia, 2009). The prevalence of asthma has continued to increase in recent years. Approximately 300 million people in the world suffer from asthma and it is estimated that this will continue to increase to reach 400 million in 2025 (Adcock & Barnes, 2008).

Based on 2013 Basic Health Research RISKESDAS data, the prevalence of asthma in Indonesia was found to be 4.5% of the entire Indonesian population. If it is projected that the population of Indonesia in 2013 was more than 248 million people, the number of asthma patients in Indonesia is more than 11 million people. After adjusting for the ages of various populations, the data simultaneously places Indonesia at number 19 in the world for deaths due to asthma (Ministry of Health of the Republic of Indonesia, 2013).

Asthma therapy can be divided into two, namely non-pharmacological therapy and pharmacological therapy. Non-pharmacological therapy can be carried out by educating patients, measuring peak flow meters, administering oxygen, avoiding trigger factors, and healthy lifestyles (Ministry of Health, 2007). Pharmacological therapy for asthma includes relievers and controllers

(Akib, 2002). Relievers (relievers) of the β_2 selective sympathomimetic group such as salmeterol, formoterol, albuterol, bitolterol, pirbuterol, terbutaline (Yosmar, Andani & Arifin, 2015). The xanthine group includes aminophylline and theophylline (Yanti et al., 2016). Anticholinergic drugs such as ipratropium bromide and tiotropium bromide (Suhartono, Tambajong & Lalenoh, 2013). Corticosteroids are the most effective long-term treatment for controlling asthma. Corticosteroids work by suppressing the inflammatory process and preventing the emergence of various symptoms in asthma patients (Lorensia et al., 2016). Corticosteroids are the most effective drugs in asthma management in controlling asthma or other chronic inflammatory diseases because these corticosteroid drugs can provide good effectiveness. Corticosteroids, also known as glucocorticosteroids, glucocorticoids, or steroids, are the most widely used drugs throughout the world to treat immune or inflammatory disorders including asthma (Rozaliyani et al., 2011).

Rational use of drugs includes the right category of diagnosis given for the right diagnosis, (right drug selection) therapy taken after the diagnosis is correctly established, (right indication) Each drug has a specific therapeutic spectrum, (right patient) right assessment of the patient's condition due to individual response to the effects of drugs are very diverse, (the right dose) the method and duration of drug administration greatly influences the effect of drug therapy, (the right method and duration of administration) the length of drug administration must be appropriate according to each disease, (the right price) the drug given must be effective and safe with guaranteed quality, and available at any time at an affordable price, (accurate information) Accurate and correct information on the use of drugs is very important in supporting the success of therapy, (accurate side effects) Administration of drugs has the potential to cause side effects, namely undesirable effects that arise in administering drugs at therapeutic doses (Ministry of Health of the Republic of Indonesia, 2011).

METHODS

Types and Research Design

This research is a non-experimental study with descriptive methods and retrospective data collection, data obtained from medical records of outpatient asthma patients at the Jati Kudus District Health Center in 2019.

Research sites

This research was conducted in the medical records room of the Jati Kudus District Health Center and the research was conducted in May 2020 at the Jati Kudus District Health Center.

Research Population and Sample

The population in this study was all prescription data for outpatient asthma patients at the Jati Kudus District Health Center in January – December 2019. The sample used in this study was all outpatient asthma patients who met the inclusion criteria at the Jati Kudus District Health Center in 2019, namely outpatients with a diagnosis of asthma at the Jati Kudus District Health Center in 2019, outpatients with asthma who received corticosteroids, complete patient prescription data including patient name, age, gender, dose and type of corticosteroid preparation.

Research Instruments and Data Collection Techniques

The instruments in this research include medical record data from asthma patients in outpatient installations at the Jati Kudus District Health Center in 2019, patient data search sheets, supporting literature books such as British National Formulary 68, Drug Information Handbook in 2008, Pharmaceutical Care for Asthma in 2007, Global Initiative for Asthma (GINA) in 2019. Data collection techniques were carried out using descriptive analysis methods. The data taken in this study was a search for data on patients diagnosed with asthma including the age and gender of the patient, and the rationale for drug use which includes the right indication, the right patient, the right drug, and the right dose. Data was processed using Microsoft Excel software.

RESULTS AND DISCUSSION

Research result

Research regarding the evaluation of the rationality of using corticosteroid drugs in outpatient asthma patients at the Jati Kudus District Health Center in 2019 obtained a sample of 60 patients who met the inclusion criteria. Then it will be discussed based on patient characteristics, drug characteristics, and rationale including the right drug, the right indication, the right patient, and the

right dose.

1. Patient Characteristics

Research conducted at the Jati Kudus District Health Center on outpatient asthma patients in 2019 who met the inclusion criteria can be seen in Table 1.

Table 1. Characteristics of Outpatient Asthma Patients at the Jati Kudus District Health Center in 2019

Patient Characteristics	Number of Patients (60 people)	Percentage (100%)
Gender		
- Man	29	(48%)
- Woman	31	(52%)
Age		
- 18 - 28 years old	9	(15%)
- 29 - 40 years old	9	(15%)
- 41 - 52 years old	16	(27%)
- 53 - 65 years old	23	(38%)
- 66 - 74 years old	3	(5%)

Source: Primary Data (2020)

a) Gender

In 2019, asthma patients at the Jati Kudus District Health Center outpatient clinic showed that the highest gender frequency was 31 women (52%) and 29 men (48%). Women experience increased emotions which can activate the parasympathetic system which can cause constriction of the smooth muscle of the bronchioles resulting in bronchoconstriction (Choi, 2011). This is inversely proportional to childhood, where male patients tend to be more at risk of asthma than females (Bateman et al., 2011). This happens because in adult women there will be hormonal changes that occur around puberty, thus contributing to the development of asthma. In addition, the hormone estrogen increases adhesion to endothelial cells in blood vessels and the combination of the hormones estrogen and progesterone can increase eosinophil degranulation, making it easier for asthma attacks to occur (Postma, 2007).

b) By Age

From the data obtained, patients suffering from asthma at the Jati Kudus District Health Center were mostly 23 people aged 53 - 65 years (38%). This is because the older a person gets, the more vulnerable their immune system becomes. These results are under Darmila's (2012) research conducted at Dr. Soedarso Pontianak, namely patients aged 20-55 years, occupied the largest distribution with 51 people (72.9%). In another study by (Sihombing, Alwi & Nainggolan, 2010), based on age, it was found that there was an increase in the incidence of asthma in line with the increasing age of the respondents. From several studies, it is known that asthma in childhood can persist into adulthood and some asthma can disappear for years but reappear as age increases. Besides that, there is a decrease in lung function and airway inflammation with increasing age.

2. Drug Characteristics

The results of data on the characteristics of drugs and preparations that are widely used at the Jati Kudus District Health Center can be seen in Table 2.

Table 2. Characteristics of Corticosteroid Drugs in Outpatient Asthma Patients at the Jati Kudus District Health Center in 2019

Drug Characteristics	Number of Patients (60 people)	Percentage (100%)
Types of Corticosteroids		
- Methylprednisolone	25	(42%)
- Dexamethasone	12	(20%)
- Prednisone	23	(38%)
Preparation		
- Orally	60	(100%)
- Inhalation	0	(0%)

Source: Primary Data (2020)

a) Types of Corticosteroids

In this study, data was obtained on the type of corticosteroid drug most commonly used in the Jati Kudus District Health Center, namely Methylprednisolone at 25 (42%), followed by prednisone at 23 (38%), and dexamethasone at 12 (20%). The thing that influences the choice of methylprednisolone for asthma treatment is that this drug has fewer side effects. Methylprednisolone has also been shown to reduce the frequency of asthma attacks. Under research conducted by Lutfiyati (2015) at the Magelang Region Community Lung Health Center (BKPM), the results of patients who used the drug methylprednisolone showed a decrease in the frequency of attacks after using the drug. This decrease is statistically significant as indicated by a value of $p < 0.005$.

b) Corticosteroid Preparations

In this research, which was conducted at the Jati Kudus District Health Center, data on the corticosteroid preparations used were oral by 60 people (100%) and inhaled by 0 people (0%). This is because using oral preparations does not require special methods for use and the price is affordable. Research conducted by Rohmah at the PKU Muhammadiyah Delangu Hospital in 2016 concluded that few patients received medication in the form of inhaled dosages, out of a total of 46 patients, only 10 patients (21%) used inhaled corticosteroids. The majority of doctors and patients choose oral preparations. This is related to the availability of inhaled preparations, both corticosteroids and β_2 adrenergic agonists, most of whom use drugs that are given orally because of the high price of inhalers (Lutfiyati., Ikawati & Wiedyaniningsih, 2014).

3. Rationality

The results of data on the rationale for using corticosteroids in outpatient asthma patients at the Jati Kudus District Health Center in 2019 were assessed from the right drug, the right indication, the right patient, and the right dose.

a) Right Medicine

The results of medication accuracy in outpatient asthma patients at the Jati Kudus District Health Center can be seen in Table 3.

Table 3. Appropriate Medications for Using Corticosteroids in Outpatient Asthma Patients at the Jati Kudus District Health Center in 2019

Rationality	Number of Patients (60 people)	Percentage (100%)
Right Medicine		
- Appropriate	37	(62%)
- Not exactly	23	(38%)

Source: Primary Data (2020)

Use of drugs with less potential or side effects than other drugs by providing treatment whose safety is known. In the table above, it is explained that the accuracy of corticosteroid medication in outpatient asthma patients at the Jati Kudus District Health Center with the data obtained was that 37 patients (62%) had the correct medication and 23 patients, 38% of whom had the incorrect medication. This is because the use of prednisone has the most complex side effects compared to methylprednisolone and dexamethasone according to the 2008 Drug Information Handbook.

According to the Drug Information Handbook (2008), the difference between the side effects of prednisone and the drugs methylprednisolone and dexamethasone is the side effect of damage to the eyes. Long-term use may cause posterior subcapsular cataracts, and glaucoma (with possible nerve damage) and may increase the risk of eye infections.

b) Exact Indication

The results of data on the accuracy of indications for the use of corticosteroid drugs in outpatient asthma patients at the Jati Kudus District Health Center can be seen in Table 4. Accurate indications are seen from the administration and selection of drugs based on the correct diagnosis and complaints experienced by the patient, if there is a correct indication for the use of the drug according to the diagnosis and its benefits have been proven, until the

desired therapy is achieved.

Table 4. Appropriate Indications for Using Corticosteroids in Outpatient Asthma Patients at the Jati Kudus District Health Center in 2019

Rationality	Number of Patients (60 people)	Percentage (100%)
Exact Indication		
- Appropriate	60	(100%)
- Not exactly	0	(0%)

Source: Primary Data (2020)

In the table above, it is explained that the accuracy of indications at the Jati Kudus District Health Center in 2019 with data obtained was 60 patients, the indications were correct for 60 patients (100%) and incorrect indications for 0 patients (0%). This is because in this study the patient's diagnosis and complaints were under the medical records at RSUD Dr. Loekmono Hadi Kudus, and the patients at the Jati Kudus District Health Center were patients undergoing follow-up outpatient care from the hospital so the patients were considered to have appropriate indications. These results were obtained by interviewing health workers at the Community Health Center. An asthma diagnosis is based on symptoms which is episodic, the examination shows that breathing becomes more rapid and shallow and wheezing sounds can be heard on chest examination what is quite important is the examination of lung function which can be checked with spirometry or peak expiratory flow meter (Ministry of Health of the Republic of Indonesia, 2007).

These results are under research conducted by Rohmah (2016) at the PKU Muhammadiyah Delangu Hospital with the results of therapy using corticosteroids in a total of 46 cases which were declared 100% appropriate indications because based on medical record data all asthma patients were treated according to the diagnosis of the disease and according to the symptoms experienced by the patient.

c) Exactly Patient

The results of patient accuracy data on the use of corticosteroid drugs in outpatient asthma patients at the Jati Kudus District Health Center in 2019 can be seen in Table 5.

Table 5. Appropriate Patients Using Corticosteroids in Outpatient Asthma Patients at the Jati Kudus District Health Center in 2019

Rationality	Number of Patients (60 people)	Percentage (100%)
Exactly Patient		
- Appropriate	58	(97%)
- Not exactly	2	(3%)

Source: Primary Data (2020)

The medication given must be an appropriate assessment of the patient's condition, the administration of the medication does not cause contraindications if given to the patient for an appropriate period and does not cause problems if given to the patient. The table above explains the use of corticosteroids in outpatient asthma patients at the Jati District Health Center, getting results from 60 patients, 58 (97%) were correct patients and 2 patients (3%) were incorrect patients.

It was declared inappropriate for the patient because the patient was accompanied by another disease, namely diabetes, where the use of dexamethasone in diabetes patients could increase blood sugar levels (Saputri, Ulfa & Setyaningsih, 2019). These results are under research conducted by Saputri at Pesawaran Regional Hospital. Based on research data, it was stated that out of a total of 85 people, 84 patients (99%) were correct, while 1 patient (1%) had an incorrect rationale.

d) Right Dosage

The results of data on the accuracy of doses used for corticosteroid drugs in outpatient asthma patients at the Jati Kudus District Health Center in 2019 can be seen in Table 6.

Table 6. Correct Dosage for Use of Corticosteroids in Outpatient Asthma Patients at the Jati Kudus District Health Center in 2019

Types of Corticosteroids	British National Formulary 68	Corticosteroid dosage at the District Health Center. Teak	Dosage Accuracy			
			T	%	TT	%
Methylprednisolone ne - Dosage	2-40 mg/day	8 mg/day	25	42%	-	-
Dexamethasone - Dosage	0.5-10 mg/day	1.5 mg/day	12	20%	-	-
Prednisone - Dosage	10-20 mg/day	15 mg/day	23	38%	-	-
Total			60	100%	0	0%

Source: Primary Data (2020)

The dose, method, and duration of drug administration greatly influence the therapeutic effect of the drug. Giving excessive doses, especially for drugs with a narrow therapeutic range, is very risky for side effects. On the other hand, a dose that is too small will not guarantee the desired therapeutic level is achieved.

In the table above, the rationale for using corticosteroids in asthma patients at the Jati Kudus Subdistrict Community Health Center explains the results for 60 asthma patients, 60 (100%) of whom were on the right dose according to the British National Formulary 68 of 2015. These results are under research conducted by Rohmah at PKU Muhammadiyah Hospital Delangu in 2016 with asthma who received corticosteroids 100% in 56 patients. In this study, the dose used for methylprednisolone was 8 mg/day and dexamethasone 1.5 mg/day.

CONCLUSION

The research data, several things can be concluded regarding the evaluation of the rationality of using corticosteroids in asthma patients carried out at the Jati Kudus District Health Center in 2019:

1. There was use of corticosteroid drugs in patients diagnosed with asthma, namely 25 prescriptions of methylprednisolone (42%), and 23 prescriptions of prednisone (38%) and dexamethasone with 12 prescriptions (20%).
2. There is rationality in the use of corticosteroid drugs for asthma outpatients at the Jati Kudus District Health Center, getting the right results for the indication and the right dose (100%), the right drug (62%) and the right patient (97%).

REFERENCES

- Adcock, I.M., & Barnes, P.J. (2008). Molecular mechanisms of corticosteroid resistance. *Chest Journal*, Vol. 134(2), 394–401.
- Akib, A. A. (2002). Asthma in Children. *Journal of Sari Pediatrics*, Vol. 4(2), 78–82.
- Bateman, E.D., Boulet, L.P., Cruz, A., FitzGerald, M., Haahtela, M., & Levy, M. (2011), Global Strategy for Asthma Management and Prevention Update. *European Respiratory Journal*. Vol. 38:5
- British National Formulary. (2015). The Authority on the selection and use of medicines. *Volume 68*.
- Choi, IS, (2011). Gender-specific asthma treatment. *Allergy, asthma & immunology research*. Vol 3: 74–80.
- Republic of Indonesia Ministry of Health. (2007). Pharmaceutical Care for Asthma. Ministry of Health, Directorate of Community and Clinical Pharmacy Development Directorate General of Pharmacy and Health Equipment Development Ministry of Health Republic of Indonesia 127(09), 1441. Jakarta.
- Republic of Indonesia Ministry of Health. (2009). Asthma Control Guidelines, Directorate of Non-Communicable Disease Control (p. 10). Jakarta.
- Republic of Indonesia Ministry of Health. (2013). Indonesian Ministry of Health Data and Information Center Infodata, You Can Control Your Asthma.
- Hidayah, FN, & Prasetyo, SD (2011). Identification of Drug-Related Problems in Inpatient Asthma

- Patients at PKU Muhammadiyah Hospital Yogyakarta. *Journal of Pharmaceutical Management and Services*. Vol 1 (3). 180-189.
- Indonesian Ministry of Health. (2011). *Module on Rational Drug Use in Practice*. Rational Drug Use Module, 3–4. Jakarta.
- Lorensia A., Queljoe DD, Bella LK & Heru A. (2016). Complete Study of Explanation of How to Use Controller Inhaler Preparations (Combination of Corticosteroids with Beta-2 Agonists) Disc and Turbuhaler Types by Pharmacists in Pharmacies. *Manuntung Scientific Journal*, 2(2), 137–146.
- Lutfiyati, H., Ikawati, Z., & Wiedyaningsih, C. (2014). Evaluation of Oral Therapy on Therapy Outcomes for Asthma Patients. *Journal of Management and Pharmacy Practice*, Vol 4(3), 193–199.
- Lutfiyati, H., Ikawati, Z., & Wiedyaningsih, C. (2015). Side Effects of Using Oral Therapy in Asthma Patients. *Journal of Scientific and Practical Pharmacy*, Vol (1), 21-28.
- Postma, D. S. (2007). Gender differences in asthma development and progression. *Gender medicine*, Vol 4, S133-S146.
- RISKESDAS (Basic Health Research). (2013). *Main Results of Indonesian Basic Health Research*. Ministry of Health of the Republic of Indonesia, Jakarta.
- Rohmah, AS (2018). Evaluation of the rationality of using corticosteroids in asthma outpatients at PKU Muhammadiyah Hospital in Delanggu in 2016. Thesis published. Surakarta: Muhammadiyah University of Surakarta.
- Rozaliyani, A., Susanto, AD, Swidarmoko, B., & Yunus, F. (2011). Mechanisms of Corticosteroid Resistance in Asthma. *Indonesian Respiration Journal*, Vol. 31(4).
- Saputri, GAR, Ulfa, AM, & Setianingsih, T. (2019). Evaluation of the rationality of using corticosteroids in Pesawaran. *Malahayati Pharmaceutical Journal*, vol 2(1), 50– 57.
- Suhartono, C., Tambajong, HF & Lalenoh, DC (2013). Perioperative Management of Asthma. *Biomedical Journal (Jbm)*, Vol. 5(1).
- Yanti, B. & Rasmin, M. (2016). The Role of Xanthines in Pulmonary Obstructive Disease. *Respir Indo Journal*, Vol. 36(4).
- Yosmar, R., Andani, M., & Arifin, H. (2015). Study of the Dosage Regimen for Asthma Medication Use in Inpatient Pediatric Patients in the Children's Ward of RSUP. Dr. M. Djamil Padang. *Journal of Pharmaceutical & Clinical Sciences*, Vol. 2(1), 22.