Analysis of Prescribing Phase in Prescription of Pulmonary Tuberculosis Outpatients at Regional General Hospital in Jakarta in 2018

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Abstract. Based on PERMENKES No. 72 of 2016 about Pharmaceutical Service in Hospital, this study aimed to determine percentage of patient characteristics, completeness, and accuracies in prescriptions on pharmaceutical and clinical aspects to improve the quality of tuberculosis treatment. A retrospective descriptive study was conducted on 211 pulmonary tuberculosis prescriptions with a purposive sampling method in pharmacy service at a Regional General Hospital in Jakarta from January to December 2018. Most characteristics of patients were male, 26-35 years old, new patients classification, first category tuberculosis treatment, and complete treatment results were 64%, 23%, 92%, 92%, and 90%, respectively. The completeness in pharmaceutical aspects such as dosage form and drug strength were on 51% and 37%, respectively. Accuracies in clinical aspects were 93% for both dose accuracies and frequency of drug administration. Last, there was 2% of drug duplication. Collaboration between physicians and pharmacists plays a significant role in ensuring patient safety and the quality use of medicines.

Keywords: Clinical aspect; Pharmaceutical aspect; Prescription; Pulmonary tuberculosis

1 Introduction

Based on the Minister of Health Regulation No. 72 of 2016, prescribing activities include administration, pharmaceutical suitability, and clinical considerations on prescription. Prescription services start from receiving prescriptions until giving medicine to patients with providing information. Pharmacists should play a central role carefully in each stage of the prescription service flow to prevent medication errors. Currently, medication errors have become one of the health problems that cause many health problems from mild to severe, which is death [1]. Medication errors affect such as detrimental to the patient due to drug use during the handling of health personnel, which can be prevented [2]. There are four phases in medication errors are prescribing errors, transcribing errors, dispensing errors, and administration errors [3].

Tuberculosis is in the third position disease with the highest death rate in the world [4]. Tuberculosis cases in the world continue to increase, in 2017 India was in the first rank of

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tuberculosis incidence which reached 2.700.000 cases, followed by China with 889.000 cases, and Indonesia with 842.000 cases [4]. In 2018, the total tuberculosis sufferers in Indonesia increased to 845.000 cases and reached a prevalence rate of 316 of 100.000 population, making Indonesia in the third position of highest tuberculosis cases in the world [5].

A study of medication errors at a Tertiary hospital in Central Jakarta that was conducted by Bilqis [6], reported that for the drug aspect study, there was 32.8% of prescriptions have incorrect drug doses and 8,5% of administration error then there is 49.2% of drug interactions. High prevalence of tuberculosis case in one of the regional general hospital in Central Jakarta, the hospital where the research was conducted has been an interesting focus of prescription study because there isn't any research about this yet and to know if medication errors especially in pharmaceutical and clinical aspects become one of the reasons behind high cases of tuberculosis in this hospital.

2 Method

This was a retrospective and descriptive study. This study was conducted of 211 pulmonary tuberculosis outpatient prescriptions, medical records, and tuberculosis 01 forms with purposive sampling method in pharmacy service at a Regional General Hospital in Jakarta from January to December 2018. A total of 211 samples were processed for patient characteristics and because of limitation due to pandemic, only 59 samples were obtained from prescriptions and medical records processed for analyzing medication errors in pharmaceutical and clinical aspects. Institutional Ethics Committee permission from the hospital was obtained (No.004/KEPK/RSUDT/2020). Pharmacist, pharmacist assistants, and pulmonologist were included in this study. Inclusion criteria in this study were pulmonary tuberculosis in outpatients, outpatients who returned their prescriptions to the pharmacy service in this hospital, both 17 years old and older patients. The error classification system used in this study was based on the regulations set by the Ministry of Health Regulation number 72 from 2016 concerning the Standards of Pharmaceutical Services with slight modifications. This study aimed to determine percentages of patient characteristics, completeness, and accuracies in tuberculosis treatment prescriptions in prescribing stages of drug administration on pharmaceutical and clinical aspects. Pharmaceutical aspects: dosage form and drug strength. Clinical aspects: dose accuracy, frequency of drug administration, and drug duplication.

3 Result

Sociodemography

Gender

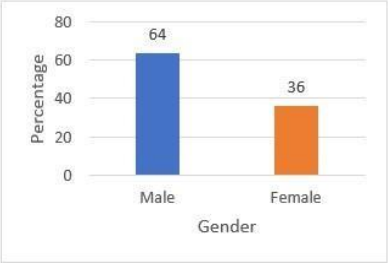

Fig.1. Patient's gender percentage

From 211 samples, the patient's gender were female and men present on 36% and 64%, respectively. Based on that data, men cases higher than female. This data aligned with Afidayanti [7] which obtained from 58 medical records 53% of it were male.

Age

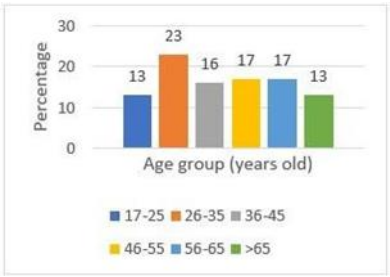

Fig.2. Patient's age group percentage

From figure 2 ages were present in group 17-25, 26-35, 36-45, 46-55, 56-65, >65 years old in 13%,23%,16%,17%,17%,13% respectively. The highest in 26-35 years old, this data aligned with Camila's [8] research with obtaining that age group patient dominant in 15-55 years old (76,36%).

Classification of patient based on previous treatment

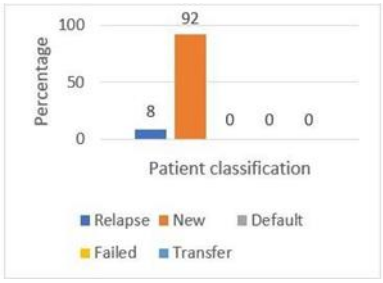

Fig.3. Classification of patient based on previous treatment percentage

From the figure 3, there are 2 classifications patient based on previous treatment was namely relapse and new were present at 8% and 92%, respectively. This data aligned with Prananda [9] which obtain patient tuberculosis in his research were new patient, relapse, and failed on 80%, 16%, and 4%, respectively.

Treatment Categories

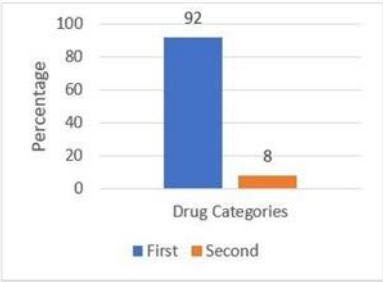

Fig.4. Patient's treatment categories percentage

From the figure 4, there are two tuberculosis treatment category which category 1 and category 2 were in 92% and 8%, respectively.

Treatment result

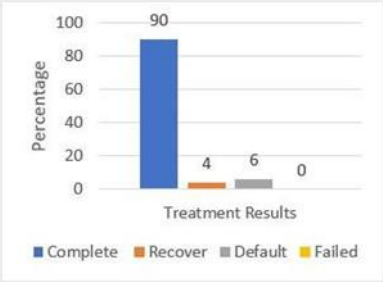

Fig.5. Patient's treatment result percentage

From the figure 5, there are 3 treatment results were complete treatment, default, and recover 90%, 6% and 4% respectively.

Pharmaceutical Aspects

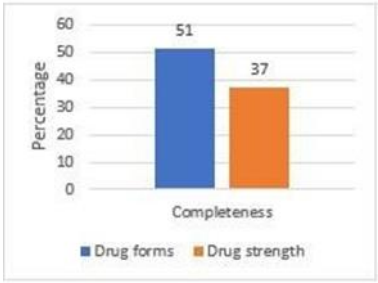

Fig.6. Completeness of pharmaceutical aspect percentage

From figure 6, the pharmaceutical aspects for dosage forms and drug strength completeness at 51% and 37%, respectively. The incompleteness of dosage forms and drug strength 49% and 63%, respectively.

Clinical Aspect

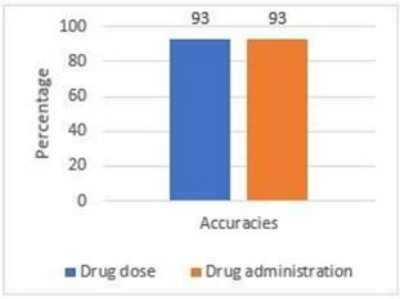

Fig.7. Accuracies of clinical aspect percentage

From figure 7, the clinical aspects include accuracies of drug dose and frequency of drug administration were present both 93%, for the inaccuracies of drug dose and frequency of drug administration both 7%.

Drug Application

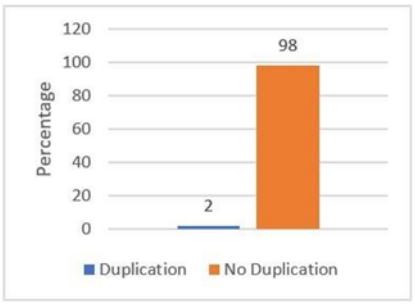

Fig.8. Presence of drug duplication percentage

From figure 8, there were 2% of drug duplications. The results showed the duplication of the drug in 1 prescription namely pyridoxine 2 x 10 mg and lesichol 2 x 300 mg because the content of lesichol consists of lecithin (ppc 95%) 300 mg, vitamin B1 6 mg, B2 6 mg, B6 (pyridoxine) 6 mg, B12 6 mg, vitamin E 10 mg and nicotinamide 30 mg.

4 Discussion

Sociodemography

From 211 samples, we can conclude that patient's gender dominant by 134 (64%) males then 77 females (36%). One of the reasons why most men suffer from tuberculosis because they have smoking habits that cause a high risk of tuberculosis. A study showed that tuberculosis patients who smoke as much as 32% [10]. Smoking will mess the mucociliary as it can make defects on the body immune, macrophage response, dendritic cells, and natural killer cells thus increasing the risk, subdistrict, and duration of infection [11,12].

According to one study, pulmonary tuberculosis tends to be higher in men than females

due to its exposure and a higher level of susceptibility than females [13]. Professions in men such as farmers, drivers, rickshaws, and taxi drivers where it requires more force than female living at home such as housewives work so that men are more likely to be exposed to tuberculosis germs [14].

Females have a stronger immune response to antigenic challenges such as infection and vaccination than men have. It is mediated mostly by sex hormones that play a role in tuberculosis, supported by the fact that in men sex hormones do not appear until puberty. Sex hormones have a variety of effects on various types of immune cells including B cells, T cells, neutrophils, dendrite cells, macrophages, and natural killer cells. While there have been no direct studies to show this, there are many supportive aspects that the immune response to tuberculosis can be modified from sex hormones. Male and female sex hormones can affect the function of immune cells in ways that may be relevant to *Mycobacterium* [15,16]

The Age group of 26-35 years old is a productive age to work or produce something for themselves and others. Productive age is prone to tuberculosis due to a large number of interactions with others who may have been exposed and high mobility. This leads to the possibility of transmitting or contracting from others [17]. The Ministry of Health [2] stated that about 75% of tuberculosis patients are the most economically productive age group (15-54 years old). The second-highest rate of age group with tuberculosis is 46-65 years old group where there is a decrease in endurance and the condition is more susceptible to diseases, especially infectious diseases, one of which is tuberculosis [18].

New cases are patients who have never been treated with tuberculosis drugs or have already ingested tuberculosis drugs for less than a month, relapsed patients are patients who have previously received tuberculosis treatment and have been declared recover or complete treatment but re-diagnosed with positive Acid Resistant Basil, default patient has been treated and given treatment but then haven't done treatment in 2 months later or more with positive Acid Resistant Basil before the treatment period is complete, failed patients are patients whose phlegm test results remain positive or return to positive in the fifth month or during treatment and the transfer case is the patient who is transferred to another register to continue his treatment [19]. People with pulmonary tuberculosis with positive Acid Resistant Basil test results (+) are the main source of transmission. At the time of coughing or sneezing, the sufferer spreads germs into the air in the form of a droplet. Droplets containing germs can stay in the air at room temperature for several hours. A person diagnosed with tuberculosis with positive Acid Resistant Basil can transmit at least 10-15 others each year [20].

The first treatment category consists of 2(HRZE)/4(HR)3 used by new patient classification, positive Acid Resistant Basil pulmonary tuberculosis patients, negative Acid Resistant Basil with positive thorax result, and extra pulmonary tuberculosis patients. The second treatment category consists of 2(HRZE)S/(HRZE)/5(HR)3E3 used for previously treated positive Acid Resistant Basil patients, relapsed patients, failed patients, and patients with treatment after breaking up (default) [19].

The complete treatment is a patient who has completed its treatment in full but no results of the re-phlegm examination on the last treatment and one previous examination or a patient who has completed his treatment in full but does not complete the requirements of curing or failing. Recover is a patient that has completed its treatment in full and the follow-up examination results already negative on the last treatment and one previous examination. Default is a patient who is not been treated for 2 months in a row or more before the treatment period is complete [19].

Pharmaceutical and Clinical Aspects

The presence of drug strength is necessary for the prescription so there won't be any errors in the administration for the patient. The drug supply will be used by the patient according to the needs, circumstances, and condition of the patient. The same drug can have more than one drug strengths e.g. lansoprazole has a dosage strength of 15 and 30 mg, there are dosage strengths of 50 mg, 100 mg, and 200 mg, then domperidone there are a dosage strength of 10 mg and 5 mg / 5 ml in the form of syrup or suspension, then ambroxol dosage strengths are 30 mg, 15 mg / 5 ml in syrup form [21] The strength of the dosage is important because it relates to the dosage of the drug as well as the drug forms. But for the regulation in this General Hospital, if there's no presence of drug strength, so it means the smallest drug strength that available.

Another important thing is to write the drug form because the drug can have more than one form and it adjusts the patient's need. For example, ambroxol has more than one form, namely tablets and syrups. Another example of a drug that has more than one the available drug is acetylcysteine there are syrups, tablets, and capsules then curcuma can be in the form of tablets or syrups. Last, for pyridoxine there are tablet and syrup options [22]. In this hospital, pyridoxine only available in form of a tablet. The reason behind a high percentage of the incompleteness in drug forms because if the drug form is a tablet, it is usually not written on the medical records or on prescription. The tuberculosis drugs themselves already have complete pharmaceutical aspects.

The dose of a drug is the number of drugs that can be used or given to a patient both to be used as medicine inside and outside [23]. Dose accuracy is necessary for the effects of the drug to be achieved. The determination of the dose for tuberculosis drugs is determined from the patient's weight because the effects of the drug itself are affected by the patient's condition. As for tuberculosis patients according to this hospital formulary, for weight less than 40 kg R/H/Z/E 300/300/750/750, 40-60 kg R/H/Z/E 450/300/1000/1000 and weights above 60 kg R/H/Z/E 600/400/1500/1500 (R= Rifampin, H= Isoniazid, Z= Pyrazinamide, E= Ethambutol). As for FDC or Fix Dose Combination is also based on weight. For weight less than 38 kg FDC 1x2 tab, 38-55 kg 1 x 3 tabs and more than 55 kg FDC 1 x 4 tabs. For the tuberculosis drugs it already have a 100% clinical aspects accuracies.

The error of dosing is one prescription containing duplication of vitamin B6, in the prescription written vitamin B6 2 x 10 mg and lesichol 2 x 300 mg. The content of lesichol consist of lecithin (ppc 95%) 300 mg, vitamin B1 6 mg, B2 6 mg, B6 6 mg, B12 6 mg, vitamin E 10 mg and nicotinamide 30 mg. Duplication of vitamin B6 passes the maximum dose (5-20 mg/day) [27]. Furthermore, in other prescriptions there is the administration of curcumin 1 x 5 tab where according to the literature of curcmin administration is 1 x 1-3 tab and in the last 2 recipes, there is the administration of lesichol 2 x 300 mg where according to the literature of the administration of lesichol is 3 x 1-2 soft capsules [22]. However, from the hospital formulary dose administration of the above drugs are correct. Dosing should also refer to the patient's condition.

According to figure 7 accuracy of the frequency of administration of the drug amounted to 93%. This result is said to be correct because it is in line with Bilqis' research [6] which obtained the accuracy of the frequency of drug administration 91.5% and has been said to be appropriate. On the prescription written lesichol 2 x 300 mg where according to the literature the frequency of use of lesichol 300 mg is 3 x 1-2 soft capsules. Lesichol is a useful drug to maintain liver function where one of the side effects of anti-tuberculosis drugs namely isoniazid, rifampin, and pyrazinamide can interfere with liver function [2]. But for the frequency of drug administration written in this hospital formulary shows that the frequency

of administration of the drugs are appropriate.

According to figure 8, there was 2% for drug duplication. Duplication of treatment is a double dose of treatment or the same drug but through different administration routes [24]. The results showed there were drug duplication in 1 prescription namely pyridoxine 2 x 10 mg and lesichol 2 x 300 mg because the content of lesichol consists of lecithin (ppc 95%) 300 mg, vitamin B1 6 mg, B2 6 mg, B6 6 mg, B12 6 mg, vitamin E 10 mg and nicotinamide 30 mg. Duplication of therapy in addition to wastage can also lead to increased risk of toxicity of patients, especially hepatotoxic [25]. However, for pyridoxine which includes water-soluble vitamins, it is never in a state of toxicity in the body because this excess vitamin will be secreted through urine [26]. Consideration of administering lesichol with pyridoxine can also be based on the patient's condition which makes it possible to get additional doses.

Limitations of Research

Because of the lack samples due to the Covid-19 outbreak makes it impossible for researchers to visit hospitals, the samples obtained were samples before the Covid-19 outbreak.

5 Conclusion

In sociodemography aspects, most characteristics of patients were male, 26-35 years old, new patients classification, first category tuberculosis treatment, and complete treatment results were 64%, 23%, 92%, 92%, and 90%, respectively. The completeness in pharmaceutical aspects such as dosage form and drug strength were on 51% and 37%, respectively. Accuracies in clinical aspects were 93% for both dose accuracies and frequency of drug administration. Last, there was 2% of drug duplication. The highest incorrect data is drug strength presence on 63% and the highest correct aspects are accuracies in drug dose and frequency drug administration on 93%.

In tuberculosis drug aspects, this hospital have complete accuracies and presence in pharmaceutical and clinical aspects. The electronic prescription service especially in tuberculosis treatment in this hospital in 2018 has been said to be appropriate. For better result need more samples. Collaboration between physicians and pharmacists play a significant role in ensuring patient safety and the quality use of medicines.

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