Open Access　　　　　　　　　　　　　　　　　　　　　　　　　**Research Article**

The Evaluation of Rationality of Medicines Use in Terms of Prescribing Indicators At The Health Center (Puskesmas) Serdang Bedagai District In 2019

Irawati Sasmita [1*]; Khairunnisa [2]; Dalimunthe Aminah [2]

[1]Graduate Student, Faculty of Pharmacy, University of Sumatera Utara, Medan, **Indonesia.**

[2]Department of Pharmacology, Faculty of Pharmacy, University of Sumatera Utara, Medan, **Indonesia.**

A B S T R A C T

Objective: Irrational use of drugs is still the biggest problem in achieving effective and efficient therapy inpatient health. The World Health Organization estimates that more than 50% of all drugs in the world are prescribed, administered and sold inappropriately and half of the patients use drugs inappropriately. According to the Indonesian Ministry of Health, prescribing in Indonesia is still categorized as non-rational. So from that, the purpose of this study is to evaluate the rational use of drugs in terms of indicators of limited prescription drugs at the Serdang Bedagai District Health Center, North Sumatra Province.

Methods: This research method is descriptive and carried out with a retrospective cross-sectional study design at the health center in Serdang Bedagai District. The rationality analysis of the drug was carried out on 3 types of diseases, Upper Respiratory Tract Infection (URTI) non-pneumonia, non-specific diarrhea, and myalgia. The rational drug use data analysis was compared with 6 predefined indicators and 1 additional indicator set by the Indonesian Ministry of Health and WHO.

Results: The results showed that the mean number of drugs per patient for URTI non-pneumonia, non-specific diarrhea and myalgia were 3.16; 3.50; 3.10. The mean percentage of generic drugs prescribed for URTI non-pneumonia, non-specific diarrhea and myalgia were 85.1%; 90%; 86.8%. The mean percentage of antibiotic prescribing for URTI non-pneumonia and non-specific diarrhea were 26.49% and 38.24%. The mean percentage of injection prescriptions for myalgia was 2.9%. The percentage of prescription according to Essential Medicines List (EML) for URTI non-pneumonia, non-specific diarrhea and myalgia was respectively 80%; 76.3%; 78.4%. The average cost of each prescription for URTI non-pneumonia, non-specific diarrhea and myalgia were RP. 12,001; Rp. 5,716; Rp. 2,778.

Conclusion: Based on the indicators of prescribing drugs at the health center in Serdang Bedagai District, it is still not rational.

Keywords: Rationality of drug use, prescribing indicators, Public health center, Serdang Bedagai district.

INTRODUCTION

Medicine is an indispensable component of health care. Medicines play a very important role in patient health, however rational use of drugs is still the biggest problem in achieving effective and efficient therapy in patient health. Rational use of drugs is the use of drugs tailored to the clinical needs of the patient, both in sufficient quantity and time, accompanied by the lowest cost[1]. With the rational use of drugs, the effectiveness and efficiency of drug spending can be increased, which is one of the efforts to cost-effective medical intervention [2]. In addition to these goals, the public can easily obtain drugs at affordable prices, prevent the impact of using inappropriate drugs that can endanger patients and increase patient confidence in the quality of health services [2].

The irrational use of drugs can have an impact on the decline in the quality of health services and increase the government budget allocated for medicines. Waste of costs mainly due to the occurrence of antibiotic resistance which is reported to cost US $ 4-5 billion per year in the United States and € 9 billion in Europe. Deaths due to antimicrobial resistance in the world in 2014 are estimated to reach 700,000 people per year and an estimated 10,000,000 people per year in 2050 [3]. Besides, irrational use of drugs can have an impact on increasing health and psychosocial service costs which can reduce public confidence in the quality of health services. or patient dependence on unnecessary drugs, an increase in the number of drug items which will lead to increased side effects and antibiotic resistance and the higher costs to get health services [4,5].

The World Health Organization estimates that more than 50% of all drugs in the world are prescribed, administered and sold inappropriately and half of the patients use drugs inappropriately. Approximately 1/3 of deaths in the world are due to irrational drug use including overuse and use of wrong drugs and more than 60% of patients are prescribed non-standard treatment guidelines in developing countries [6]. Studies conducted WHO states that spending on drug costs has increased by 70% in the last decade but not accompanied by an increase in rational drug use. In addition to drug-selling companies, health providers and patients are also responsible for irrational drug use [4]. Whereas in Indonesia itself, based on the results of the 2016 Government Agency Performance Accountability Report, the Ministry of Health of the Republic of Indonesia reported Prescription Indicator Data at Health center 2016 in the fourth quarter that it was still high percentage of antibiotic use in non-pneumonia cases of URTI 36.68%; 36.54% use of antibiotics in cases of non-specific, non-specific diarrhea, 3.34% use of injections in cases of myalgia and 3.31 mean score of drug-type items for each prescription sheet [7].

The World Health Organization has established several indicators of drug use as a basic method for assessing rational drug use in health facilities. One of them is prescription indicators, this indicator can be used to measure data, both taken retrospectively and prospectively on health services. Prescribing indicators use an assessment method of prescriptions given to patients which are then determined by WHO standards [8,9]. So from that, the researchers conducted an evaluation related to rational drug use in terms of indicators of limited prescription drugs at the Serdang Bedagai District Health Center, North Sumatra Province.

MATERIAL AND METHODS

Design and Type of Research

This research is a descriptive study conducted with a cross-sectional study design retrospectively at the health center in Serdang Bedagai Districts.

Place and Time Of Research

This research will be carried out in 20 health centers in Serdang Bedagai Districts, North Sumatra. Data were collected in July 2019. Data were taken from January to March 2019.

Population

The population in this study were inpatient, outpatient and medical record prescription sheets with a diagnosis of URTI non-pneumonia, non-specific diarrhea and myalgia at the Health center in Serdang Bedagai Districts for the period January - March 2019. The prescription selection was based on inclusion and exclusion criteria, namely as following [3]:

1. Prescription Inclusion Criteria
   a) Recipes with recipe dates that are in the period January - March 2019.
   b) The prescription that has administrative completeness (name of patient, age, weight of patient especially in children aged <12 years and patient's address).
   c) Prescription for patients with non-pneumonia UTRI, non-specific diarrhea and myalgia
2. Sample exclusion criteria:
   a) Recipe with illegible writing.
3. The criteria for calculating the amount of medicine per prescription are:
   a) All of the drugs that are in the prescription, different drugs will be counted as different drugs.
   b) Drug with the same name but with a different dosage form is counted as a different drug.
   c) The drug combination that has been used as a fixed standard of therapy for certain diseases according to the basic treatment guidelines at the health center is counted as one drug.
   d) Powder and drug combinations were calculated for the details of the drug.
   e) Types of drugs include oral drugs, injections and external drugs.
   f) Antibiotics include chemotherapy and antiamoeba.
   g) The vitamins given are also counted as medicine

Data Collection Technique

Data collection for prescription rationality was carried out by taking one prescription for each disease per day. Prescription data was taken in the January-March 2019 period by observing and analyzing the existing recipes at the Health center in Serdang Bedagai Districts. If on the day of sampling there were no cases with a diagnosis of the disease, the data were continued with the same diagnosis on the following day [3].

Data Analysis

The data analysis obtained was analyzed descriptively and described in tabular form. The data is inputted into the Microsoft Excel program. Data on rational drug use were compared with the tolerance limits set by the Indonesian Ministry of Health and WHO. The following is the tolerance limit set by the Ministry of Health of the Republic of Indonesia and WHO regarding prescribing indicator parameters [3,9–13].

1. The average number of medicines prescribed per patient encounter: 2.6
2. Percentage of medicines prescribed by generic name:

100%

3. Percentage of encounters with an antibiotic prescribed of URTI non-pneumonia: 20%
4. Percentage of encounters with an antibiotic prescribed of non-specific diarrhea cases: 8%
5. Percentage of encounters with an injection prescribed of myalgia cases: 1%
6. Percentage of medicines prescribed from an EML or formulary: 100%
7. In addition to the prescription indicator parameters above, there are additional indicator parameters, namely the average drug cost per patient [3,9–13].

RESULT

Characteristics of Public health center

The Serdang Bedagai District Health Office has 20 Health center. All health center are scattered in several sub-districts and outputs in the area. Each health center has different conditions related to workforce, workload and facilities. The difference in the availability of health personnel can affect the services provided at each health center. The following is a table of the number of health workers at the Serdang Bedagai District health center

Table 1 Number of Health Workers in Public health center in Serdang Bedagai District

No.	Public health center in Serdang Bedagai districts	Variable Health Workers		
		Pharmacist	Pharmaceutical Technical Staff	Doctor
1	Sipispis	0	0	5
2	Silinda	0	1	4
3	Bintang Bayu	0	3	5
4	Kotarih	1	1	4
5	Tanjung Bringin	0	1	4
6	Pegajahan	0	2	3
7	Bandar Khalipah	0	1	3
8	Dolok Masihul	0	1	3
9	Naga Kesiangan	1	2	2
10	Tebing Syahbandar	0	1	3
11	Parawi Pantai Crermin	0	1	6
12	Melati	0	1	3
13	Plus Perbaungan	0	2	6
14	Sialang Buah	0	1	3
15	Serampah	1	0	4
16	Desa Pon	1	0	4
17	Pangkalan Budiman	1	0	4
18	Paya Lombang	0	1	4
19	Kuala Bali	0	2	5
20	Dolok Merawan	0	0	2
	Total	5	21	77

Patient Demographics

In this study, patient demographic data including gender and age group were taken from medical records at the Serdang Bedagai District Health Center. Research data based on gender and age category can be seen in tables 3 and 4 in the three cases at Serdang Bedagai District Health Center.

Table 3 Characteristics of Gender in Serdang Bedagai District Health Center

Variable		Gender		Total
Disease		Women	Male	
Non-pneumonia UTRI	n (%)	1748 (55,2%)	1419 (44,8%)	3167 (100%)
Non specific diarrhea	n (%)	1192 (51,6%)	1120 (48,4%)	2312 (100%)
Myalgia	n (%)	506 (59,2%)	349 (40,8%)	(100%)

Table 4 Characteristics by Age at the Serdang Bedagai District Health Center

Age Group	Non-pneumonia UTRI	Non-specific diarrhea	Myalgia
0-1 Years	85 (2,68%)	22 (1%)	0 (0%)
1-4 Years	284 (8,98%)	169 (7,3%)	0 (0%)
5-9 Years	374 (11,80%)	232 (10%)	15 (1,8%)
10-14 Years	401 (12,65%)	244 (10,6%)	18 (2,1%)
15-19 Years	360 (11,36%)	340 (14,7%)	82 (9,6%)
20-44 Years	742 (23,44%)	538 (23,3%)	252 (29,5%)
45-54 Years	352 (11,10%)	302 (13,1%)	195 (22,8%)
55-59 Years	264 (8,35%)	179 (7,7%)	139 (16,3%)
60-69 Years	200 (6,33%)	161 (7%)	117 (13,7%)
>70 Years	105 (3,31%)	125 (5,4%)	37 (4,3%)

Prescribing Rationality

The rationale for prescribing according to the indicators set by WHO in the form of prescribing indicators consisting of the average number of items in each prescription, the percentage of prescriptions with generic names, the percentage of prescriptions with antibiotics, the percentage of prescriptions by injection and the percentage of prescriptions following the Essential Medicines List (EML) against non-pneumonia cases of URTI, non-specific diarrhea and myalgia [3,8,14]. The results of the sample collection showed that the total sample of recipes for this study from the health centers in Serdang Bedagai District was 3825 recipes. These data have been selected based on inclusion and exclusion criteria.

Non-pneumonia UTRI

In cases of non-pneumonia UTRI, the average number of drugs prescribed to each patient at the health center in Serdang Bedagai District was 3.16. The average percentage of generic drugs at the health center in Serdang Bedagai Districts was 85.1%. The average antibiotic prescription at the health center in Serdang Bedagai District was 26.49%. The average percentage of drugs prescribed from EML in health center in Serdang Bedagai District was 80%. The average cost of drugs per prescription for each patient at the health center in Serdang District is RP. 12,001. The value of prescription and additional indicators for non-pneumonia cases can be seen in table 5.

Table 5 Value of prescription and additional indicators for non-pneumonia cases of UTRI.

No	Parameter	Public health center in Serdang Bedagai districts
1	Average number of medicines prescribed per patient encounter	3,16
2	Percentage of medicines prescribed by generic name	85,1%
3	Percentage of encounters with an antibiotic prescribed	26,49%
4	Percentage of medicines prescribed from an EML or formulary	80%
5	Average medicine cost per encounter	Rp.12.001

Non specific diarrhea

In the case of non-specific diarrhea, the average number of drugs prescribed to each patient at the health center in Serdang Bedagai District was 3.50. The mean percentage of generic drugs at the health center in Serdang District was 90. The average prescription for antibiotics at the health center in Serdang was 38.24%. The average percentage of drugs prescribed from EML in health center in Serdang Bedagai District was 76.3%. The average cost of drugs per prescription for each patient at the health center in Serdang Bedagai District is Rp. 5,716. Prescription and additional indicator parameter values are shown in table 6.

Table 6 Parameter values for prescription and additional indicators in cases of non-specific diarrhea.

No	Parameter	Public health center in Serdang Bedagai districts
1	Average number of medicines prescribed per patient encounter	3,50
2	Percentage of medicines prescribed by generic name	90%
3	Percentage of encounters with an antibiotic prescribed	38,24%
4	Percentage of medicines prescribed from an EML or formulary	76,3%
5	Average medicine cost per encounter	Rp.5.716

Myalgia

In the case of Myalgia, the average number of drugs prescribed to each patient at the health center in Serdang Bedagai District was 3.10. The average percentage of generic drugs at the health center in Serdang Bedagai Districts was 86.8%. The mean percentage of injection use at the health center in Serdang Bedagai District was 2.9%. The average percentage of drugs prescribed from EML at the health center in Serdang Bedagai District was 78.4%. The average cost of drugs per prescription per patient at the health center in Serdang Bedagai District is Rp. 2,778. Parameter values for prescription and additional indicators in cases of myalgia can be seen in table 7.

Table 7 Parameter values for prescription and additional indicators in cases of myalgia.

No	Parameter	Public health center in Serdang Bedagai districts
1	Average number of medicines prescribed per patient encounter	3,10
2	Percentage of medicines prescribed by generic name	86,8%
3	Percentage of encounters with an injection prescribed	2,9%
4	Percentage of medicines prescribed from an EML or formulary	78,4%
5	Average medicine cost per encounter	Rp.2.778

DISCUSSION

Based on the prescription indicator data, the average value of the number of drugs per prescription sheet in Serdang Bedagai District exceeds the criteria determined by the Indonesian Ministry of Health where the value is 2.6. Meanwhile, the average percentage of generic drugs in health centers is still below the target of the Ministry of Republic of Indonesia, which is 100% [13]. The percentage of non-pneumonia ARI antibiotic prescriptions exceeds the maximum limit set by the Indonesian Ministry of Health, which is 20%, while non-specific diarrhea also exceeds the maximum limit set by The Indonesian Ministry of Health is 8%. The percentage of injection prescribing exceeds the maximum limit set by the Indonesian Ministry of Health, which is 1% [3,9–12].

One of the problems of the irrational use of drugs in Serdang Bedagai Districts is polypharmacy, this is probably because doctors are not only focused on providing therapy for disease diagnosis but also therapy for the symptoms it causes. Besides that, it can also be caused by the doctor's habit of prescribing. The paradigm of patients who perceive disease symptoms can quickly disappear with the administration of analgesics, antibiotics and vitamins [15].

Prescription of generic drugs is still below the target of the Ministry of Health at both the Puskesmas in Serdang Bedagai District. Based on the results of interviews with officers at the District/City Health Office, it was found that procurement at the health center was carried out by the District/City Health Office based on the proposed drug needs plan from each health center. The proposed drug needs plan for each health center is different, including proposals for branded drugs. This is due to the varied needs in each health center and the habits of doctors prescribing drugs in therapy. Funds for drug procurement come from special allocation fund, regional budget and use capitation funds. Procurement is carried out through the system in the E-catalog, but drugs that are not listed in the E-catalog are carried out by tender or direct purchase.

Excessive prescription of antibiotics may be due to excessive concern by doctors and patients about bacterial infections and the desire for symptoms to disappear quickly. This is also caused by the habit of doctors in prescribing and the patient's lack of knowledge in the use of antibiotics. The most worrying consequence of overprescribing antibiotics is the development of antibiotic resistance. Anti-oxidic resistance can cause very detrimental impacts both in terms of economics (cost of therapy) and clinical (severity of disease) [8,9]. Therefore, the percentage of antibiotics is expected to be as low as possible avoiding unwanted consequences.

The high prescribing of injections in Serdang Bedagai District is probably due to the belief of the community and doctors that injection preparations are more effective than other preparations [16]. There are other factors such as patients who want injections to quickly relieve their pain and are supported by the availability of trained health workers in performing these injections.

In the percentage of drugs based on EML, there were still drugs that were not included in the EML list. This is in line with the low percentage of generic drug use and based on the results of interviews with officers at the District/City Health Office, there is still drug procurement outside EML and the National Formulary due to requests from doctors at health centers who think these drugs are still needed in medical therapy. The purpose of implementing EML is to improve the accuracy, safety, rationality of use and management of drugs which at the same time increase the effectiveness and cost-effectiveness available as one step to expand, level and improve the quality of health

The average cost of each prescription for each patient varies. This is due to the high amount of polypharmacy on one prescription sheet and the presence of branded drugs in one prescription. The amount of drug costs for each prescription is not felt directly by the community because the cost of treating patients at the health center has been borne by the social security administration for health. However, if the cost of treatment is low, the budget allocation in terms of drug procurement can be reduced and diverted to other sectors, such as increasing development and health services at health center. In addition, the high use of branded drugs causes the allocation of drug spending to be higher than buying generic drugs.

Based on the results of interviews with officers at the District/City Health Office, that the health center in Serdang Bedagai District has conducted training on rational drug use for doctors and pharmaceutical personnel, besides that there are also treatment guidelines available at the health center, EML and the National Formulary which should be a reference in therapy medication to increase the rationality of drug use.

CONCLUSIONS

Based on the indicators of prescribing drugs at the health center in Serdang Bedagai District, it is still not rational. This can be seen from all the parameters analyzed that still exceed the tolerance limits set by the Indonesian Ministry of Health and WHO

REFERENCES

1. Pratiwi AA, Sinuraya RK, Farmasi F, Padjadjaran U. Analisis Peresepan Obat Anak Usia 2–5 Tahun di Kota Bandung Tahun 2012 Ami. *J Farm Klin Indones*. 2014.

2. Kardela W, Andrajati R, Supardi S. Perbandingan Penggunaan Obat Rasional Berdasarkan Indikator WHO di Puskesmas Kecamatan antara Kota Depok dan Jakarta Selatan. *J Kefarmasian Indones*. 2014.

3. RI KK. *Modul Pergerakan Penggunaan Obat Rasional*. Jakarta; 2015.

4. Mohiuddin A. Managing Rational Use of Drugs in Bangladesh. *PharmaTutor*. 2018. doi:10.29161/pt.v6.i11.2018.30

5. Hadiningsih H. Analisis Besaran Biaya Obat Beberapa Penyakit Rawat Jalan dan Faktor- Faktor yang Mempengaruhi di Rs. Awal Bros Bekasi Tahun 2014. *J Adm Rumah Sakit Indones*. 2015.

6. Chao J, Gu J, Zhang H, Chen H, Wu Z. The impact of the national essential medicines policy on rational drug use in primary care institutions in Jiangsu province of China. *Iran J Public Health*. 2018.

7. Kementerian Kesehatan RI. *Laporan Akuntabilitas Kinerja 2016 Direktorat Pelayanan Kefarmasian*. (Kesehatan DJK dan A, ed.).; 2017.

8. Shankar PR. Medicines use in primary care in developing and

transitional countries. *Bull World Health Organ*. 2009.

9. World Health Organization WHO. How to Investigate Drug Use in Health Facilities: Selected Drug Use Indicators - EDM Research Series No.007 WHO/DAP/93.1. *Dep Essent drugs Med policy* 2001.

10. Atif M, Azeem M, Sarwar MR, et al. WHO/INRUD prescribing indicators and prescribing trends of antibiotics in the Accident and Emergency Department of Bahawal Victoria Hospital, Pakistan. *Springerplus*. 2016. doi:10.1186/s40064-016-3615-1

11. Ihsan S, Sabarudin, Leorita M, Syukriadi ASZ, Ibrahim MH. Evaluasi Rasionalitas Penggunaan Obat Ditinjau dari Indikator Peresepan Menurut World Health Organization (WHO) di Seluruh Puskesmas Kota Kendari Tahun 2016. *Medula J*. 2017.

12. Aravamuthan A, Arputhavanan M, Subramaniam K, Udaya Chander J SJ. Assessment of current prescribing practices using World Health Organization core drug use and complementary

indicators in selected rural community pharmacies in Southern India. *J Pharm Policy Pract*. 2016. doi:10.1186/s40545-016-0074-6

13. Republik Indonesia. Kewajiban Menggunakan Obat Generik Di Fasilitas Pelayanan Kesehatan Pemerintah. *Kewajiban Menggunakan Obat Generik Di Fasilitas Pelayanan Kesehatan Pemerintah*. 2010.

14. WHO. Promoting rational use of medicines: core components. *WHO Policy Perspect Med*. 2002.

15. Bhartiy SS, Shinde M, Nandeshwar S, Tiwari SC. Pattern of prescribing practices in the Madhya Pradesh, India. *Kathmandu Univ Med J (KUMJ)*. 2008.

16. Saleh K, Ibrahim MIM, Ibrahim M. How rational are drugs used in Malaysian primary health care sector *Malaysian J Pharm Sci*. 2006.