



Drug Related Problems Research Phenomena in Pharmacy Journals in Indonesia: from Patient Criteria to DRPs Analysis

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ABSTRACT

The influence of Drug Related Problems on patient therapy is an issue that greatly affects the quality of life in the 21st century. This study analyzes a number of articles that have been published in pharmaceutical journals in Indonesia from 2010 to 2023, with Drug Related Problems as the main focus of the study. This study shows that in the last five years, the number of publications focusing on Drug Related Problems has decreased. Among these publications, the most common researcher is the Retrospective Observational Analysis Study. In addition, consecutive hospitalized patients were the object of the study, the DRPs classifications used were Cipolle, PCNE V 5, PCNE V 6.2, PCNE V 9.0, Pharmacology Handbooks, and many DRPs classifications were found to be 'not mentioned' in the literature used in the study. The DRPs research that was conducted was mostly conducted in Java Island while research in several other islands was very little found in Pharmaceutical Journals in Indonesia indexed by Sinta. In connection with the findings of this study, several recommendations have been proposed for future research that supports the analysis of Drug Related Problems on patient therapy as the main focus that can be seen from the results and discussion and conclusions.

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INTRODUCTION

Currently, Drug Related Problems (DRPs) are events or circumstances involving actual or potential drug therapy that can interfere with and affect the desired therapeutic outcome (Pharmaceutical Care Network Europe Foundation, 2019). The identification of DRPs in medication is important in order to reduce morbidity, mortality, and cost of drug therapy. This will be very helpful in improving the effectiveness of drug therapy, especially in

diseases that are chronic, progressive and require treatment throughout life, one of which is the patient's disease. By identifying the causes of DRPs, pharmacists can develop care plans to overcome DRPs so as to achieve the expected therapeutic goals (Sinjal et al., 2018).

In 2010, a study was conducted to identify DRPs in Kardinah Hospital, Tegal City, for outpatient Tuberculosis patients, and it was found that the most common DRPs was Drug

Interaction (Laela et al., 2010). The identification of DRPs in Type II DM patients with comorbidities at TuguRejo Semarang Hospital in 2010, the most frequent DRPs category was inappropriate drug selection (Sri & Wiwit, 2010). At UPT Puskesmas Gedong Air Bandar Lampung, DRPS identification was carried out in Type II DM patients with the category of DRPs that often occurred was Drug Interaction (Akhmad et al., 2020).

Starting from 2011, a study was conducted to identify DRPs at PKU Muhammadiyah Yogyakarta Hospital in asthma inpatients with comorbidities, it was found that the most common DRPs were drugs without indications and duplication of therapy (Fitria & Septimawanto, 2011). In 2015, research was conducted at PKU Muhammadiyah Yogyakarta Hospital and Sleman Regency Hospital on outpatient Pediatrics patients using the Cipolle classification, the most DRPs occurred were drug interactions (Maya et al., 2015) and other studies on outpatient Pediatrics patients also found the most DRPs were drug interactions and followed by patients failing to receive drugs (Gita et al., 2015). In 2016, a study was conducted at PKU Muhammadiyah Yogyakarta Hospital and Sleman Regency Hospital on outpatient pediatrics patients which found the incidence of DRPs in the categories of inappropriate drug selection, drug interactions, less drug dose, and more drug dose. The most DRPs were the less drug dose (Irnayanti et al., 2016) and other studies on outpatient Geriatric patients also found the most DRPs were Drug Interactions (Arissa et al., 2016).

Another study in 2011 conducted a DRPs Study at Panti Rapih Yogyakarta Hospital on pediatric inpatients with lower respiratory tract infections and Asthma, found the most DRPs were more drug doses and drugs without indications (Dyah Anggraeni et al., 2011). In the same year at Dr. Ramelan Surabaya Naval

Hospital, the most DRPs in stroke patients in the inpatient installation were excessive drug duplication/combination. (Bangunawati et al., 2011). In RSUD Banyumas, DRPs occurred in Acute Myocardial Infarction (IMA) patients related to drug interactions in patient treatment (Anjar & Ning, 2011). DRPs analysis was also carried out at Sari Medika Clinic Makassar that the most DRPs occurred, namely Inappropriate Drug Selection and followed by indications without drugs in the treatment of CKD patients (Veronika & Poppy Diah, 2021).

In 2013, a study was conducted to evaluate DRPs in Chronic Kidney inpatients with comorbidities at Fatmawati General Hospital Jakarta, that the most DRPs category was the effect of non-optimal drug therapy with the most comorbidities being Anemia disease (Lusi Indriani et al., 2013). There were DRPs found in UPT Puskesmas Jembrana in the treatment of Hypertension outpatients with inappropriate drug selection and dose selection so that additional therapy was needed (Gumi et al., 2013).

In 2014 a study was conducted at Panti Rini Hospital Yogyakarta on outpatient geriatric patients with hypertension accompanied by vertigo that there were DRPs in the categories of adverse drug reactions, drug interactions, less drug dosage, and more drug dosage (Kresensiana et al., 2014). There is also the identification of DRPs in Autistic patients at Hospital "X" Yogyakarta City with inaccurate doses (Ruri Renggani et al., 2019).

In 2015, a study was conducted in class II and III inpatient rooms of Dr. Soeradji Tirtonegoro Klaten General Hospital on the therapy of heart failure patients with concomitant diseases, the most common DRPs were the onset of adverse reactions and additional drug therapy required (Alfin et al., 2015).

In 2016, the identification of DRPs in outpatient chronic disease patients at the internal medicine polyclinic of Dr. Sardjito Yogyakarta Hospital was found that the main diagnosed diseases were Hypertension and Diabetes Mellitus Type II and, the highest incidence of DRPs were indications without drugs and drug interactions (Yovita et al., 2015). The incidence of DRPs occurred at RSU Azzahrah Kalirejo Central Lampung in Hypertension patients with the most category, namely Drug Interaction with a Moderate level (Lilik et al., 2022). The same year also identified DRPs in Cardiac Polyclinic patients, that the most common category was Adverse Drug Reactions (Deby Afriani et al., 2016). Previously, in Hemodialysis Elderly outpatients, the most DRPs were Drug Interactions (Ndraru et al., 2012).

In 2017 a study was conducted at the General Hospital. Dr. M. Djamil Padang with inpatients in the ENT ward that there was an incidence of DRPs with under-dosing, drug interactions, and adverse drug reactions. The most common category found was drug interactions. (Suhatri et al., 2017). With the same location in 2022, DRPs research was conducted on chronic kidney disease patients with inpatients that there was an incidence of DRPs with Indications without drugs, Less Drug Dosage, and More Drug Dosage. (Dian Ayu et al., 2022) and in Geriatric Pneumonia patients in the Inpatient installation also found the incidence of DRPs Drug interactions in patient treatment (Endang et al., 2023). In the same year, 2017, a DRPs study was conducted at the Jakarta National Brain Center Hospital on the treatment of Ischemic Stroke inpatients, which found the most DRPs of indications without drugs (Okpri & Handika, 2017). Research at RSUD Pangkep South Sulawesi on inpatients of children with diarrhea disease found that the most DRPs were indications without drugs and inaccurate drug selection (H Asyhari, 2017). In

Central Sulawesi, the identification of DRPs was carried out at Madani Regional Hospital in pediatric pneumonia patients in the inpatient installation which found the highest incidence of DRPs, namely drug interactions (Putu Maharani et al., 2017) and at Anutapura Palu Hospital in pediatric patients with acute gastroenteritis in the inpatient installation, the most DRPs were drugs without indications (Arlinda et al., 2016).

In 2018, a study was conducted at RSUD Dr. M Yunus Bengkulu on outpatient stroke patients, that the incidence of DRPs was found with inappropriate drug selection, adverse drug reactions, indications without drugs, and drugs without indications (Dian H & Dwi, 2018). Research at Bethesda Yogyakarta Hospital with Vertigo patients in outpatient installations found the incidence of DRPs in the category of adverse drug reactions, inappropriate drug selection, drug interactions, and insufficient drug doses (Andreas & Rizaldy, 2018). Research at Labuang Baji Hospital Makassar found DRPs in pediatric inpatients in diarrhea treatment with subtherapeutic doses (Raimundus et al., 2018), in Type II DM patients with hypertension there were also DRPs (Hendra et al., 2017), and the incidence of DRPS at Hospital "X" in Makassar with the most DRPs category being Drugs without Indication in Hepatic Cirrhosis patients (Hijrawati Ayu et al., 2020). Analysis of DRPs in patients with Kidney Failure with Diabetes Mellitus at the Tegal Hospital in 2018, there were DRPs with excessive doses and drug interactions (Siti Pandanwangi et al., 2018).

In 2021, a study was conducted to identify DRPs in West Nusa Tenggara Provincial Hospital with the most frequent DRPs occurrence being Over Dosage of rice therapy for patients with peptic ulcer, Dyspepsia, and Gastritis (Dedent & Annisa, 2021).

In 2023 a study was conducted to identify DRPs in the intensive stage of Tuberculosis treatment for outpatient Geriatric patients at

Surakarta General Hospital, it was found that the most common DRPs categories were Drug Side Effects and Drug Interactions (Khusnul & Sutrisna, 2023). In patients with schizophrenia with comorbidities at Dr. H Marzoeki Mahdi Mental Hospital in Bogor, using the PCNE V 9.0 DRPs Classification, it was found that the highest incidence of DRPs with drugs without indications was the use of Clozapin in new patients (Witri et al., 2023).

This study shows that in the last five years, the number of publications focusing on Drug Related Problems has decreased. Among these publications, the most common researchers were Retrospective Observational studies. In addition, inpatients and outpatients respectively were the objects, the DRPs classifications used were Cipolle, PCNE V 5, PCNE V 6.2, PCNE V 9.0, Pharmacology Handbooks, and many DRPs classifications were found to be 'not mentioned' in the studies. The DRPs research that was conducted was mostly conducted in Java Island while research in several islands was very little found in the Pharmaceutical Journal in Indonesia indexed by Sinta. In connection with the findings of this study, I conducted a Review Article so that in the future it can provide references or input to future researchers to properly identify DRPs in order to improve the Quality of Life of patients, especially in Indonesia.

METODE PENELITIAN

Research Design

This study adheres to the principle of content analysis, which focuses on the findings of various studies that have been published in Pharmaceutical journals in Indonesia. Both the results of DRPs Identification, Classification according to the literature, and various research subjects.

Data Source

Data were collected from the content analysis of Pharmaceutical Journal articles in Indonesia registered in Science and Technology Index (SINTA) in 2010. SINTA <https://sinta.kemdikbud.go.id/> is a platform to measure the development of science and technology designed and developed by the Indonesian Ministry of Research, Technology and Higher Education. There are a total of 20 Pharmacy journals in the SINTA database. Henceforth, all articles that reviewed Drug Related Problems in patient therapy were collected from each of these journals. The articles analyzed in this study were published online in 2010. Of the hundreds of articles collected, there were 37 articles that reviewed Drug Related Problems in patient therapy. All articles were analyzed in this study.

In light of the research findings of this study, several recommendations have been proposed for future research that supports the identification of Drug Related Problems to patient therapy as the main focus.

Research Instruments

The instrument used in this study was a content analysis guideline containing the relevant aspects observed (Table 1). Five main aspects were reviewed for content analysis in this study. These aspects include (1) number of publications per five years; (2) Observational Analytic Research Sampling; (3) Patient Criteria; (4) Relationship of Sampling, Patient Criteria, and Diagnosis Type for DRPs Research; (5) Classification of DRPs. In particular, category (4) was not decided at the beginning because there is no previous research that can be used as a reference to determine what should be included in these categories and the possibility of overgeneralization of categories.

Table 1 Aspects and Categories used for Content Analysis in Studies

Aspects	CATEGORIES	
Number of publications per year	A.1)	2010 – 2013
	A.2)	2014 – 2018
	A.3)	2019 – 2023
Method Type and Sampling of DRPs Analysis	B.1) Observational	(a) Cross Sectional
		(b) Cohort / Prospective
		(c) Case Control / Retrospektif
	B.2) Retrospective – Cohort Prospective	
B.3) Retrospective – Purposive Sampling		
B.3) Mixed Methods Research		
B.4) Eksperimental	(a) Pra Eksperimental	

(b) Kuasi Eksperimental

(c) True Eksperimental

PATIENT CRITERIA

I	C.1)	Outpatient Care
	C.2)	Inpatient Care
II	C.3)	Primary Diagnosis Only
	C.4)	Primary Diagnosis with Comorbidity
Classification of DRPs	D.1)	Cipolle/Morley/Strand
	D.2)	Pharmaceutical Care Network Europe (PCNE)
	D.3)	HandBook
	D.4)	American Society of Hospital Pharmacist
	D.5)	Granada Consensus
	D.6)	Unspecified

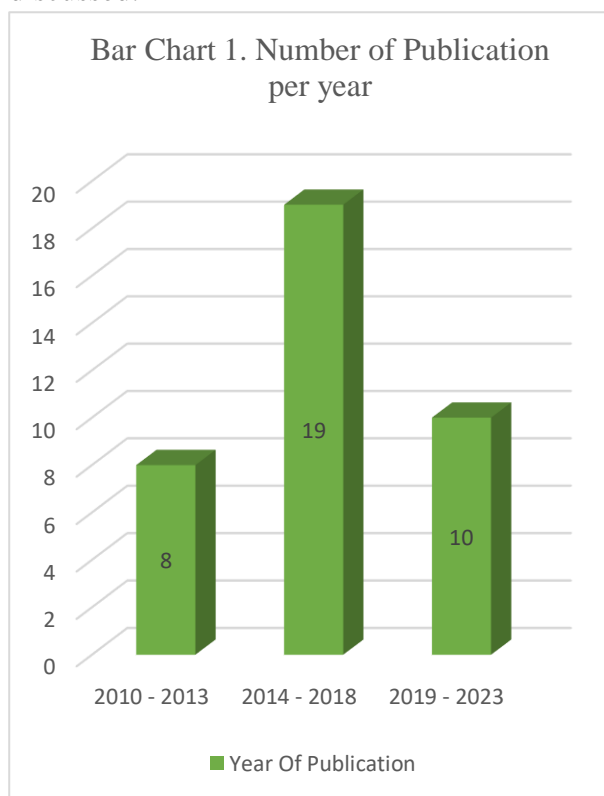
Data Analysis

Each article was grouped into predetermined categories based on the aspects and categories in (Table 1). The determination of the category is based on the information submitted by the author in the abstract, method, and results and discussion sections. Furthermore, the data that has been collected is presented in the form of bar charts.

RESULTS AND DISCUSSION FINDINGS

Number Of Publications Per Year

The number of article publications shows how often research is conducted in a certain period. Referring to bar chart 1, articles that review the identification of Drug Related Problems in patient therapy in Health Facilities in Districts, Regencies, and Provinces in Indonesia can be found since 2010. However, when referring to bar chart 1, the number of publications from 2014 - 2018 has increased very high, but in the last 5 years there has been a decrease in publications related to DRPs. this phenomenon should be questioned and discussed.



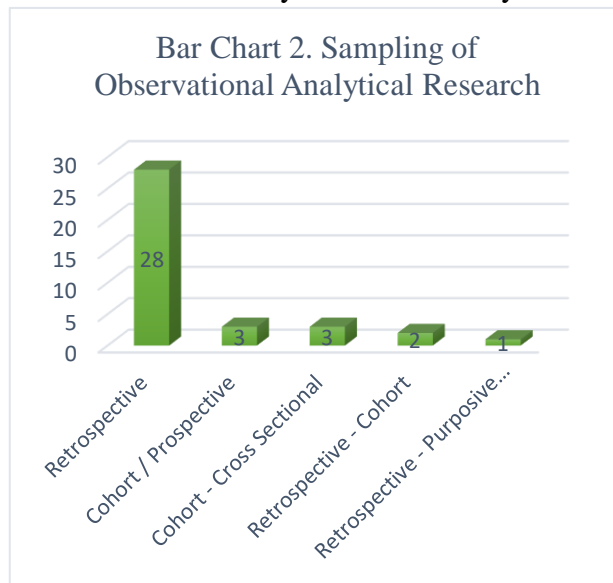
Bar Chart 1.

The phenomenon of decreasing the number of DRPs research on patient therapy has become a major concern in Indonesia in the last 5 years. Most research results from researchers' sensitivity to common issues that often occur around them. One of the problems that is widely

encountered today is the DRPs of patient therapy in Health Facilities, especially in Indonesia. Therefore, conducting this study is believed to provide insight into problems that often occur in patient therapy management, provide information to increase the use of safer and more effective drugs and reduce the risk of DRPs. Through research, researchers can analyze and identify DRPs to achieve optimal therapy and reduce mortality rates in Indonesia. This premise is based on the idea that the ultimate goal of a study is to improve educational practices (Coburn & Penuel, 2016)

Sampling of Observational Analytical Research

Research type and design determine the focus of a study. Based on Bar Diagram 2, Retrospective Observational Analysis research sampling is the most dominant design used by researchers to analyze and identify DRPs.



Bar Chart 2.

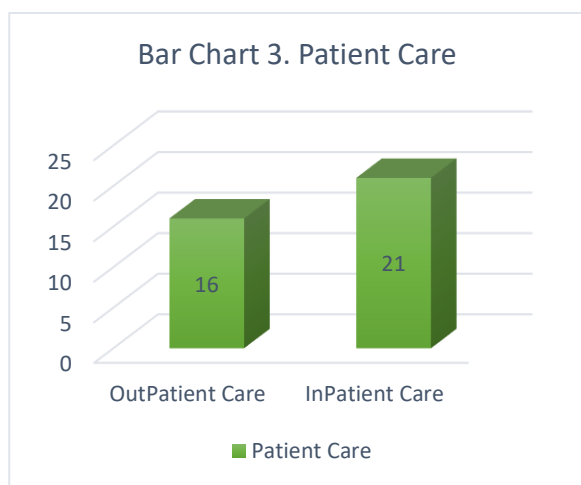
Retrospective sampling of existing patient medical record data or using past data greatly shortens the research time. In contrast to Observational Cohort / Prospective which is a study that examines a case by looking at the causal factors first (risk factors), and then

looking at the consequences of a case within a certain period of time which requires a long research time.

Patient Criteria

I. Patient Care

There are two criteria for patients based on the type of treatment, namely outpatients and inpatients in Health Facilities such as Clinics, Puskesmas, and Hospitals. The results of a study of 37 articles, that the criteria for patients on an inpatient basis are more widely carried out than Outpatients.

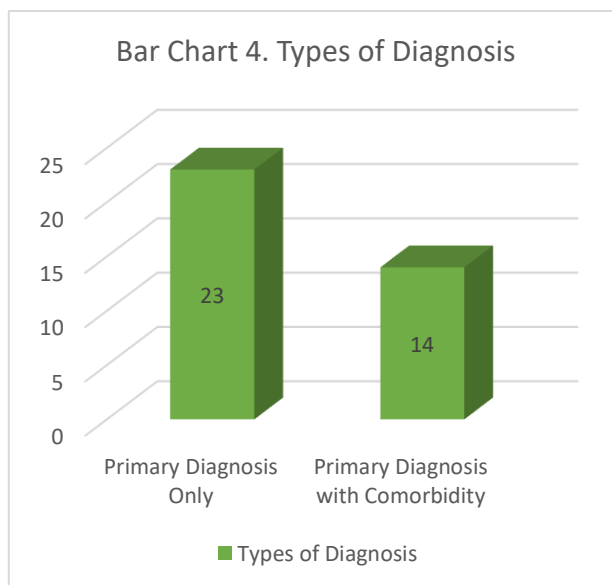


Bar Chart 3.

This phenomenon needs to be discussed for future research developments. To choose research subjects in cases of DRPs in inpatient and outpatient therapy, it is very necessary to consider the purpose of a study and the time of research later.

II. Types of Diagnosis

The criteria for patients based on the type of diagnosis to be observed in the study of the 37 articles are patients with their primary diagnosis only and patients with a primary diagnosis with comorbidities.



Bar Chart 4.

In research DRPs, researchers may choose to focus on patients with a specific primary diagnosis, such as heart disease, diabetes, or hypertension. In this case, the study will examine DRPs associated with drug use in patients with a primary diagnosis only. However, in patients with a primary diagnosis accompanied by comorbidities it is also necessary to consider. Comorbidities can affect drug use, drug interactions, and the risk of DRPs in patient therapy.

Relationship of Sampling, Patient Criteria, and Diagnosis Type for DRPs Research

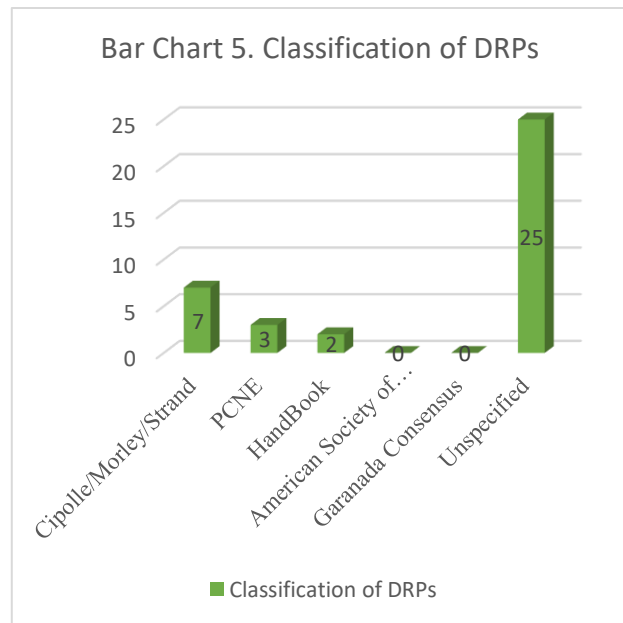
The choice between retrospective and prospective studies depends on the purpose of the study, the availability of data, and the resources and time available at the time of wanting to conduct the study Observational analysis. If the purpose of the study is to observe the effect of therapy or intervention in patients with chronic or complex conditions, then inpatient study subjects may be more suitable. This is because hospitalized patients tend to have more serious conditions and require more intensive and continuous care, thus providing an opportunity for researchers to observe changes

in the patient's condition directly. However, if the research objective is to observe treatment patterns or DRPs in patients with milder or acute conditions, an outpatient research subject may be more suitable. This is because outpatients tend to have milder conditions and require shorter treatment, thus providing an opportunity for researchers to observe treatment patterns or DRPs that occur in a shorter period of time.

In terms of sampling, both retrospective/case control and prospective/cohort observational analysis research methods can be used on inpatients or outpatients. However, it is worth considering that prospective studies on inpatients may require greater resources and longer time to carry out as inpatient care tends to be more intensive and complex. Whereas, retrospective studies on outpatients may require difficulties in collecting complete and detailed data from patients' medical records. Therefore, it is important to carefully consider the purpose of the study, the formulation of the research problem, and the availability of the required data before selecting an appropriate research subject and research method.

In terms of selecting the type of research diagnosis, when researchers want to analyze therapy with a specific condition. Then, the researcher can focus on the primary diagnosis only. However, it will limit the analysis to the patient's therapeutic effect. Meanwhile, if the researcher wants to approach the treatment of a more complex patient. Then, researchers can use the type of patient with the main diagnosis as well as his comorbidities or risk factors.

Classification of DRPs



Bar Chart 5.

In 1996 the American Society of Hospital Pharmacy developed a classification of DRPs in patient therapy followed by Cipolle/Marley/Strand, and Granada Consensus. [Classification for Drug Related Problems From ASHP, Cipolle or Marley or strand, and Granada Consensus.pdf](#). Later, as it continued to evolve, it was developed by the Pharmaceutical Care Network Europe (PCNE V 9.1) organization. [PCNE Classification For DRPs V 9.1.pdf](#)

CONCLUSION

In this study, articles highlighting Drug Related Problems in patient therapy and published in pharmacy journals across Indonesia from 2010 to 2023 were reviewed. It was found that there was a decrease in the number of publications highlighting Drug Related Problems in patient therapy in the last five years. Among the hundreds of publications, most were quantitative studies. In addition, hospitalized patients were mostly selected as research subjects; while the type of research method Observational analysis with retrospective data collection was mostly selected. The researchers

mostly used the criteria of patients with a primary disease diagnosis only.

Several recommendations have been made for further research. First, it is important to increase the frequency of conducting Observational Analysis studies with retrospective-prospective sampling for patient therapy DRPs. Second, research and development aimed at optimizing patient therapy should be supported and conducted. Third, researchers should clearly inform about the research instruments, as well as the validity and reliability of the instruments. Lastly, researchers are advised to use the classification of DRPs with the latest literature.

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