OVERVIEW OF FACTORS INFLUENCING DRUG MANAGEMENT AT PRIMARY HEALTH CENTERS IN INDONESIA: A SYSTEMATIC REVIEW

Uswatun Khasanah[1], **Nanang Munif Yasin**[2]✉, **Satibi**[3]

[1]Master's Degree Student of Pharmacy Management, Faculty of Pharmacy, Gadjah Mada University, Yogyakarta, Indonesia
[2]Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Gadjah Mada University, Yogyakarta, Indonesia
[3]Department of Pharmaceutics, Faculty of Pharmacy, Gadjah Mada University, Yogyakarta, Indonesia

✉ nanangy@yahoo.com

ABSTRACT

Drug management is part of pharmaceutical service activities, which includes interrelated stages: selection, planning, requesting, receiving, storage, distribution, controlling, recording, reporting, monitoring and evaluation, which play an essential role in ensuring the availability of drugs at PHCs. The systematic review aims to identify indicators of drug management at PHCs in Indonesia and analyze factors that influenced it. This systematic review used the PRISMA methods. Google Scholar is an electronic database to identify related studies. This study is limited publications from 2013 to 2023. The quality of the articles was assessed using JBI Critical Appraisal. The electronics database search earned 570 articles, while only nine articles met the criteria for analysis. Several indicators are different from the standards used due to several factors. Based on the result, factors influencing drug management at PHCs include human resources, financing, information management, facilities, and technology. For most of them, human resources are a determining factor that significantly influences the quality of pharmaceutical services at PHC's in Indonesia. The implementation of pharmaceutical services at the PHCs must be carried out by at least one pharmacist, the person in charge, who can be assisted by pharmaceutical technical staff as needed. Resources humans influence indicators of planning accuracy; suitability of requests; storage; distribution; control; recording, reporting, and archiving. This study's results are to make improvement strategies, including interventions to improve the quality of pharmaceutical services that impact community satisfaction and stakeholders.

Keywords: Drug management; Primary health center; Factor influencing

1. INTRODUCTION

Primary Health Centers (PHCs), also called "Puskesmas", provides healthcare service accessible on the first point of contact by prioritizing promotive and preventive. In Indonesia, an increasing number of PHCs should ideally balance improving the quality of primary health centres. Drug management ensures quality, affordability, availability, effectiveness, and efficiency. It is protected from drug abuse or misuse (RI Ministry of Health, 2019). The paradigm about the quality of pharmaceutical services was altered from drug-oriented to patient-oriented (Tualeka et al., 2021) because the community's impression of health care outcome is obtaining medicine after visiting health facilities.

Based on the Regulation of Minister of Health Number 74 of 2016 concerning standards for the implementation of pharmacy services at primary health care define, drug management is part of pharmaceutical service activities which includes: planning/selection, procurement, storage,

distribution, controlling, documentation, reporting, monitoring and evaluation. Drug management cycles are linked to each other. Compliance with this standard can be a guideline for drug officers to improve the quality of pharmaceutical services at PHCs. Unlinked and inefficient drug management can harm PHCs performance (Satibi et al., 2021). Factors influencing drug management at PHCs, such as quality of human resources, finances, facilities, and management informatic system, are internal factors affecting pharmacists' performance, thus impacting the quality of pharmaceutical services (Satibi et al., 2018). Measurement indicators of drug management at several PHCs still need to be met 100%. Drug management is not yet optimal caused by a planning system that is not by essential medicines, inaccurate analysis, worst procurement, geographic conditions of PHCs that are difficult to reach, limited quantity and competence of resources, financing, and various other problems that impact on drug management, especially drug availability (Marathe et al., 2015).

During the last decade, several studies on drug management have been conducted in several PHCs in Indonesia to explore the inhibiting and supporting factors in PHCs drug management. However, systematic review research has yet to explore the factors influencing PHCs drug management. This study aims to conduct related studies to explore and identify indicators of PHCs drug management and the factors that influenced it. This study's results are to make improvement strategies, including interventions to improve the quality of pharmaceutical services that impact community satisfaction and stakeholders.

2. METHODS

2.1. Search Strategy

The literature search started on March 17, 2023, using Google Scholar. This literature search technique targets finding all article descriptions, metrics for measuring drug management, and factors influencing drug management at several primary health centers in Indonesia. The keywords used were "drug management," AND "primary health center" AND "influenced factors." Boolean operators ("AND") are used to obtain more specific article results (Wibowo A. & Putri S., 2021). "Drug management" describes the types of activities and objects studied, "primary health center" indicates the research location, and "influencing factors" represents things that play an essential role in drug management. The author applies the following inclusion criteria: (1) the articles must be original research; (2) the research conducted at the primary health center; (3) articles must be written in Indonesian; (4) the full text is accessible and free; (5) articles published in 2013-2023. Several systematic review guidelines recommended using the last ten years to provide more complete data and information regarding the topic under study (Tawfik et al., 2019). The exclusion criteria used were: (1) articles discussing the management of specific drug programs; (2) articles that contain incomplete discussion (such as articles only containing quantitative or qualitative data).

2.2. Study Selection

This systematic review aims to identify influencing factors of PHCs drug management. Two researchers independently screened the title and abstract for relevance to the study's purpose and whether an article fulfilled the inclusion criteria. Two authors conducted an article quality assessment using Joanna Briggs Institute (JBI) Critical Appraisal (Joanna Briggs Institute, 2022). The assessment quality article was carried out by two researchers (UK and NMY) independently to avoid subjectivity. If there are differences in the assessment of a study, it will be discussed with the third author (S) to reach an agreement (George et al., 2014). JBI Critical Appraisal contains questions to assess the quality of the study. Assessment of article quality using JBI Critical Appraisal because it has been proven to be more valid for assessing the quality of various research methods than other article quality assessment tools (Zeng et al., 2015).

2.3. Data Extraction

Data extraction includes demographics (author, year of publication), methods, drug management indicator results, and factors influencing PHCs drug management. Two authors also extracted data independently according to the main objective of conducting a systematic review. Data extraction will provide information about studies included in each study's characteristics to reduce the risk of bias.

3. RESULTS AND DISCUSSION

3.1. Search strategy

A total of 570 articles were generated from Google Scholar databases. The inclusion and exclusion criteria previously established were considered when searching for the article by the PRISMA recommendations (Page et al., 2021). 524 articles removed before screening because had not meet the criteria for this systematic review, and they were reviewed based on the titles and abstracts. 12 of the 46 remaining articles were found to meet the requirements for inclusion criteria. Three articles out of 12 were ultimately excluded because an article on a specific program (PONED drugs) and two had incomplete discussions. Nine articles that satisfy the requirements and are found through the article search process can be analyzed. **Figure 1** below shows a PRISMA diagram that illustrates the article search process.
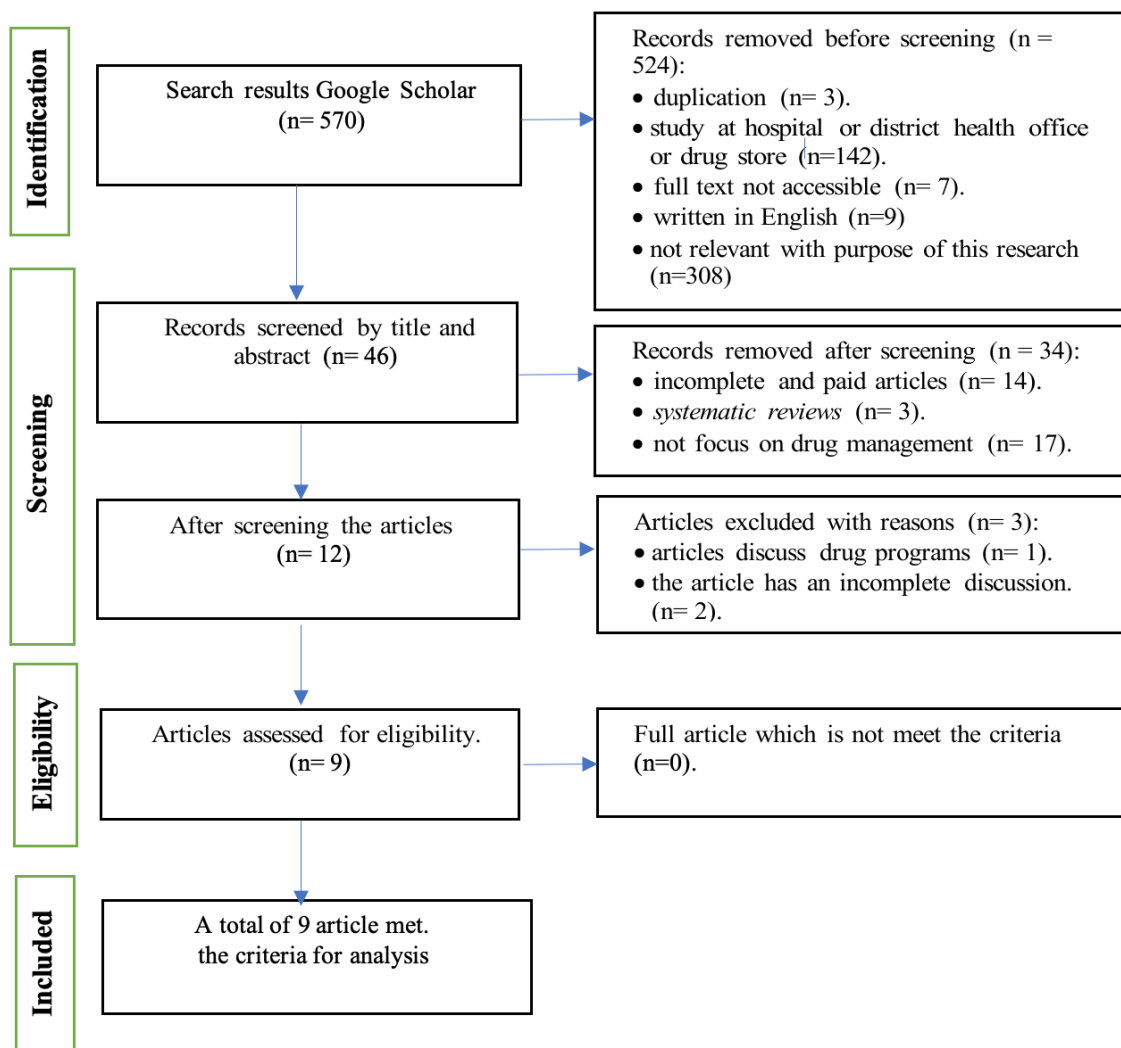

Figure 1. PRISMA diagram of extracted study

3.2. Study Quality Assessment

According to the findings of the JBI Critical Appraisal used to evaluate the article's quality, all articles obtained a score of at least seven, indicating that the methodological quality of the article was extremely high. The results of the quality evaluation are shown in **Table 1**.

3.3. Data Extraction

Data extraction was carried out after searching, selecting, and assessing the quality of the articles. The results of data extraction can be seen in **Table 2**.

Table 1. Quality Assessment of articles

No.	Author and Year	Score
1.	Chaira et al., 2016	8
2.	Carolien et al., 2017	8
3.	Tualeka et al., 2020	8
4.	Rintanantasari et al., 2020	8
5.	Cholilah et al., 2021	8
6.	Rezeki et al., 2021	7
7.	Sariah et al., 2022	7
8.	Yuswantina et al., 2022	7
9.	Anisah et al., 2023	7

Table 2. Data extraction

No	Researcher & Year	Method Study	Indicator assessment results medication management	Influencing factors
1.	Chaira et al., (2016)	descriptive-evaluative	• Suitability of drug items with DOEN 64.70% - 73.51%. • Suitability of the number of drug items requested 2.28% -24.47%. • Accuracy of the number of drugs distributed to pharmaceutical service 4.66% -35.59%. • Percentage of drugs not prescribed 5.00%-23.49%. • Generic pharmaceutical product 97.27%-100%. Accuracy of the physical amount of the drug with the amount on the stock cards or computer 0.00% -13.13%. • Values of expired and defective drugs 15.34%-26.06%.	• Human resources • Information management system. • Facilities. • Technical factors
2.	Carolien et al, (2017)	descriptive-observational	• Drug availability 70.9±6.1%. • Out-of-stock drug item $13.5 \pm 0.02\%$ with an average number of vacant days of 50 ± 13 days per year. • Suitability of drug item with DOEN/National Formulary is $80 \pm 2.1\%$. • Suitability of drugs item with disease pattern $89 \pm 4.8\%$. • Values of expired drugs $7.0 \pm 2.2\%$ equivalent to IDR. 134.632.836, -. • Values of defective drugs are $0.7 \pm 1.26\%$ equivalent to IDR 2.326.988.	• Human resources • Financing • Information management system. • Facilities • Technical factors
3.	Tualeka et al., (2020)	descriptive-cross sectional	• Out-of-stock and shortage inventory drug items 0%. • Overstock drug items $55 \pm 11.5\%$. • Shortage inventory drug items $45 \pm 11.5\%$. • Availability of drugs indicator $82.35\% \pm 9.30\%$.	• Human resources • Information management system. • Technical factors

No	Researcher & Year	Method Study	Indicator assessment results medication management	Influencing factors
4.	Rintanantasari et al., (2020)	descriptive-observational	• Suitability of drug item with National Formulary 85.81% and 73.69%. • Suitability of drug item with disease patterns 83.03% and 89.94% • Accuracy of planning 96.39% and 90.62%. • Out-of-stock drug items 0%. • Overstock drug items 38.23% and 39.56%. • Shortage inventory of drug items is 0% and 0.33%. • Adequate inventory of drug items is 63,38% and 60.19%. • Non prescribed drug items 1.90% and 3.11%. • Value of expired and defective drugs 0%. • Availability level of drugs 27.69 months and 31.42 months. • ITOR 2.58 times/year and 2.93 times/year.	• Human resources • Technical factors
5.	Cholilah, et al., (2021)	descriptive-observational	• Suitability of drug item with national formulary 76.95%. • Suitability of drug items with disease patterns 76.39%. • Adequate funds to fulfil out-of-stock drugs 0%. • Planning accuracy 321.10%. • Suitability of the number of drugs items requested 109.60%±19.46. • Suitability of drug item with national formulary 76.95%. • Suitability of drug items with disease patterns 76.39%. • Adequate funds to fulfil out-of-stock drugs 0%. • Planning accuracy 321.10%. • Suitability of the number of drug items requested 109.60%±19.46. • Suitability of drug items requested 169.84%±66.00. • Suitability of the number of drug items received 100% ± 0. • Suitability of drug items received 100%±0. • Drug storage according to the dosage form 100 % ± 0. • Drug storage according to temperature 100%± 0. • Narcotics storage according to regulations 91.07% ± 12.69. • Drug storage is not used for storing. Other items that cause contamination 98.97%±1.43. • Drug arrangement follows FEFO method 100%±0. • High-alert drug storage 68.15±40.90. • LASA drug storage 87.5%±35.36. • Accuracy of the items and number of drugs distributed to pharmaceutical service sub-unit 100%±0. • ITOR 1.87 ± 0.5 times/year. • Availability level of drugs 36.08 ± 11.60 months. • Out-of-stock drug items 1.54%±2.29. • Shortage inventory of drug items 14.01%±15.84.	• Human resources • Information mana-gement system. • Facilities • Technical aspect

Page | 235

No	Researcher & Year	Method Study	Indicator assessment results medication management	Influencing factors
			• Adequate inventory drug items 37.94%±17.03. • Overstock drug items 41.76%±11.99. • Not prescribed drug items 4.59%±1.86. • Value of expired drug 3.85% ± 2.73. • Value of damaged drug 0%±0. • Accuracy of the physical amount of the drug with the amount on the stock cards or computer 100%. • Periodic evaluation of drug management 100%.	
6.	Rezeki et al., (2021)	descriptive-observational	• Suitability of drug item with the district formulary 93.46-98.57%. • Suitability of the number of drug 114-416%. • Accuracy of reception 76-128%. • Percentage of drugs not prescribed for 6 months 1.3-31.57%. • Prescribing generic drugs 94.72-100%. • Value of damaged drugs 0-17.37%.	• Human resources • Facilities • Technical factors
7.	Sariah et al., (2022)	descriptive-observational	• Planning accuracy 68%. • Suitability of drug item with DOEN 54%. • Not prescribed drug item (> 6 months) 18%. • Value of expired drugs 4%.	• Human resources • Facilities • Technical factors
8.	Yuswantina et al., (2022)	descriptive-observational	• *ITOR* 3.2 times/year. • Availability level of drugs 31.5 months. • Value of expired drugs 2%. • Dead stock item drugs 32%. • Suitability of drug storage 85%. • LASA drug storage 50%. accuracy of the physical amount of the drug with the amount on the stock cards or computer 100%. • Items per prescription 3.69. • Generic pharmaceutical products prescription 62.06%. • Antibiotic in non-specific diarrhea prescription 12.2%. • Avoiding injection for patients with myalgia 4.07%.	• Human resources • Facilities • Technical factors
9.	Anisah et al., (2023)		• Suitability of drug item with the national formulary 91.10%. • Planning accuracy 18.14%. • Suitability of items and the number of drug items requested 105%. • Suitability of items and the number of drug items received 96.83%. • Drug storage according to the dosage form 99.19%. • Drug storage according to pharmacology 0%. • Drug storage according to alphabet 98.37%. • Drug storage according to temperature 97.56%. • Narcotics storage according to regulations 83.33%. • Drug storage not used for storing other items that cause contamination 100%. • Drug arrangement follows FEFO method 100%. • High-alert drug storage 83.33%. • LASA drug storage 88%.	• Human resources • Facilities • Technical factors

3.3.1. Study Characteristics

The study was conducted in several PHCs in Indonesia using different checklists or indicators.

3.3.2. Drug Management Description

A systematic review of the nine articles showed that drug management at PHCs in Indonesia needs to meet the specified standards. Drug management involves several steps below:

3.3.2.1. Selection and Planning

Drug selection at PHCs is measured by the suitability of drug items in PHCs drug used and received documents with the Formulary (national/district). The drug planning at Tegal PHCs has yet to meet the standard. The suitability of drug items with disease patterns was 76.39%, the planning accuracy was 321.10%, and the suitability of the number of drug items requested is 169.84% (Cholilah et al., 2021). Discrepancies also occurred at Keerom PHCs, which level of drug availability rate was 70.9% (Carolien et al., 2017). Research in Tulungagung and Kupang PHCs showed the suitability of drug items with the National Formulary was 85.81% (Tulungagung PHCs) and 73.69% (Kupang PHCs); suitability of drug items with disease patterns was 83.03% (Tulungagung PHCs) and 89.94% (Kupang PHCs); planning accuracy was 96.39% (Tulungagung PHCs) and 90.62% (Kupang PHCs). It is due to inaccuracies in planning data, inventory data, changes in disease patterns, and the adequacy of PHCs internal funds for the drug budget (Rintanantasari et al., 2021). Drug planning outside the Formulary impacts the availability of drugs at PHCs that could be more optimal. Making a PHCs Formulary must be based on factors of drug of choice, cost-benefit analysis, and clinical data to achieve effectiveness and efficiency (Rezeki et al., 2021). Rotation doctors and conditions of extraordinary events (KLB) also resulted in inaccurate drug planning at the Banjarmasin Terminal PHCs, only 68% of the standard value of 100% (Sariah et al., 2022). Communication between heads of PHCs stakeholders, drug officers, and doctors are needed to increase prescribing commitment to comply with treatment standards and drug planning.

3.3.2.2. Distribution and Storage

The value of the accuracy of the number of drugs distributed to pharmaceutical service sub-units at Tegal PHCs meets the standard (Cholilah et al., 2021). Different results occurred at Pariaman PHCs, where the accuracy rate of drug distribution was 4.66% - 35.59% (Chaira et al., 2016), Because the drug officers only adds 20% of the total buffer stock, regardless of the optimum stock value. The accuracy of the number of distributions showed to ensure drug availability in the service sub-unit. Drug storage is essential to drug management at PHCs to ensure the quality of the drugs meets the established requirements. Inappropriate drug storage will impact losses due to physical and chemical damage (Tualeka et al., 2021). Research at Boja, Kendal PHC showed drug storage according to dosage form was 85% (Yuswantina et al., 2022). Study at Tegal PHCs, reported that drug storage according to dosage form, temperature, and FEFO (First In, First Out) met the standard 100% (Cholilah et al., 2021). The percentage of the suitability of drug storage LASA (Look Alike Sound Alike) at Boja, Kendal PHCs was 50% (Yuswantina et al., 2022), Tegal PHCs was 87.5% (Cholilah et al., 2021) and South Kalimantan PHCs was 88% (Anisah et al., 2023). It was different at Central Maluku PHCs, which still needed to carry out special handling of drug storage LASA (Tualeka et al., 2021). Exceptional handling in storing drugs can prevent dispensing errors in PHCs. One of the four PHCs in Pariaman still needs a warehouse. Drug storage was separated from the service room (Chaira et al., 2016). In Keerom PHCs still need drug storage warehouses with good air circulation and are free from flooding Adequate availability and capacity of drug storage warehouses were needed to guarantee the quality of drugs at PHCs from the risk of damage and loss (Carolien et al., 2017).

3.3.2.3. Controlling

The indicators used to assess drug control include ITOR, availability rates, and non-prescribed, expired, and defective drugs. ITOR (Inventory Turn Over Ratio) is used to assess the efficiency of drug management and determine the turnover of funds a year (Satibi et al., 2021). The higher ITOR value showed that drug management is more efficient in supplying drugs. Research at Boja, Kendal PHCs, the value ITOR was 3.2 times/year (Yuswantina et al., 2022). It also happened at Tulungagung PHCs, with ITOR was 2.58 times/year, and Kupang PHCs, with ITOR of 2.93 times/year (standard 12 times/year) (Rintanantasari et al., 2021). Low values also happened at Tegal PHCs, with ITOR value being 1.87 ± 0.5 times/year (Cholilah et al., 2021). Lowing ITOR value indicates that many drug stocks are still piling up in warehouses and can potentially increase the number of expired drugs. Result-dropping program drugs (such as albendazole and blood supplement tablets) from the IFK that exceed PHCs planning also result in lower value ITOR (Rintanantasari et al., 2021). The low value of ITOR indicates a reasonably large procurement with an imbalance of needs (Yuswantina et al., 2022). The level of drug availability in several PHCs in Indonesia was more varied. Research at Keerom PHCs in the safe category (12-18 months) was equal to 14.8 ± 3.18 months (Carolien et al., 2017). While the level of overstock (> 18 months) occurred at Boja, Kendal PHCs with the available drug level was 31.5 months (Yuswantina et al., 2022), 36.08 months in Tegal PHCs (Cholilah et al., 2021). Expired drug indicators are used to assess the accuracy of planning and quality monitoring in storage, changes in disease patterns/prescribing patterns, and the quality of the distribution system. The value of expired drugs at Tulungagung and Kupang PHCs was according to the standard 0%. Drug programs can be distributed and used correctly. Adequate storage space at the PHCs in the drugs warehouse and service room can prevent defective drugs at Tulungagung and Kupang PHCs (Rintanantasari et al., 2021). While researching at Tegal PHCs, expired drugs were $3.85\% \pm 2.73$, and defective drugs were $0\% \pm 0$ (Cholilah et al., 2021). It was in line with research at the Boja, Kendal PHCs percentage of expired drugs is 2% with a total value of IDR 2.883.590 (Yuswantina et al., 2022) and 4% at Terminal, Banjarmasin PHC (Sariah et al., 2022). Expired and defective drugs were also found at Keerom PHCs, with a percentage of expired drugs of $7.0\% \pm 2.2$ with a total value of IDR.134.632.836.-. And the percentage value of defective drugs = $0.7\% \pm 1.26\%$ with a total IDR of 2.326.988 (Carolien et al., 2017). Improvements in drug management to prevent expired and defective drugs need to be carried out to avoid losses and wastage of the drug procurement and destruction budget.

3.3.2.4. Documentation, Reporting and Archiving

The accuracy of the physical amount of the drug with the amount on the stock cards or computer was a benchmark for data accuracy and drug management at the puskesmas. It was to record, report, and archive the entire series of drug management that has been carried out, received, stored, distributed, and used in PHCs (RI Ministry of Health, 2016). In research at Boja, Kedal PHCs (Yuswantina et al., 2022), and Tegal PHCs (Cholilah et al., 2021), The accuracy of the physical amount of the drug with the amount on the stock cards was 100%. These results differ from previous studies at Pariaman PHCs, with an accuracy value of 96.89%. This discrepancy was caused by the drug officers not keeping records at the time of the drug mutation (Chaira et al., 2016). Inaccurate the physical amount of the drugs with the amount on the card stock would be the worst planning because the amount of drug received would differ from the drug needed.

3.3.2.5. Monitoring and Evaluation of Drug Management

Research conducted at Tegal PHCs showed that drug management was monitored and evaluated (Cholilah et al., 2021). The monitoring step was carried out to control and avoid errors in drug management so that the puskesmas can make improvements to any problems that occur and sustainably improve the quality of service.

3.3.3. Factors Influencing Drug Management

In general, based on the literature search results, the factors that influence drug management at PHCs include:

3.3.3.1. Human Resources

Human resources are a determining factor that significantly influences the quality of pharmaceutical services, especially drug management at the Tegal PHCs. The discrepancy in drug demand at the Tegal PHCs was caused by the need for calculation by the officers, who needed to be more accurate (Cholilah et al., 2021). Prescribing patterns that do not refer to the formulary used and lack of communication between drug officers and prescribing doctors impact the inaccuracy of drug planning with the needs of PHCs (Chaira et al., 2016). Rotation doctors and lack of commitment to comply with treatment standards also resulted in the level of accuracy of drug planning at Terminal, Banjarmasin PHC was 68% (Sariah et al., 2022). In addition, drug officers are very influential in determining the type and amount of drugs planned and well-received dropping from the Health Ministry and in the procurement process independent (Yuswantina et al., 2022). Research at South Kalimantan PHCs showed that drug officers knowledge regarding proper drug storage procedures also influences the high value of defective and expired drugs was 17.37% (Rezeki et al., 2021). The drug storage according to dosage form and temperature was 97.56% due to drug officers not periodically controlling the temperature of the storage room (Anisah et al., 2023). Planning for human resource needs according to the workload of drug officers at PHCs was needed so that they could carry out drug management according to their competence (Carolien et al., 2017). Study at Central Maluku reported that only 4 Central Maluku PHCs had pharmacists (Tualeka et al., 2021). The low percentage of pharmacists at PHCs also occurred in Tulungagung (23.1%) and Kupang (33.3%). Even in Tulungagung PHCs, there was still non-pharmaceutical staff as drug officers. The lack of drug officers with a pharmaceutical education background will significantly affect their ability and understanding of PHCs drug management (Rintanantasari et al., 2021). According to the Regulation of the Minister of Health of the Republic of Indonesia Number 74 of 2016, the implementation of pharmaceutical services at the PHCs must be carried out by at least one pharmacist, the person in charge, who can be assisted by pharmaceutical technical staff as needed. Resources humans influence indicators of planning accuracy; suitability of requests; storage; distribution; control; recording, reporting, and archiving.

3.3.3.2. Financing

According to Keerom Regent Regulation No. 32 of 2014, the allocation of JKN funds or capitation costs at the Keerom PHCs for drugs is budgeted at 10% of JKN operational funds (Carolien et al., 2017). The capitation funds are often used to buy consumables that IFK does not provide in sufficient quantities. As for drugs, the PHCs must first coordinate with the IFK to avoid overlapping budgets. A different thing happened at the Tegal PHCs; there was a shortage and out-of-stock drug items from the PHCs drug warehouse. PHCs would give and receive drugs to each other with an agreement (Cholilah et al., 2021). The Health Office and the PHCs must provide a drug procurement budget in sufficient quantities and proportion to the overall health budget to ensure the availability of drugs at the PHCs. The distribution of drugs at Keerom PHCs still uses a transport shuttle that does not follow its function. The geographical location of PHCs, which is challenging to reach, and limited public transportation facilities can extend the waiting time and cause delays in drug delivery. It is necessary to determine the distribution schedule and budget for distribution costs from IFK to PHCs to prevent delays in drug delivery (Carolien et al., 2017).

3.3.3.3. Organizational and technical

The study at Keerom PHCs still needs to have Standard Operational Procedure (SOP) as a guideline for carrying out duties as drug officers at the PHCs (Carolien et al., 2017). PHCs need medications but still need to be listed in the district formulary, which is one of the reasons why

drug planning and the formulary differ. As a result, it is suggested that the formulary be updated yearly to reflect current trends in disease patterns, therapy, and medicine (Rezeki et al., 2021). SOPs are created to ensure that drug management operates efficiently and effectively. The SOP provides more specific instructions on the actions officers must take to fulfill their obligations and outlines how to guarantee collaboration with other team members. Organizations have an impact on indicators of medication item conformance to national standards and planning conformity to illness trends. Planning and administration impact measures of planning accuracy and request appropriateness. According to the study at Pariaman PHCs used generic medications less more than 100% (Chaira et al., 2016). Requests for non-generic medications, such as multivitamins for children, multivitamins for TB patients, a combination cough medicine for baby, and cream for treating eczema and burns, came from the emergency department, program unit, prescriber, and patient. The appropriateness value of medication planning at the Keerom PHCs is similarly impacted by changes to DOEN recommendations and illness trends (Carolien et al., 2017). Changes in illness patterns, the need for medications for inpatient PHCs, and the dedication to adherence to therapeutic recommendations and program drug cycle all impact the drugs available at Tulungagung and Kupang PHCS (Rintanantasari et al., 2021). Due to a shortage of injectable medicine diazepam at the distributor and manufacturer levels, the drug availability indicator at the Central Maluku PHCs was subpar at just 82.35% and 9.30% (Tualeka et al., 2021). The supply of medications like acyclovir pills and ointments was similarly impacted by smallpox Extraordinary Events (KLB) at the Tegal PHCs (Cholilah et al., 2021). Emergency medications are only used when emergency patients, such as Diazepam, Dopamine injection, Ephedrine HCl, Lidocaine injection, Ventolin nebulizer, ISDN injection, and Tranexamic acid injection, also experience dead stock (Rezeki et al., 2021). The Health Service's inability to fully meet Banjarmasin Terminal PHC medication needs results from obstacles to drug procurement because no cases or occurrences needing these medications, Covid-19 pandemic situations, overstock drugs program, and life-saving drug usage are uncommon or perhaps nonexistent (Sariah et al., 2022).

3.3.3.4. Management Information System

According to the Regulation of the Minister of Health Number 75 of 2014 it is stated that every PHC is required to carry out PHCs information system activities which include: recording and reporting of PHCs activities, field surveys, related cross-sector documents; and reports on the network of health service facilities in their working areas. Due to the need for a management information system at the PHCs, reporting drug usage and requisition documents (LPLPO) are still written by hand in Central Maluku. It causes a disparity between the physical stock and stock cards (Tualeka et al., 2021). According to research at the Pariaman PHCs had discrepancies between the stock card and the actual medication quantity (Chaira et al., 2016). Management information systems all impact indicators of accurate planning, appropriate requests, appropriate receipts, distribution, control, recording, reporting, and documentation. It is challenging to keep track of the entire medication supply at PHCs due to the need for a district pharmacy information system, according to research in Keerom PHCs. An electronic management information system must be launched to facilitate decision-making by providing accurate and timely information (Carolien et al., 2017).

3.3.3.5. Facilities

In Pariaman, one out of every three PHCs still requires a drug storage facility separate from the service room, and a refrigerator for storing specific drugs is also lacking (Chaira et al., 2016). The Keerom PHCs have some drug storage spaces that must adhere to specific requirements (such as enough airflow, no flooding risk, etc.). Different outcomes were seen at the Tulungagung PHCs and Kupang PHCs, where nearly all PHCs drug warehouses were air-conditioned, and their temperatures were recorded. Aluminum strips are used to package perishable medications,

including ascorbic acid and vitamin B complex, to prevent oxidation, brittleness, and discoloration (Rintanantasari et al., 2021). The Tegal PHCs hold liquid, semi-solid, and solid drug formulations separately. Every drug storage has air conditioning (AC) and room temperature control. Thus, maintaining the drug's temperature is possible even if the storage space is adequate. Some PHCs store narcotics cabinets in a prominent position to expand the size of the drug storage space while keeping all other drugs in the narcotics and psychotropics cabinet (Cholilah et al., 2021). A similar incident occurred at the X PHC in the province of South Kalimantan. Liquid drugs were put on a partially solid shelf because the drug cabinets were so small. Some drugs from specific drug classes (OOT) are kept in the narcotics cabinet due to a lack of room and drug shelves (Anisah et al., 2023). Adequate warehouse capacity and facilities are required to ensure drug quality, prevent irresponsible use, maintain supply continuity, and simplify searching and controlling. The amount of defective and expired drugs are also impacted by inadequate storage space in the PHCs sub-unit and a need for more information about good drug storage practices (Rezeki et al., 2021).

Based on the nine articles extracted, it was clear which human resources have the most role in drug management. Study Carolien et al. (2017) indicate any lack of quantity, skill, and accuracy of drug officers in calculating the probability of requesting drugs less than optimal. It had an impact on the value of drug availability at PHCs. The limited number of drug officers and excessive workload also affect their performance in presenting an accurate drug inventory (Tualeka et al., 2021). Study Rintanantasari et al. (2021) showed that the low number of pharmacists in the Tulungagung PHCs (23.31%) and Kupang PHCs (33.33%) has an impact on ability to carrying out tasks, preparation of LPLPO, drug management, and quality of pharmacy services at PHCs, especially for drug control, which has not reached standards such as value ITOR (2.58 times/year), availability of drugs (27.69 months), safe stock items (63.38%), excess stock items (38.23%), and items not prescribed for >3 months (1.90%). Cholilah et al. (2021) concluded that the most influential factor influencing drug management at Tegal City PHCs was human resources, both from pharmacists and prescription writers. The quantity and quality of human resources at the Tegal City PHCs affect planning, procurement, storage, and drug controlling. The prescribing pattern and the lack of accuracy of drug officers in procurement affect the conformity of items with Fornas. Low knowledge of drug storage among health workers in health service sub-units caused expired drugs or damage in 17.37% of cases (Rezeki et al., 2021). A study by Sariah et al. (2021) showed that mutations in prescribing doctors affected planning accuracy and increased items not prescribed for >6 months. Study Chaira et al. (2016) at Pariaman PHCs showed that human resources influence drug management indicators at planning, requesting, receiving, storing, distributing, using, recording, and reporting drugs. Inaccurate stock recording will cause confusion, lack, or excess in drug planning and drugs request. Anisah et al. (2023) in South Kalimantan PHCs showed HR influenced planning, receiving, and drug storage. There is a lack of awareness among pharmacists at PHCs about the importance of drug labeling. A study by Yuswantina et al. (2022) at Boja PHC showed drug officers have 71% influence in determining the type and number of drugs planned and received, which impact drug availability.

4. CONCLUSION

Overall, the reviews on factors influencing drug management at PHCs in Indonesia received good JBI quality scores (mean score = 7.5 points). Primary health centers (PHCs) in Indonesia need more drug management. PHCs in Indonesia still need to develop influencing factors, i.e., human resources, financing, information management, facilities and technical. Human resources are a determining factor that significantly influences the quality of pharmaceutical services. The observational description method is effectively used to measure drug management, and an intervention study was possible to improve drug quality management in PHCs Indonesia. This

study's results are to make improvement strategies, including interventions to improve the quality of pharmaceutical services that impact community satisfaction and stakeholders.

5. ACKNOWLEDGMENT

6. CONFLICT OF INTEREST

All authors declare no conflict of interest.

7. REFERENCES

Anisah, N., Yunita, S. L., & Hidayati, I. R. (2023). Analisis Pengelolaan Obat di Puskesmas X Provinsi Kalimantan Selatan. *Journal Syifa Sciences and Clinical Research*, *5*(1), 71–80. https://doi.org/10.37311/jsscr.v5i1.17046

Carolien, I., Fudholi, A., & Endarti, D. (2017). Evaluasi Ketersediaan Obat Sebelum dan Sesudah Implementasi JKN di Kabupaten Keerom Papua. *Jurnal Manajemen dan Pelayanan Farmasi*, *7*(1), 30–39. https://doi.org/10.22146/jmpf.30294

Chaira, S., Zaini, E., & Augia, T. (2016). Evaluasi Pengelolaan Obat pada Puskesmas di Kota Pariaman. *Jurnal Sains Farmasi & Klinis*, *3*(1), 35–41. https://doi.org/10.29208/jsfk.2016.3.1.97

Cholilah, Wijayanti, T., & Satibi, (2021). Analisis Mutu Pengelolaan Obat di Puskesmas Kota Tegal. *Jurnal Manajemen dan Pelayanan Farmasi*, *11*(4), 274–285. https://doi.org/10.22146/jmpf.69095

George, P. P., Molina, J. A. D., & Heng, B. H. (2014). The methodological quality of systematic reviews comparing intravitreal bevacizumab and alternates for neovascular age related macular degeneration: A systematic review of reviews. *Indian Journal of Ophthalmology*, *62*(7), 761–767. https://doi.org/10.4103/0301-4738.138615

Joanna Briggs Institute. (2022). *JBI Critical Appraisal Tools. Joanna Briggs Institute.https://jbi.global/critical-appraisal-tools*.

Marathe, S., Sardeshpande, N., & Yakkundi, D. (2015). What Causes Medicine Shortages in Primary Health Centers: A Case Study of Availability and Supply System of Medicines in Select PHCs from Maharashtra. *Journal of Health Management*, *17*(1), 86–97. https://doi.org/10.1177/0972063414560873

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *The BMJ*, *372*(n71). https://doi.org/10.1136/bmj.n71

Rezeki, A., Fhory, B. N., Yasa, M. S. R., Syahriah, & Wathan, N. (2021). Evaluasi ketersediaan obat di beberapa puskesmas wilayah kabupaten X tahun 2019. *Sasambo Journal of Pharmacy*, *2*(2), 65–72. https://doi.org/10.29303/sjp.v2i2.120

RI Ministry of Health. (2019). *Peraturan Menteri Kesehatan Republik Indonesia Nomor 43 Tahun 2019, tentang Pusat Kesehatan Masyarakat*.

Rintanantasari, Fudholi, A., & Satibi. (2021). Evaluasi Perencanaan dan Pengendalian Obat di Puskesmas Wilayah Kabupaten Tulungagung dan Kota Kupang. *Majalah Farmaseutik*, *17*(3), 296–302. https://doi.org/10.22146/farmaseutik.v1i1.54063

Sariah, Fernanda, Y., Annisa, R., & Wathan, N. (2022). Evaluasi Pengelolaan Obat di Puskesmas Terminal Kota Banjarmasin Tahun 2021. *Borneo Journal of Pharmascientech*, *06*(02), 86–93. https://doi.org/10.51817/bjp.v6i2.432

Satibi, Daulay, E. H., Oviani, G. A., Erlianti, K., Fudholi, A., & Puspandari, D. A. (2018). Analisis Kinerja Apoteker dan Faktor Yang Mempengaruhi Pada Era Jaminan Kesehatan Nasional di Puskesmas. *Jurnal Manajemen dan Pelayanan Farmasi*, *8*(1), 32–38. https://doi.org/10.22146/jmpf.34441

Satibi, Prasetyo, S. P., Rokhman, M. R., & Aditama, H. (2021). *Penilaian Mutu Pelayanan Kefarmasian di Puskesmas*. UGM Press, Yogyakarta.

Tawfik, G. M., Dila, K. A. S., Mohamed, M. Y. F., Tam, D. N. H., Kien, N. D., Ahmed, A. M., & Huy, N. T. (2019). A step-by-step guide for conducting a systematic review and meta-

analysis with simulation data. *Tropical Medicine and Health*, *47*(1), 46. https://doi.org/10.1186/s41182-019-0165-6

Tualeka, U., Fudholi, A., & Satibi. (2021). Analisis Ketersediaan Obat di Puskesmas Kabupaten Maluku Tengah. *Majalah Farmaseutik*, *17*(3), 303–311. https://doi.org/10.22146/farmaseutik.v1i1.54084

Wibowo A., & Putri S. (2021). *Pedoman Praktis Penyusunan Naskah Ilmiah dengan metode systematic review* (1st ed.). Departemen Administrasi dan Kebijakan Kesehatan - Fakultas Kesehatan Masyarakat Universitas Indonesia. https://doi.org/10.13140/RG.2.2.17871.20640

Yuswantina, R., Lestari, M. A., Aprilia, L., & Dyahariesti, N. (2022). Studi Pengelolaan Obat di Puskesmas Boja 1 Kabupaten Kendal Tahun 2020. *Jurnal Ilmiah Manuntung*, *8*(2), 242–247. https://doi.org/10.51352/jim.v8i2.609

Zeng, X., Zhang, Y., Kwong, J. S. W., Zhang, C., Sheng, L., Feng, S., Yuming, N., & Liang, D. (2015). The methodological quality assessment tools for preclinical and clinical studies, systematic review and meta-analysis, and clinical practice guideline: A systematic review. *Journal Evidence Based Medicine*, *8*(1), 2–10. https://doi.org/10.1111/jebm.12141