

Review Article on Rational Drug Use Based On World Health Organization Prescribing Indicators

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Abstract

Background: Rational use of drugs aims to ensure that patients obtain proper treatment according to their needs, for an adequate period of time at an affordable price. The irrational use of drugs is a global problem, and it reduces public trust to health workers. Drug side effects and medication errors also lead to patient resistance and unnecessary in medication.

Objective: This review aims to describe the rational use of drugs based on WHO prescribing indicators

Methods: This review article was conducted by searching for bibliographies published from January 2011 to 2021 in databases such as PubMed and Google Scholar. The articles included in this review were studies that assessed rational drug use based on the WHO prescribing indicators.

Results: A total of 15 articles included revealed an average number of drugs per prescription of 2.54, a percentage of generic prescriptions of 71.72%, a percentage of antibiotic prescriptions of 53.33%, a percentage of injection prescriptions of 11.48%, and a percentage of essential drugs prescription of 87.71%

Conclusion: In general, several indicators were in accordance with the criteria recommended by WHO, while several others did not meet or close to the criteria recommended by WHO.

Keywords: rational drug use, WHO prescribing indicators, public health center, hospital.

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I. Introduction

A prescription is a written request from a doctor, dentist, or veterinarian to a pharmacist, either in paper or electronic form to provide and deliver pharmaceutical preparations or medical devices for patients¹. The use of drugs is said to be rational if the patients receive treatment according to their clinical needs, in the appropriate dose, at a cost that is affordable by the community. The rationale for rational use of drugs is to increase the effectiveness and efficiency of drug costs, which is one of the cost-effective medical interventions². Prescribing indicators measure the performance of health care providers in several key dimensions related to appropriate drug use³.

WHO sets indicators to assess rationality in prescribing as shown in Table 1.

Table 1: WHO prescribing indicator parameters⁴

References	Range
Average number of drugs per prescription	1.6-1.8%
Generic prescription percentage	100%
Antibiotic prescription percentage	20-26,8%
Injection prescription percentage	13.4-24.1%
Essential prescription percentage	100%

Medication errors may occur in every treatment process, either during the prescribing, preparation and delivery of drugs (dispensing), prescriptions reading (transcribing), or during drug use (administering). Errors in prescribing and dispensing are the most commonly occur medication errors⁵. Irrational use of drugs remains occur with more than 50% occur through inappropriate drug use during its preparation, prescription or sale, and the rest 50% occur through inappropriate use by patients. In addition, about a third of the world's population are unable to access the non-essential drugs due to polypharmacy, inappropriate use of antimicrobials, use of injections, overuse of antibiotics and generic, and inappropriate use of essential drugs⁴.

Irrational use of drugs can also lead to wasted costs, especially in antibiotic resistance, medication errors, and adverse drug reactions. The health of drug use always begins with a prescription, so that if the initial process is in accordance with standard parameters, it is hoped that the use of the drug will be correct. The correct use of drugs aims to achieve an economical, safe, and effective treatment⁶. This study aims to investigate the rational drug use according to WHO prescribing indicators as one of the parameters in assessing the rational drug use

because drug use is always begin with prescription during health care services. Hence, the proper beginning that meet the standard parameters is expected to lead to proper drug use. The proper use of drugs aims to achieve an economical, safe, and effective treatment.

II. Methods

The articles were searched in databases, namely PubMed and Google Scholar. The keywords used in the PubMed database were "rational drug use (AND) WHO prescribing indicators" while the keywords used on Google Scholar were "rational drug use (AND) WHO prescribing indicators" that were used to expand or define the search, making it easier to select articles or journal. The articles included were articles published in the last 10 years. The articles selected for screening were articles that address rational drug use based on WHO prescribing indicators. Articles that were not freely accessible, meta-analysis, articles without full text, and case studies were excluded.

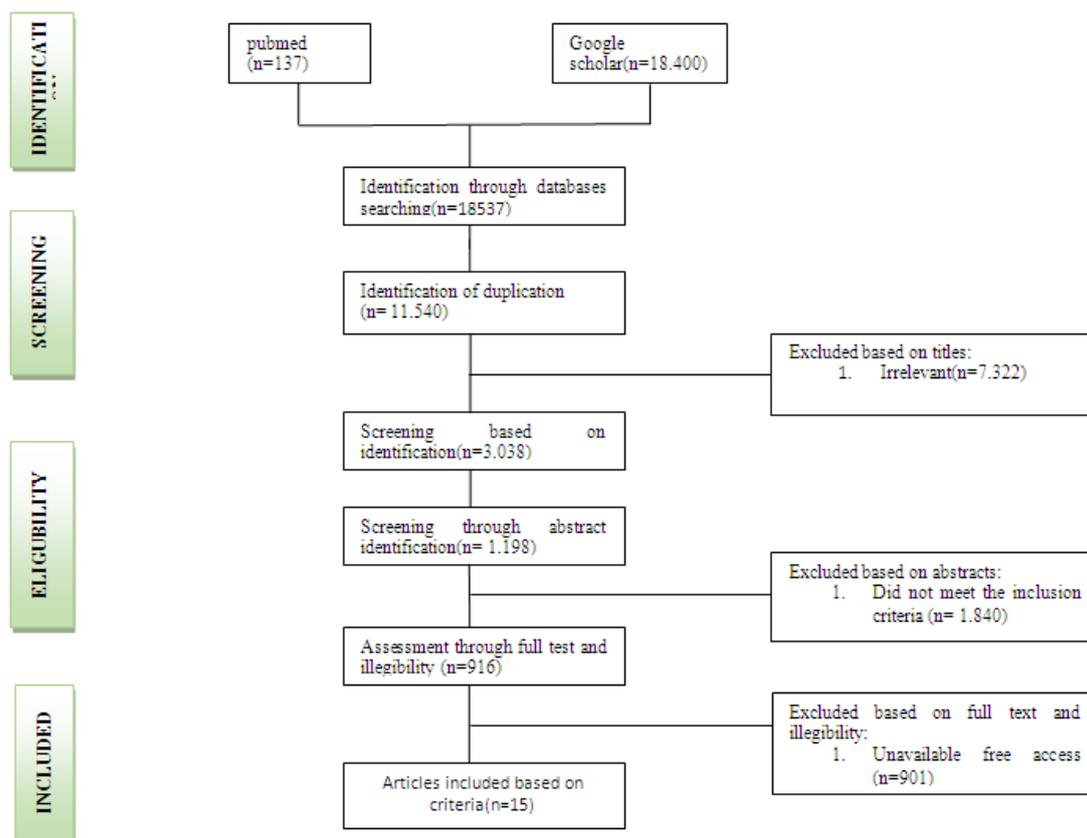


Figure 1. Diagram of article screening / article extraction

III. Result

Table 2. Rational drug use according to WHO prescribing indicators

Ref	WHO prescribing indicators				
	Average number of drugs per prescription	Generic prescription percentage	Antibiotic prescription percentage	Injection prescription percentage	Essential prescription percentage
7	3.24	25.67%	51.64%	4.39%	94.50%
8	2.3	86.8%	70.6%	20.3%	89%
9	2.5	90.53%	34.64%	13.80%	82.83%
10	1.9	98.7%	58%	38.1%	96.6%
11	3.97	96.64%	56%	0%	88.24%
12	2.9	27.7%	84.8%	24.9%	96.7%
13	2.2	97%	82.5%	11.1%	92%
14	2.5	95.4%	39.2%	9.9%	95.4%
15	1.77	100%	48.67%	10.3%	100%
16	1.76	83.14%	53%	7.80%	98.39%
17	2.82	56.6%	51.5%	0%	98.8%
18	2.34	90.61%	57.87%	10.7%	0%
19	1.98	84.22%	25.55%	11.07%	89.8%

²⁰	3.26	0%	76.4%	8.25%	97.8%
²¹	2.7	42.9%	9.6%	1.6%	95.6%
Average	2.54	71.72%	53.33%	11.48%	87.71%

IV. Discussion

The WHO prescribing indicators for rational use of drugs consist of five prescribing parameters that assess the average number of drugs per prescription, the percentage of generic prescriptions, the percentage of antibiotic prescriptions, the percentage of prescription injections, and the percentage of essential drugs prescription.

Average number of drugs per prescription

The average number of drugs per prescription is the number of items per patient prescription sheet to measure the polypharmacy⁷. The average number of drugs per prescription revealed in this study was 2.54, with the highest prescription of 3.97, and the low prescription of 1.76. The recommended standard by WHO for the average number of drugs per prescription is 1.6 - 1.8. In this study, the average number of drugs prescribed was higher than the WHO recommendation. The higher drug prescription may occur due to the lack of professionalism and training of the prescribers⁸. This high average number of drugs per prescription may seriously affect health care by increasing drug interactions, increasing patient costs for drugs, patient non-adherence, wastage, and adverse drug reactions⁹. The high average number of drugs is also possibly due to financial incentives for prescribers, lack of therapeutic training or lack of therapeutically proper drugs¹⁰.

Aside from the economic impact, excessive drug use also stimulates the patient's demand for excessive drugs. If the patient is accustomed to getting large amounts of medicine, the patient will have a tendency to choose a doctor who will prescribe many drugs, because he or she believes that the doctor is more aware of the therapy for his disease¹¹. Polypharmacy affects the patient's treatment outcomes, because patients are more likely to be non-adherent or experience adverse drug reactions. WHO encouraged rational prescription to avoid unnecessary medication and possible side effects in patients¹². As a result of physician prescription focused on symptoms rather than diagnosis, patients are more likely to experience side effects, iatrogenic disease, drugs interactions, and toxicity⁷. There are no adequate studies identifying the reasons for polypharmacy in the study area, but it may be related to variations in the health care delivery system, lack of adequate professional training, differences in socioeconomic profiles as characteristics of population mortality and morbidity¹³. The percentage of prescriptions is expected to increase the professionalism and adequate training, thereby avoiding increased drug interactions, overuse of drugs, adverse drug reactions. Meanwhile, low average number of drugs per prescription may occur due to lack of knowledge of the prescriber.

Generic Prescription Percentage

Generic drug is a drug with a trade name, which uses the name of the drug manufacturer²². The percentage of generic prescriptions in this study was 71.72% with the highest prescription of 100%, and the lowest prescription of 0%. Meanwhile, the generic prescription percentage recommended by WHO is 100%. In this study, there were generic prescriptions that were lower or close to the WHO recommended standard.

Prescribing drugs with generic names is important, as it makes the exchange of communication and information between health care providers easier¹⁴. Increasing generic prescriptions can substantially reduce drug costs for patients. Generally, generic prescription is an indicator of prescribing quality and the cost of prescription can determine compliance levels¹⁵.

The high rate of generic drugs prescription may be due to procurement of generic drugs is the prevailing practice¹³. The prescription for essential drugs written with a generic name significantly reduces the cost compared to prescription of branded drugs⁸. Several branded drugs are difficult to access. The prescription of several branded drugs in this study may be due to the relationship between the business group and the drug promoter with the physician⁹. Familiarity with the brand name, the habit of prescribing old prescriptions, may also be the reason of physician to prescribe branded drugs. Prescribing with generic names is something that needs to be addressed in health care settings¹⁶. Doctors prescribe generic drugs when there is a request from the patient to replace the prescription with an unbranded generic drug whose price is relatively more affordable, considering it is the right of each patient to ask for a generic drug prescription every time come to see a doctor. When a generic drug without a brand experiencing scarcity, the doctor will switch to branded or patented generic drugs⁷. WHO recommends prescribing drugs with their generic names providing clear identification, and the possibility of increased communication between health professionals¹². Polypharmacy affects treatment outcomes by putting patients at higher risk for side effects. Similarly, drugs that do not need to be prescribed under generic names can put extra financial pressure on patients, as well as health care budgets. The goal is to prioritize generic prescribing over originator brand prescription because it helps increase clarity among health providers. In addition, generic drugs are cheaper than brand-name drugs¹⁷. Generic prescriptions must provide clear identification, so that

patients perceive it as a safety measure, and improve communication between healthcare professionals, in order to avoid higher risk to experience side effects.

Percentage of Antibiotics Prescription

Antibiotics are the most widely used drugs for infections caused by bacteria²³. The percentage of antibiotic prescribing in this study was 53.33%. The highest prescription was 84.8% and the lowest was 9.6%, while the standard recommended by WHO is 20-26.8%. In this study, there were prescriptions with antibiotic names that were higher than the WHO recommended range, but there were some that were close to the WHO recommended range, and some were lower than the WHO recommended range. The irrational use of antibiotics is a worldwide problem, which can lead to adverse reactions and hospitalizations. Therefore, safety precautions must be taken when antibiotics are used. Excessive use of antibiotics results in an increase in antibiotic resistance which is one of the problems under the irrational use of antibiotics¹⁴. It also has become a serious potential threat⁹.

Irrational prescription of antibiotics may lead to the emergence of antimicrobial resistance which is one of the main obstacles to chemotherapy¹⁸. It may be due to overestimation of disease severity, and the desire of both doctors and patients to get rid of the disease quickly¹¹. This leads to increased antibiotic resistance and waste of scarce resources¹². This irrational antibiotic prescription may be caused by middle-level health workers who work in periphery area with small distribution of health workers to the population ratio, especially doctors, health workers and pharmacists¹³. This irrational antibiotic prescription occurs due to the absence of regulations ruling the antibiotic prescribing. Eventually, it can affect patient compliance by causing the emergence of drug-resistant microorganisms⁸. The high percentage of antibiotics prescription may be due to various reasons. Firstly, the high rate of excessive routine empiric care in resource-poor countries. Secondly, because of patient pressure on prescribers. Thirdly, increased prevalence of infectious diseases in developing countries resulting in the number of antibiotics being prescribed, these results may suggest that because patients are involved in self-medication using antibiotics¹⁶. Antibiotic prescribing needs to be regulated. The high percentage of antibiotics prescribed, perhaps because of cultural beliefs about antibiotics, the patient's expectation of receiving antibiotics or the prescriber's belief that the efficacy of antibiotic therapy is low. Evaluation of used medication should be carried out to evaluate whether the antibiotics prescribed are appropriate or not¹⁰. Antibiotics prescription is not expected to be over-prescribed or used indiscriminately, because over-administration of antibiotics is an irrational use of antibiotics, which can also lead to the emergence of antimicrobial resistance. Antibiotics are given when the doctor suspects a bacterial infection that cannot be cured without antibiotics.

Percentage of injection prescription

Injection is an invasive procedure that involves inserting drugs through sterile needles that are inserted into body tissues²⁴. The percentage of injection prescription in this study was 11.48% with the highest prescription of 38.1%, and the lowest prescription of 5.97%. Meanwhile, the recommended standard set by WHO is 13.4-24.1%. In this study, there were prescriptions with injection which were lower than the WHO recommended range, but there were also those that were higher than or close to the WHO recommended range.

Drugs are prescribed by injection when the doctor's clinical examination indicates that the patient needs the drug to be given quickly, the patient has limitations in taking oral drugs and to obtain a drug reaction that is quickly absorbed, uncooperative patients, for example, the patient cannot swallow the drug, but a rapid effect is required⁷. Minimum injection use is preferred because it reduces the risk of infection via the parenteral route and costs involved in therapy¹³. Overuse of injections can be associated with unnecessary injection-related costs, risk of transmission of potential infection through needle stick injury and physiological pain during injection, difficulty of overdose titration, therefore safer, cost-effective and simple oral alternatives should be promoted¹⁸. Overuse of injections despite oral medication availability is an irrational drug use, because of the higher cost¹⁴. High injection prescription may occur because most of the drug preparations are injected, and the patient believes that the disease will heal if given an injection. Excessive injection can cause local irritation, septic hepatitis, tissue necrosis and difficulty correcting pain errors⁸. The administration of injections is associated with risks and injections require a trained health care professional for administration. Prescribing is advised to be non-parenteral route of administration whenever possible¹⁶. Thus, WHO recommends that prescriptions of less than 10% should include one or more injections, all health facilities permitting injections in a manner comparable to WHO recommends strongly recommended¹⁹. Irrational use of antimicrobials is a widespread problem that ends in adverse drug reactions and increased morbidity²⁰. Injections are expensive compared to other dosage forms and require trained people, but use of unhygienic injections can increase the risk of transmission of diseases such as hepatitis²¹. This variation can be explained due to differences in the distribution of disease patterns and the level of care provided by professionals, reducing the percentage of injection may be advantageous in reducing the chances of transmitting blood-borne infections such as HIV¹⁵. Possible reasons for the high use of injections are the beliefs and attitudes of patients and health professionals about the efficacy of the injection, treated and injectable form result in a faster onset of action. Injections are very expensive compared to other dosage forms and require trained personnel for administration. In addition, the use of unhygienic injections can increase the risk of transmission of

potentially serious pathogens¹⁰. The use of drugs by injection is not expected to be over-prescribed and trained people are required, because the use excessive drugs can lead to irrational use of the drug, which can cause local irritation, and hygienic injections are also required to prevent hepatitis.

Percentage of essential drug prescription

Essential drugs are selected drugs that are highly needed for health services, including prophylaxis, therapy and rehabilitation, diagnosis, which are made available at health facilities according to their function and level²⁵. The percentage of essential drug prescription in this study was 87.71%. The highest prescription was 100%, and the lowest prescription was 82.83%. meanwhile, the WHO recommended percentage is 100%. In this study, there were essential prescriptions that were lower than the WHO recommended range, but many were almost the same as those recommended by WHO. The percentage of prescription essential drugs in the formulary aims to determine the tendency of prescribing drugs that are in accordance with the formulary of health care facilities⁷. Prescription of EDL(Essential Drug list) drug list is recommended by WHO, because all drugs listen in EDL have been tested clinically with lower price compared to new drugs. Even so sometimes doctors choose drugs that are not in the EDL due to insufficiency and the lack of supply²⁰. Prescribers are expected to be aware of drugs in the list of essential drugs, The practice of prescribing from EDL needs to be encouraged through rational prescribing patterns⁸. Prescribing from EML is a rational way of prescribing, but prescribers may not choose drugs that are not in the EML due to insufficient supply of copies of EML¹². DEON application is intended to improve the safety, accuracy, rationality and management of drug use which at the same time increases the usability and effectiveness of the available costs as one of the steps to expand, equalize and improve the quality of health services to the community. Factors that affect the lack of utilization of essential drugs are insufficient prescription of essential drugs¹¹. Prescription of essential drugs must meet the recommended standards who (100%). It is expected that there will be no excessive use of drugs, or less than the recommended range, because essential drugs are selected drugs that are highly needed in health services hence the use of essential drugs can be said to be rational.

V. Conclusion

A total of 15 articles addressing rational drug use based on WHO indicators were included in this study. Several article results were in accordance with the criteria recommended by WHO, while the rest were not in accordance or close with the criteria recommended by WHO. The average number of drugs per prescription was 2.54%, the percentage of generic prescriptions was 71.72%, the percentage of antibiotic prescriptions was 53.33%, the percentage of injections prescription was 11.84%, and the percentage of essential drugs prescription was 87.71%

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