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Prescription Patterns in the Outpatient Unit of XYZ Hospital, Pekanbaru: A Study from 2022

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ABSTRACT

This study aims to assess the rationality of drug prescribing practices in the Outpatient Department of XYZ Hospital Pekanbaru using the World Health Organization (WHO) prescribing indicators. The research is an observational study with a descriptive nature, employing systematic random sampling to analyze data extracted from prescription records in the pharmacy department of XYZ Hospital Pekanbaru. A total of 660 prescription samples were evaluated, revealing an average of 2.91 drugs prescribed per prescription sheet, indicating a lack of adherence to diagnostic considerations. The findings show that the percentage of generic drug prescriptions was 64.04%, while antibiotic prescriptions accounted for 32.57%. Additionally, prescriptions for injectable forms constituted 1.36%, and adherence to the national formulary was at 72.27%. Out of the five prescribing indicators assessed, only the prescribing of injectable forms met the WHO's prescribing indicators standard. These results highlight the necessity for improved adherence to rational prescribing practices to enhance treatment efficacy, minimize adverse drug reactions, and ensure cost-effectiveness in patient care. Regular monitoring and education of healthcare providers regarding rational drug use principles are essential for improving healthcare service quality.

1. Introduction

The proper and appropriate use of drugs in hospitals based on treatment guidelines can support the optimization of fund usage, increase coverage, and improve the quality of health services (Andayani & Satibi, 2016). Rational drug use requires that patients receive medication that meets their clinical needs, in the correct dosage and timing, at an affordable cost. Globally, more than 50% of drugs are prescribed, distributed, and sold inappropriately, and 50% of patients fail to take their medication correctly. Inappropriate drug use includes polypharmacy, incorrect antibiotic use, excessive use of injections, and failure to prescribe medications in accordance with clinical guidelines (Aparasu & Rege, 2022).

Hospitals must develop policies related to effective drug management, which should be reviewed at least once a year. This review helps hospitals identify the needs and priorities for quality systems and drug safety (Zairina et al., 2024). Continuous evaluation is necessary to maintain rational drug use and healthcare quality. One way to measure rationality in treatment is by using indicators developed by the International Network for the Rational Use of Drugs (INRUD) and adopted by the World Health Organization (WHO) for assessing outpatient drug use (Putri et al., 2024).

The World Health Organization (WHO) has three key drug use indicators: prescription indicators, patient care indicators, and facility indicators. Prescription indicators are the most commonly used to

identify issues in prescribing practices. These include parameters such as the average number of drugs per prescription (to assess polypharmacy), percentage of generic drugs prescribed (cost-effectiveness), percentage of antibiotics prescribed (to control resistance and cost), percentage of injections (to minimize injection use), and percentage of prescriptions in line with formularies (to assess physician compliance) (Andayani & Satibi, 2016; Zairina et al., 2024).

Based on research findings from several hospitals in Indonesia, many results still do not meet the World Health Organization (WHO) prescription indicator standards. For instance, Anggriani's (2015) study on outpatient prescriptions at PKU Muhammadiyah Yogyakarta Hospital Unit II in 2013 revealed that appropriate drug use had not been achieved. The findings showed an average of 2.44 drug items per prescription (WHO: 1.8-2.2), 38.92% generic prescriptions (WHO: >82%), 12.7% antibiotic prescriptions (WHO: <22.70%), 2.11% injection prescriptions (WHO: 0%), and 95.55% prescriptions compliant with the hospital formulary (WHO: 100%) (Andayani & Satibi, 2016; Zairina et al., 2024).

A separate study conducted by (Rahmawati & Mutmainah, 2023) on the analysis of medication usage among roadside patients at one of Hospital in Sleman (Indonesia) in June 2016 also revealed results that did not meet the standards set by the World Health Organization (WHO). The results indicate that the average number of listed pharmaceuticals is 2.47 (WHO: 1.8-2.2), the average percentage of pharmaceuticals with generic names is 80.16% (WHO: >82%), the average percentage of antibiotics prescribed is 41% (WHO: <22.70%), the average percentage of pharmaceuticals with injectable availability is 6% (WHO: 0%), and the average percentage of pharmaceuticals listed in the National Formulary is 97.85% (WHO: 100%). Inappropriate prescribing can lead to treatment failure, an increase in adverse drug reactions (ADR), antibiotic resistance, drug shortages, and a decrease in patient trust in the healthcare system (Atmaja et al., 2024; Elbeddini et al., 2023) .

Based on a preliminary study conducted by the researcher at XYZ Hospital Pekanbaru on 50 outpatient prescriptions, the results showed an average of 3.28 prescriptions per sheet (WHO: 1.8-2.2), prescriptions with generic drug names amounted to 95.12% (WHO: >82%), antibiotic prescriptions were 24% (WHO: <22.70%), injectable prescriptions were 0% (WHO: 0%), and the prescribed drugs in accordance with the formulary were 90% (WHO: 100%). From the results of the research, it was found that there are still many cases of over-prescription, excessive use of antibiotics, and drug selection that is not in line with the formulary. Based on the issues related to prescribing that have been described above, the researcher is interested in evaluating drug use based on the World Health Organization (WHO) prescribing indicators (Hadi et al., 2008; Limato et al., 2022).

The selection of XYZ Hospital Pekanbaru as the research site was motivated by the absence of similar studies conducted at this institution. Accredited at the paripurna level by the Hospital Accreditation Commission (KARS), the hospital is required to meet stringent standards of drug utilization. Additionally, the hospital’s high volume of outpatient visits, averaging 5,500 visits per month in 2022, further supports its suitability as a site for this research (Yuniar et al., 2020; Zairina et al., 2024).

The aim of this study is to evaluate drug use in the Outpatient Department of XYZ Hospital, Pekanbaru, by applying the prescribing indicators established by the World Health Organization (WHO). This evaluation is crucial to ensure that medications are used effectively and efficiently, and to improve the quality of healthcare services at the hospital. The findings from this study are expected to provide a clear overview of drug use patterns at the hospital, and to serve as a basis for future evaluation and improvement in drug prescribing practices (Aparasu & Rege, 2022; Hadi et al., 2008; Limato et al., 2022).

2. Materials and Methods

This study is an observational descriptive study. The data used are retrospective data in the form of outpatient prescriptions at XYZ Hospital Pekanbaru for the 2022 period. The population in this study consists of 83,241 outpatient prescriptions at XYZ Hospital Pekanbaru from January to December 2022 (Prawiroharjo et al., 2024).

The sample size determination follows WHO guidelines, requiring a minimum of 600 prescriptions for retrospective studies. A 10% margin of sampling error was considered, leading to a total of 660 prescriptions to account for potential dropouts, such as incomplete or illegible prescriptions (Ghozali,

2024). The study employed Systematic Random Sampling, where the first element is selected randomly, followed by subsequent selections at a fixed interval (Aparasu & Rege, 2022; Hadi et al., 2008; Limato et al., 2022).

Sampling is conducted by determining the sample interval using the formula:

$K = \frac{N}{n}$

Notes :

K: Range of Interval

N: Total population

n: Total sample

Using this formula, the calculation is as follows:

$K = \frac{83.241}{660}$

= 126

The instrument used in this study is the outpatient prescriptions from the pharmacy department of XYZ Hospital Pekanbaru. Based on the above calculation, an interval of 126 prescriptions was obtained for each sample selection. The instrument used in this study consists of outpatient prescriptions collected from the pharmacy department of XYZ Hospital Pekanbaru. These prescriptions contain essential information such as patient demographics, prescribed medications, dosages, duration of therapy, and prescribing physician details. The prescriptions were retrospectively reviewed to assess completeness, legibility, and compliance with prescribing guidelines.

The collected data were analyzed descriptively, tabulated, and presented in diagrams and tables. The findings were compared with relevant literature, including WHO guidelines, national formularies, and peer-reviewed studies on prescription patterns. The comparison focused on drug appropriateness, dosage accuracy, and prescribing trends to evaluate compliance with standard guidelines (Hasanuddin et al., 2024).

The data analysis includes the number and percentage of patient characteristics such as age, gender, and health insurance status. Further analysis covers the average number of medications per prescription sheet, the number and percentage of generic drug prescriptions, the number and percentage of antibiotic prescriptions, the number and percentage of injectable drug prescriptions, and the number and percentage of prescribed drugs that align with the National Formulary (FORNAS) and the hospital's formulary (Purwono et al., 2023).

3. Results and Discussion

After After Table 1 presents the demographic characteristics of patients at XYZ Hospital Pekanbaru based on age, gender, and health insurance status. The majority of patients fall within the elderly category (46–65 years old), accounting for 36.06% (n = 238) of the total sample, followed by adults aged 26–45 years (27.73%, n = 183). Meanwhile, teenagers (12–25 years old) and children (0–11 years old) constitute 14.70% (n = 97) and 7.87% (n = 52), respectively. Seniors aged 66 years and above represent 13.64% (n = 90).

Regarding gender distribution, female patients (59.85%, n = 395) outnumber male patients (40.15%, n = 265), which may suggest differences in healthcare-seeking behavior, with women generally being more proactive in utilizing medical services compared to men.

In terms of health insurance status, the majority of patients (68.94%, n = 455) are covered by National Health Insurance, while 31.06% (n = 205) do not have National Health Insurance coverage. This disparity in insurance coverage could potentially impact access to healthcare services, treatment adherence, and financial burden on uninsured patients. The demographic trends observed in this study provide an essential foundation for understanding healthcare service utilization, prescribing patterns, and potential areas for healthcare policy improvement.

Table 1. Patient Characteristics Based on Age, Gender, and Insurance Status at XYZ Hospital Pekanbaru

Patient Characteristic	Total (n)	Percentage (%)
Age (Year)		
Children (0 - 11 years old)	52	7,87
Teenager (12 - 25 years old)	97	14,70
Adult (26 - 45 years old)	183	27,73
Elderly (46 - 65 years old)	238	36,06
Seniors (66 years old)	90	13,64
Gender		
Male	265	40,15
Female	395	59,85
Health Insurance Satus		
National Health Insurance	455	68,94
Non National Health Insurance	205	31,06

Based on the results of the patient characteristics above, it is evident that, by age, the incidence of disease occurs most frequently among elderly patients. Similar findings were reported in the previous study. which indicated that the highest incidence of disease was also observed in elderly patients, with a percentage of 40.15% (Table 1). Based on the results of the patient characteristics above, it is evident that, by age, the incidence of disease occurs most frequently among elderly patients. Similar findings were reported in previous studies, which indicated that the highest incidence of disease was also observed in elderly patients. In this study, the elderly group (46–65 years) accounted for the largest proportion of patients at 36.06%, followed by the adult group (26–45 years) at 27.73%. Meanwhile, the senior group (66 years and older) comprised 13.64% of the patients. These findings align with epidemiological trends that show an increasing prevalence of diseases with aging, particularly among middle-aged and elderly populations. Furthermore, the distribution of patients by gender shows that female patients (59.85%) outnumber male patients (40.15%), which may reflect healthcare-seeking behavior differences or disease prevalence variations between genders. In terms of health insurance status, the majority of patients (68.94%) were covered under the National Health Insurance, while 31.06% were not, indicating a significant reliance on government-supported healthcare services (Andrajati et al., 2017; Purwono et al., 2023).

This is because the elderly population is vulnerable to various diseases. This vulnerability occurs due to several factors, including a decrease in immunoglobulin production as antibodies, a decline in immune system response, the presence of comorbidities that arise after a decline in the structure and function of body organs, functional impairments, malnutrition that increases susceptibility to infectious diseases, and poor environmental conditions. In general, the most common diseases experienced by the elderly include infectious diseases such as influenza, diarrhea, pneumonia, and urinary tract infections, as well as non-communicable diseases like diabetes mellitus, coronary heart disease, hypertension, and joint diseases. According to the Central Statistics Agency (BPS), the life expectancy of residents in Pekanbaru reaches 72.70 years. Consequently, in this study, there were only 90 elderly patients, accounting for 13.64% (Himawan, 2012).

The percentage of patients in the youngest age group is the lowest, with pediatric patients being present in several outpatient clinics, including the pediatric clinic, ENT clinic, dental clinic, and general surgery clinic. In essence, any disease can affect individuals of all age groups, but some diseases tend to impact certain age groups more frequently. For instance, children are more susceptible to upper respiratory tract infections (URTIs). This is due to the immunity they receive from their mothers, which lasts only during the first six months after birth; afterward, their immunity decreases, leading to an increase in URTIs (Pilmis et al., 2024; Stepanovic et al., 2024).

In this study, there were more female patients compared to males, which can be linked to the clinics from which the prescriptions originated. The highest number of prescriptions came from the neurology clinic, where one of the most common conditions is vertigo. In women, experiencing vertigo is associated with decreased estrogen levels, which coincides with increased levels of prostaglandin fatty acids that trigger a drop in serotonin in the body, resulting in head contractions. Generally, any disease can affect both men and women, but there are differences in frequency for certain diseases between

the two genders. This may be attributed to differences in occupation, lifestyle habits, genetics, or physiological conditions (Eltayeb & Leaver, 2024).

Based on data from the Central Statistics Agency, the percentage of the population with health insurance in Riau Province is 64.72%, placing Riau 24th out of 34 provinces in Indonesia regarding National Health Insurance coverage. The presence of patients who have yet to utilize National Health Insurance can be attributed to lingering negative perceptions about the (National Health Insurance) program. This situation may stem from low awareness and socialization concerning the (National Health Insurance) program, resulting in inadequate understanding of its implementation among the community (Ghozali, 2024; Hadi et al., 2008; Pilmis et al., 2024).

The findings on insurance status in this study reveal that the number of patients using (National Health Insurance) is higher than those utilizing non-(National Health Insurance), with 458 individuals (69.39%) opting for (National Health Insurance) compared to 202 individuals (30.61%) choosing non-(National Health Insurance). This indicates that (National Health Insurance) users at XYZ Hospital Pekanbaru outnumber those using non-(National Health Insurance) services. XYZ Hospital Pekanbaru has established a partnership with the National Health Insurance system, allowing patients to be referred to one of its health facilities, thus providing (National Health Insurance) services to the community in need of healthcare (Gach et al., 2024; Lakka et al., 2020).

With the existence of (National Health Insurance), it is anticipated that participants will be protected from financial burdens when accessing essential healthcare services. (National Health Insurance) serves as a primary means to promote health sector reform aimed at achieving optimal healthcare delivery, as the utilization of (National Health Insurance) in Indonesia is crucial for the welfare of the Indonesian population in the health sector (Himawan, 2012; Rahmawati & Mutmainah, 2023).

Table 2. Prescription Patterns Based on World Health Organization (WHO) Prescription Indicators

WHO Prescribing Indicator Parameters	Standar score by WHO	Result	Notes
Average number of R/ per prescription sheet	1,8-2,2	2,91%	Not in accordance
Percentage of generic drug prescriptions	>82%	64,04%	Not in accordance
Percentage of antibiotic prescriptions	<22,70%	32,57%	Not in accordance
Percentage of injectable formulation prescriptions	0% or as minimal as possible	1,36%	In accordance
Percentage of drug prescriptions in accordance with the formulary	100%	72,27%	Not in accordance

The average R/ prescription parameter aims to measure the likelihood of polypharmacy occurrences. Based on the results above, this suggests a potential for polypharmacy incidents; however, it cannot be definitively confirmed as the researchers do not have access to patients' medical records to ascertain their diagnoses (Atmaja et al., 2024; Gach et al., 2024). Polypharmacy refers to the excessive use of medications within a single prescription that does not align with the patient's diagnosis and health condition. Polypharmacy is defined as a prescription containing five or more types of medications. This study revealed that out of 660 prescriptions, 70 (10.61%) contained five or more types of medications (Table 2 and Figure 1). One contributing factor to polypharmacy is the presence of chronic diseases or complications from a condition, leading condition, leading doctors to prescribe multiple medications to address these issues (Baskoro et al., 2024; Hidayat et al., 2022).

The consequences of polypharmacy, defined as the concurrent use of multiple medications by a patient, are significant and wide-ranging, with several adverse effects on both individual health outcomes and the broader healthcare system. A primary concern is the increased incidence of side

effects and drug interactions, which can arise from the combined use of various medications that may not have been adequately assessed for their compatibility. These interactions can lead to unintended clinical consequences, including reduced efficacy of treatment or heightened risk of harm (Raut et al., 2025).

Another serious issue associated with polypharmacy is drug toxicity, where the accumulation of multiple drugs in the body overwhelms its ability to process and eliminate these substances effectively. This increases the likelihood of overdoses or toxic effects, particularly in vulnerable populations such as the elderly or those with impaired organ function. Additionally, polypharmacy contributes to the rise of iatrogenic diseases, or conditions caused by medical treatments themselves, which may be misdiagnosed as new health issues, leading to further unnecessary prescriptions and a vicious cycle of medication misuse (Jónsdóttir et al., 2024).

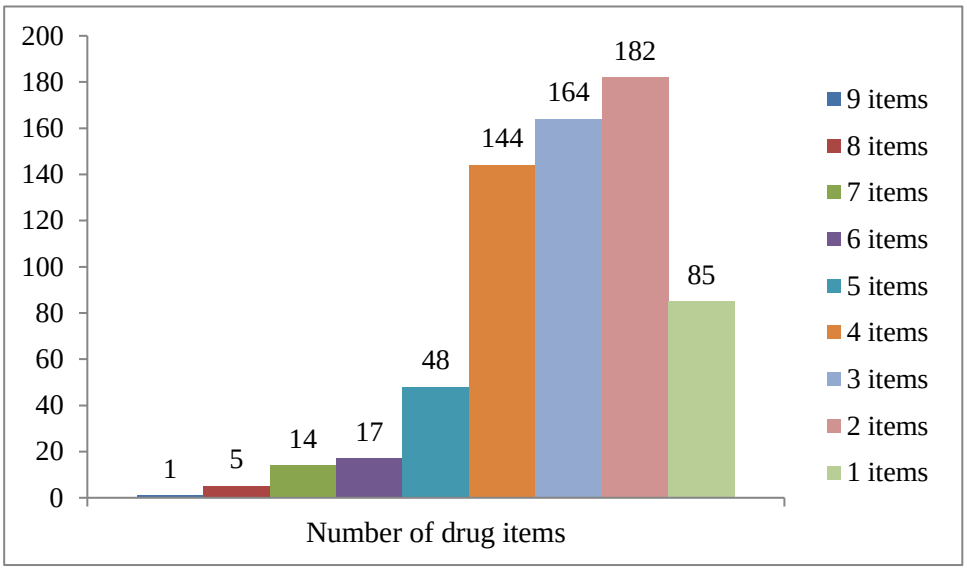

Fig. 1. Diagram of the number of prescriptions per prescription sheet

Polypharmacy also often results in frequent prescriptions that do not align with the actual disease diagnosis, as clinicians may resort to prescribing additional medications without fully considering the underlying conditions or exploring non-pharmacological treatment alternatives. This not only compromises the quality of care but also contributes to non-compliance with medication usage guidelines, as patients are more likely to struggle with adhering to complex medication regimens, increasing the risk of missed doses or incorrect administration (Zare et al., 2024).

The cumulative effects of polypharmacy highlight the need for careful medication management and the importance of regular medication reviews to ensure that all prescribed drugs are necessary, effective, and safe for the patient (García-Cárdenas & Hohmeier, 2022).

3.1. Persentage of generic drug prescriptions

The second parameter evaluates the prescribing patterns of healthcare providers, specifically their tendency to prescribe medications using generic names. The findings reveal a lower-than-anticipated adherence to generic prescribing. Several factors may contribute to this trend, including the limited availability of certain medications in generic formulations and the prescribing habits of physicians who may favor products from specific pharmaceutical manufacturers. Additionally, concerns regarding the efficacy, safety, and overall quality of generic drugs could influence prescribing decisions, as some healthcare providers may perceive branded medications as more reliable.

Beyond prescribers, patient preferences and perceptions also play a significant role. Some individuals remain skeptical about the therapeutic equivalence of generics compared to their branded counterparts, potentially due to misconceptions about their manufacturing standards, bioavailability, or effectiveness. Such doubts may lead to a preference for brand-name medications, further reinforcing prescribing behaviors that favor non-generic options (García-Cárdenas & Hohmeier, 2022). Addressing these concerns requires a comprehensive approach that includes education, policy

adjustments, and stronger regulatory measures to build trust in the quality and reliability of generic pharmaceuticals.

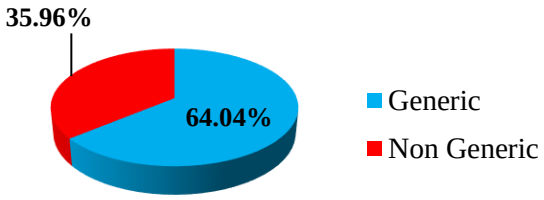

Fig. 2. Percentage (%) diagram of generic and non-generic drug prescriptions

To address concerns about generic drugs, educational campaigns can reinforce their efficacy, safety, and bioequivalence. Workshops and seminars for healthcare providers can help dispel doubts and increase confidence in prescribing generics. Strengthening regulatory assurance through strict quality control mechanisms can build trust in the reliability of generics. Hospitals and pharmacies can also implement policies that encourage generic prescribing through incentives or mandatory guidelines (Atmaja et al., 2024; Gach et al., 2024).

Public awareness programs can educate patients on the benefits of generics, reducing misconceptions. Collaboration with professional organizations can further promote confidence through endorsements and recommendations. Economic incentives, such as financial benefits for prescribing generics, can motivate healthcare providers. Additionally, improving the branding and packaging of generics can enhance their perceived value and acceptance (García-Cárdenas & Hohmeier, 2022).

Doctors' reasons for continuing to use generic medications include several considerations, such as the relatively lower prices of generic drugs compared to non-generic For patients with lower socioeconomic status, using generic drugs can facilitate the treatment process, as it enables them to afford all necessary medications (Figure 2) (Octavia & Sari, 2024). ones and the socioeconomic conditions of patients Additionally, there is an awareness among doctors to support government programs promoting the use of generic medications.

3.2. Antibiotic prescription percentage (%)

The analysis of antibiotic prescribing patterns (Figure 3) seeks to quantify the frequency of antibiotic use in clinical practice, a topic of growing concern due to the risk of overprescription. The excessive and often unnecessary use of antibiotics is driven by multiple factors, including diagnostic uncertainty, precautionary prescribing habits, and the perceived need to meet patient expectations. In many instances, physicians may prescribe antibiotics preemptively to avoid potential complications, even when the bacterial nature of the illness is uncertain.

Patient expectations further contribute to this trend, as individuals frequently associate antibiotics with quick symptom relief, leading to pressure on healthcare providers to prescribe them regardless of clinical necessity. This dynamic not only reinforces inappropriate prescribing habits but also accelerates the emergence of antimicrobial resistance, a critical global health threat. Misuse of antibiotics can diminish their effectiveness over time, rendering common infections harder to treat and increasing the burden on healthcare systems (McDonough et al., 2022).

Addressing this issue requires a comprehensive strategy that encompasses physician education, public awareness initiatives, and the implementation of strict antibiotic stewardship programs. Healthcare providers must be equipped with clear guidelines and diagnostic support tools to ensure antibiotics are prescribed only when clinically justified. Simultaneously, patient education efforts should emphasize the importance of responsible antibiotic use, correcting misconceptions about their necessity in treating viral infections. Strengthening regulatory oversight and promoting alternative treatment approaches where appropriate can further support efforts to curb overprescription. By

adopting these measures, the healthcare system can work toward reducing unnecessary antibiotic use, preserving the effectiveness of these critical medications, and safeguarding public health.

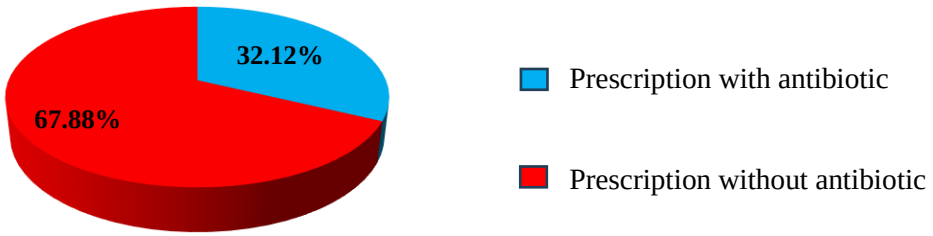

Fig. 3. Percentage (%) Diagram of Prescriptions with Antibiotics and Without Antibiotics

Improving diagnostic accuracy is crucial to reducing unnecessary antibiotic use. Implementing rapid diagnostic tests can help distinguish bacterial from viral infections, ensuring antibiotics are prescribed only when needed. Strengthening healthcare provider training on antimicrobial stewardship and evidence-based guidelines can enhance clinical decision-making. Additionally, increasing access to laboratory facilities for culture and sensitivity testing can guide targeted antibiotic therapy. Digital decision-support tools integrated into electronic health records can further aid in accurate diagnosis. Public awareness campaigns on responsible antibiotic use can also reduce pressure on doctors to prescribe antibiotics unnecessarily (Octavia & Sari, 2024).

In this study, antibiotics were used for severe infections where the causative bacteria were not clearly identified. In this context, the administration of combination antibiotics aims to achieve the broadest possible antimicrobial spectrum, resulting in a high usage of combination medications. The decision to prescribe antibiotics to patients should be carefully considered regarding their benefits and drawbacks. Less selective use of antibiotics can increase treatment costs and the risk of side effects. The most undesirable effect is the development of resistance due to inappropriate antibiotic use (Herawati et al., 2020; Jónsdóttir et al., 2024; Octavia & Sari, 2024; Rahmawati & Mutmainah, 2023).

3.3. Percentage (%) of Injection preparation prescription

The subsequent parameter is designed to evaluate the frequency with which injectable drug forms are prescribed, a practice that is frequently associated with overuse and heightened healthcare costs. Injectable medications, though sometimes necessary for specific clinical conditions, are often prescribed more than required, leading to unnecessary expenditures and patient discomfort. Within the scope of this study, the data revealed that injectable drugs accounted for 1.36% of the total prescriptions, a figure that aligns with the World Health Organization's (WHO) recommended indicators for minimizing the use of injectables (Andayani & Satibi, 2016; Hadi et al., 2008; Jónsdóttir et al., 2024).

The WHO advocates for the limited use of injectable forms, primarily due to their invasive nature and the potential for complications such as infections, in addition to the overall higher costs associated with their administration (Figure 4). Overuse of injectable drugs can also contribute to increased risks of adverse drug reactions, improper administration techniques, and potential dependency on parenteral therapy, particularly in settings where oral alternatives may be equally effective. Moreover, healthcare facilities must allocate additional resources for the procurement, storage, and disposal of injectables, further emphasizing the need for cost-conscious prescribing practices.

The results of this study underscore the importance of adhering to these guidelines, emphasizing the need for judicious prescribing practices that prioritize less invasive and cost-effective treatment alternatives whenever feasible, without compromising the quality of care. Encouraging the use of oral or topical medications when clinically appropriate can enhance patient safety, improve treatment adherence, and reduce overall healthcare expenditures. Furthermore, educational initiatives targeting healthcare professionals can reinforce the importance of evidence-based prescribing, ensuring that

injectables are reserved for cases where they provide clear therapeutic advantages over other forms of medication administration (Kosen, 2022).

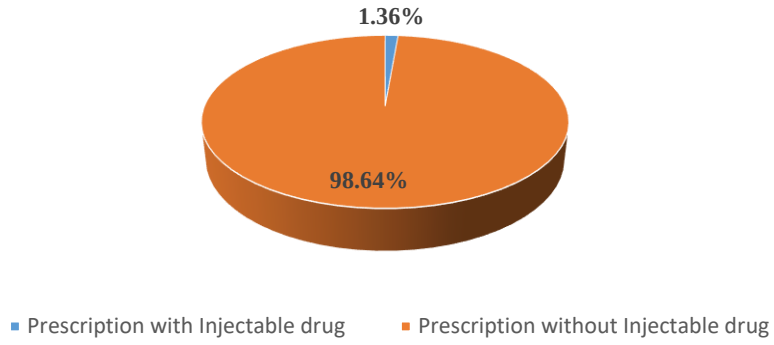

Fig. 4. Percentage (%) Diagram of Prescriptions with Antibiotics and Without Antibiotics

Adherence to WHO guidelines on the rational use of injectable drugs has positively influenced prescribing practices in this study. The low percentage of injectable prescriptions (1.36%) (Figure 4) aligns with WHO recommendations, indicating an awareness of the risks associated with excessive injectable use, such as infections and higher healthcare costs. This adherence contributes to safer, cost-effective treatment while maintaining therapeutic efficacy. Furthermore, the study's findings highlight the success of interventions aimed at minimizing unnecessary injections, potentially reducing complications and improving patient outcomes. Strengthening these prescribing habits through continuous education and policy reinforcement can further enhance rational drug use (Andayani & Satibi, 2016; Hadi et al., 2008; Jónsdóttir et al., 2024).

Table 3. Details of Injectable Form Usage

Drug name	Polyclinic	Total prescription
Epodion	Hemodialysis	3
Aminofusin®	General Surgery Specialist	1
Inj. Vitamin C Inj. Neurobion Inj. Epodion	Hemodialisa	1
Lantus® Novorapid	Internal Medicine Specialist	1
Novorapid Flexpen	Internal Medicine Specialist	1
Inj. Epodion Inj. Neurobion Inj. Ketorolac	Hemodialysis	1
Inj. Epodion Inj. Neurobion	Hemodialysis	1

The utilization of injectable medications in this study primarily originated from the Hemodialysis Clinic, which accounted for six prescriptions. In addition, the Internal Medicine Clinic contributed two prescriptions, primarily involving insulin products such as Lantus® and Novorapid®, typically used for managing blood glucose levels in patients with diabetes. There was also a single prescription from the General Surgery Clinic, where Aminofusin® was prescribed as nutritional support for patients suffering from liver-related conditions, including liver cirrhosis and liver metastasis. The comprehensive breakdown of injection usage is provided in Table 3, highlighting the clinical contexts

in which injectables were deemed necessary and reflecting a targeted approach in the administration of such medications (Baskoro et al., 2024). This focused use of injectables underscores the clinical judgment exercised in minimizing invasive interventions while addressing the specific needs of patients in critical care settings (Fanda et al., 2024).

The elevated use of injectable medications can be attributed to several factors, one of the most prominent being the widespread perception among the public that injections are inherently more effective than oral medications. This belief persists despite the fact that injectable treatments are often less comfortable for patients and come with higher costs. To counter this misconception, it is crucial to implement educational initiatives aimed at informing the public about the efficacy and appropriateness of various drug forms, including oral medications, which in many cases are just as effective as injectables (Anggriani et al., 2020).

Efforts to reduce the reliance on injectable prescriptions have been supported by several key factors. Government interventions, such as the establishment of therapeutic guidelines and standards, play a pivotal role in guiding healthcare providers towards more balanced prescribing practices. Additionally, increasing awareness and knowledge among both physicians and the general public about the proper use of medications has contributed to this shift (Andayani & Satibi, 2016; Anggriani et al., 2020; Baskoro et al., 2024). Furthermore, advancements in the pharmaceutical sector in Indonesia are anticipated to expand the range of available drug formulations, offering alternatives to injectables and thereby reducing their overuse. The combination of these strategies not only aims to reduce unnecessary costs but also promotes patient comfort and enhances the overall efficiency of healthcare delivery (Rahmadani et al., 2020).

3.4. Percentage of drug prescriptions in accordance with the formulary

The last parameter aims to measure compliance with the implementation of the national drug policy, which refers to the formulary. The results show that drug use has not yet reached 100% adherence to the formulary. The requirement to follow the list of drugs listed in the National Formulary is due to the fact that patients are (National Health Insurance) patients who have paid a certain amount based on the type of insurance chosen, allowing them to access healthcare in line with the premium they pay. If the prescribed drug is not in accordance with the National Formulary, the patient will be charged for the medication not listed in the National Formulary (Figure 5). This could be a disadvantage for the patient, as the medication must be paid for, even though it could be substituted with another drug available in the National Formulary (Jormanainen & Relander, 2019).

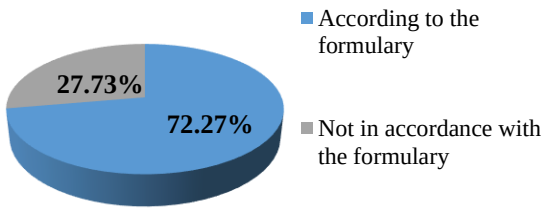

Fig. 5. Percentage (%) Diagram of Drug Compliance with the Formulary

The low utilization of formulary-based drugs can be partially explained by physicians who may not yet be fully accustomed to prescribing medications according to the established formulary. Additionally, the limited availability of certain drugs within the formulary could further restrict adherence (Hadi et al., 2008; Himawan, 2012). In this context, the role of pharmacists becomes critical, as they serve as essential intermediaries in facilitating communication with doctors, ensuring that prescriptions align with the formulary guidelines. It is expected that pharmacists will adopt a more proactive stance in monitoring the implementation of the Indonesia National Insurance (National Health Insurance) system, ensuring that prescribed medications conform to national standards (Abed et al., 2023).

Furthermore, oversight from the government and relevant institutions is crucial for the effective execution and monitoring of the (National Health Insurance) program. This supervision ensures that the system operates optimally, allowing the Indonesian public to fully benefit from the healthcare

services provided. By strengthening collaborative efforts among healthcare professionals, pharmacists, and regulatory bodies, the efficient and cost-effective use of formulary-based drugs can be promoted, ultimately enhancing the quality and accessibility of healthcare under the (National Health Insurance) system (Jormanainen & Relander, 2019).

4. Conclusion

Provide Based on the findings of the study, it can be concluded that the drug utilization patterns at XYZ Hospital in Pekanbaru for the year 2022, as evaluated using the five WHO prescribing indicators for outpatient care, reflect several areas of concern in comparison to international benchmarks. The average number of drugs prescribed per prescription was 2.9, which exceeds the WHO standard of 1.8-2.2. This suggests that prescriptions were issued with a tendency towards polypharmacy, potentially without sufficient consideration of precise diagnostic needs. Additionally, the percentage of generic drug prescriptions stood at 64.04%, falling short of the WHO's recommended minimum of 82%, indicating room for improvement in promoting cost-effective and accessible treatment options through the increased use of generics. Moreover, the prescription rate for antibiotics was 32.57%, significantly exceeding the WHO standard of 22.70%, signaling a potential overprescription of antibiotics, which could contribute to the growing global issue of antimicrobial resistance. On a more positive note, the percentage of prescriptions for injectable formulations was 1.36%, which aligns with WHO recommendations of minimizing the use of injections due to their higher costs and invasive nature. However, the proportion of drugs prescribed from the national formulary was 72.27%, well below the WHO standard of 100%, indicating a need for better adherence to formulary guidelines to ensure standardized, evidence-based treatment protocols. In summary, while the prescription of injectable formulations met WHO standards, there is a clear need for improved prescribing practices at XYZ Hospital, particularly in terms of reducing polypharmacy, increasing the use of generic medications, curbing antibiotic overuse, and enhancing adherence to the national formulary to meet global health benchmarks.

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Competing Interests

The author declares that there is no conflict of interest in the writing of this article.

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