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From Business to Care: An Analysis of Pharmaceutical Service Compliance Across Indonesian Pharmacies

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ABSTRACT

Pharmaceutical services in Indonesian community pharmacies play a critical role in ensuring safe and effective medication use. However, despite the establishment of the Ministry of Health Regulation No. 73 of 2016, significant disparities in compliance persist, which may compromise patient safety and the quality of pharmaceutical care. This study analyzes pharmacy compliance across various regions of Indonesia in implementing pharmaceutical service standards, focusing on three key domains: pharmaceutical supply management, clinical services, and human resources. A total of 43 eligible studies were systematically reviewed and categorized according to the regulatory indicators. The results showed that pharmaceutical supply management demonstrated the highest compliance levels (average 88–94%), as it directly supports pharmacy profitability. In contrast, clinical services such as counseling, Home Pharmacy Care (HPC), and Drug Therapy Monitoring (DTM) exhibited low implementation rates (23–40%), primarily due to limited remuneration and insufficient pharmacist engagement. Only 36.87% of pharmacies conducted self-evaluations, yet these showed significantly higher compliance compared to those that did not. Pharmacist attendance alone did not correlate with improved clinical service provision, indicating that competency and institutional support are more critical determinants of compliance. In conclusion, the findings highlight that Indonesian pharmacies remain largely business-oriented, with clinical services underperformed relative to managerial aspects. Strengthening policy enforcement and professional capacity-building is essential to enhance compliance and support a shift toward patient-centered pharmaceutical care.

INTRODUCTION

Pharmacies serve as one of the most accessible healthcare facilities for the general public and play a critical role as frontline providers of healthcare services, especially in the context of self-medication. Given their proximity to the community, pharmacies are uniquely positioned to not only dispense medications but also actively contribute to the improvement of patient health outcomes and overall public health. This expanded role requires pharmacies to go beyond traditional business operations and embrace a patient-centered approach focused on optimizing medication use and safety (Straw et al., 2023).

To ensure the quality and safety of pharmaceutical services, the Indonesian Ministry of Health has established comprehensive regulatory standards detailed in the Minister of Health Regulation (PMK) Number 73 of 2016 (Kementerian Kesehatan Indonesia, 2016). This regulation delineates standards across two principal domains: the management of pharmaceutical supplies and the delivery of pharmaceutical services. These standards form the foundation for pharmacy operations to meet safety, quality, and service benchmarks essential for patient care. Moreover, the integration of PMK No. 73/2016 with Article 8 of the 2009 Health Law underscores a paradigm shift in the role of pharmacies–from a predominantly business-oriented model toward a healthcare model that prioritizes the enhancement of patients' quality of life. This shift aligns with the fundamental right of every individual to receive healthcare services that are safe, high-quality, and affordable. Consequently, pharmacies are mandated to actively engage in pharmaceutical care services that focus on the entire medication use process, ensuring the safety, efficacy, and rational use of medicines by applying scientific knowledge and patient care principles (Kementrian Kesehatan Indonesia, 2016).

The healthcare compliance model provides an additional conceptual, emphasizing that adherence to regulatory standards depends not only on policy design but also on organizational structures and behaviors, including healthcare professional commitment, healthcare professional training, active supervision and corrective actions. These elements

collectively promote a culture of compliance of pharmaceutical service standards in Indonesia. The responsibility for complying with these standards largely rests on the supervising pharmacist, who is pivotal in driving the quality of pharmaceutical services. The pharmacist's role encompasses critical functions such as providing accurate drug information, conducting patient counseling, and monitoring therapy outcomes (Bradley et al., 2013; Hindi et al., 2022). These activities are essential in preventing Drug-Related Problems (DRPs), which can lead to adverse effects, hospitalizations, and increased healthcare costs. By minimizing DRPs, pharmacies contribute to better treatment outcomes and enhanced cost-effectiveness in healthcare delivery (Bektay et al., 2023; Lekpittaya et al., 2023).

Challenges in implementing pharmaceutical service standards are not unique to Indonesia. Similar issues have been reported in other developing countries such as India, the Philippines, and Vietnam, where community pharmacies face difficulties in translating regulations into consistent practice due to workforce shortages, insufficient training, and limited enforcement mechanisms (Agaceta et al., 2014; Maddirala Venkata, 2007; Minh et al., 2013). In India, the primary challenge lies in the weak integration of pharmacists into the healthcare system, resulting in limited recognition of their role as health professionals and inadequate implementation of Good Pharmacy Practice (GPP). The proposed solutions emphasize policy reform to formally recognize pharmacists as essential healthcare providers, revision of outdated pharmaceutical regulations, and upgrading of pharmacy education to strengthen clinical and patient-centered competencies. In the Philippines, the major barriers include lack of interdisciplinary support, insufficient economic incentives, and inadequate physical infrastructure, particularly in government hospitals. Addressing these issues requires establishing structured remuneration systems, clearer practice guidelines, and collaboration frameworks that promote teamwork between pharmacists and other healthcare professionals. Meanwhile, in Vietnam, although community pharmacies also faced challenges with inconsistent service quality and limited clinical engagement, a national training and supportive supervision program significantly improved pharmacists' knowledge and practices related to childhood diarrhea and emergency contraceptive care. This intervention demonstrated that continuous professional development and monitoring can effectively strengthen pharmacy practice and service delivery. Collectively, these regional experiences highlight that improving pharmaceutical care in developing countries requires not only regulatory alignment but also systematic investment in human resource development, professional recognition, and sustainable support mechanisms (Agaceta et al., 2014; Maddirala Venkata, 2007; Minh et al., 2013).

Indonesia, conversely, remains in an early implementation stage, where policies exist but practical enforcement, pharmacist capacity building, and financial support mechanisms are still fragmented. Given this condition and the growing demands on the healthcare system, especially within the framework of Indonesia's National Health Insurance (NHI), optimizing pharmaceutical services presents a strategic opportunity to enhance budget efficiency and patient care simultaneously. The implementation of pharmaceutical standards must be approached holistically and systematically, addressing multiple interrelated challenges within the healthcare delivery system. Identifying these challenges and understanding the dynamic interactions between different components–such as human resources, infrastructure, and regulatory frameworks–are essential first steps in developing effective solutions.

Several factors influence the successful adoption and implementation of pharmaceutical practice standards, particularly the availability and competency of supervising pharmacists. Recent empirical research conducted in 2019 across 11 provincial capitals in Indonesia revealed that while compliance with pharmaceutical supply management standards was relatively high at 98.4%, adherence to clinical pharmacy service standards lagged behind at 73.8%. This gap highlights an uneven implementation of pharmaceutical care practices and suggests areas needing focused improvement (Supardi & Handayani, 2019). However, most previous studies have examined compliance only within limited geographic or administrative contexts, often focusing on single provinces or districts. This narrow scope restricts understanding of broader regional variations and the systemic factors that shape compliance nationally. Assessing these regional variations is critical because unequal implementation contributes directly to disparities in healthcare quality and patient safety across Indonesia's vast and diverse population. Regions with lower compliance may experience poorer medication outcomes, reduced patient satisfaction, and higher rates of preventable adverse drug events, further widening health inequality.

Therefore, this study aims to address this research gap by conducting a comprehensive analysis of pharmacy compliance with pharmaceutical practice standards across multiple regions in Indonesia. By applying theoretical frameworks from implementation science and healthcare compliance, this study seeks to identify the key determinants of compliance and the contextual factors driving regional disparities. The findings are expected to inform policymakers and stakeholders in designing targeted, evidence-based interventions to strengthen the quality, equity, and sustainability of pharmaceutical services nationwide.

METHOD

Study Design

This review employs a scoping review approach in accordance with the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews) guidelines. The scoping review methodology is particularly suited for this study because the primary aim is to broadly map the existing literature on the topic, identify key concepts, gaps, and types of evidence available, rather than to answer a narrowly focused research question or assess the effectiveness of specific interventions.

Literature Search Strategy and Information Source

To ensure a comprehensive and inclusive literature search, we employed multiple search methods. In addition to conducting searches in major academic databases such as PubMed and Scopus, we utilized Google Search to capture relevant studies that might not be indexed in these databases. The keywords used were combinations listed in Table 1, which also shows the number of search results for each keyword. This approach was necessary because many of the targeted studies for this review are undergraduate theses from various universities across Indonesia, which are

typically published in university repositories and not indexed in international databases like Elsevier or Scopus. Furthermore, a significant portion of the relevant literature is published by local Indonesian publishers, such as those indexed in the SINTA database, and many are written in the Indonesian language. These studies are often accessible via Google Search, making it an essential tool to ensure broad regional coverage and inclusion of grey literature. We considered that the included undergraduate theses have undergone academic review processes, including supervision and examination by university faculty members, ensuring a minimum standard of quality. This strategy allowed us to capture diverse perspectives and a more representative body of evidence relevant to our research objectives.

Eligibility Criteria

The inclusion criteria for this review were: evaluation of at least one parameter or aspect of pharmaceutical services in pharmacies, evaluation conducted across more than one pharmacy, coverage of a specific geographical area such as a city, district, or sub-district, and the study being written in either English or Bahasa Indonesia. Studies were excluded if they lacked information on the sample size of pharmacies, focused on pharmaceutical services in hospitals or community health centers, or evaluated only specific pharmacy groups such as franchises. The literature reviewed consisted of journal articles and undergraduate theses that were accessible through public repositories. In cases where multiple studies covered the same region and evaluation parameters, the most recent study was prioritized for inclusion.

The inclusion criteria for this review were designed to ensure that the analyzed studies provided reliable, comparable, and policy-relevant data on the implementation of pharmaceutical service standards in Indonesian community pharmacies. Studies were included if they evaluated at least one aspect of pharmaceutical services, such as supply management, clinical services, or human resources, and if the evaluation covered more than one pharmacy to capture regional trends rather than individual facility practices. Only studies with defined geographical coverage, including cities, districts, or sub-districts, and published in English or Bahasa Indonesia were considered, allowing for accurate appraisal and interpretation while accounting for contextual variations in resources, workforce distribution, and regulatory enforcement. Studies focusing on hospitals, community health centers, specific pharmacy chains, or those lacking sample size information were excluded to maintain representativeness and minimize selection bias. When multiple studies addressed the same region and parameters, the most recent study was prioritized to reflect current practices. These criteria collectively ensured that the review captured systemic patterns of pharmacy compliance, identified gaps in clinical service provision, and provided evidence relevant to policy development and the advancement of patient-centered pharmaceutical care.

Study Selection Process

The selection of studies followed a rigorous, multi-stage process to minimize bias. Two reviewers independently screened titles and abstracts against the eligibility criteria. Studies deemed potentially relevant were retrieved in full text and independently reviewed. Discrepancies were resolved through discussion; if consensus was not reached, a third reviewer made the final decision.

Table 1. Keywords Used in the Search

No.	Words				Research result
	1	2	3	4	
1	Suitability	Implementation	Services	Pharmaceutical	89
2	Evaluation	Implementation			107
3	Assessment	Implementation			95
4	Review	Administration			100
5	Evaluation	Implementation			110
6	Assessment	Implementation			97
7	Review	Implementation			92
8	Suitability	Implementation			91
9	Assessment	Implementation			85
10	Review	Implementation			101
11	Suitability	Implementation			87
12	Evaluation	Administration			108
13	Review	Implementation			99
14	Suitability	Implementation			87
15	Evaluation	Implementation			100
16	Assessment	Administration			100
Total					**1548**

All records were managed using a citation management tool (e.g., Zotero or Mendeley), and duplicates were removed before screening. The selection process was documented using a PRISMA-ScR flow diagram. The final inclusion was

based on relevance to the research objectives, data completeness, and alignment with inclusion criteria.

Data Extraction Process

According to the Ministry of Health Regulation No. 73 of 2016, pharmaceutical services in pharmacies are divided into two main activities: managerial tasks and clinical pharmacy services. The implementation of pharmaceutical service standards must be supported by pharmaceutical resources, including human resources and facilities; hence, these resources are one of the key evaluation aspects in this literature review. Supply management activities include planning, procurement, receiving, storage, disposal, control, recording, and reporting. Meanwhile, clinical pharmacy services cover prescription assessment and services, dispensing, Drug Information Services (PIO), counseling, home pharmacy care (HPC), Drug Therapy Monitoring (DTM), and Adverse Drug Reaction Monitoring (MESO). These management and service aspects, along with their parameters, serve as the basis for literature evaluation. Other commonly reported parameters such as pharmacy ownership, pharmacist presence, and other pharmacist activities were also considered.

Quality Appraisal

In accordance with the scoping review methodology, a formal risk of bias assessment was not required. However, due to the inclusion of grey literature–particularly undergraduate theses–a basic quality appraisal was performed to ensure minimum standards of credibility. Each study was assessed for clarity of objectives, methodological transparency, sample size, and relevance to the parameters defined by national pharmaceutical service standards. Studies lacking essential data (e.g., sample size, geographic coverage, or clearly defined parameters) were excluded during screening. For undergraduate theses, a baseline level of academic quality was assumed based on institutional supervision and examination requirements. While no formal scoring tool (e.g., JBI or GRADE) was applied, the pragmatic quality check ensured that only studies fit for the review's purpose were included.

Data Synthesis and Analysis.

Collected data consisted of the percentage or number of pharmacies implementing specific pharmaceutical service parameters. These were summarized in tabular format according to each parameter or category. Where applicable, associations between parameters (e.g., pharmacist presence and service quality) were analyzed using linear regression and Kendall's Tau correlation, as the data were non-parametric or not normally distributed.

Pharmacist Presence Scoring System

To standardize the measurement of pharmacist presence across studies, a scoring system was applied that weighted attendance time and the number of prescriptions served daily. This scoring system refers to the method used in journal by dominica et.al (Score 5: Pharmacist present during all pharmacy operating hours; Score 4: Pharmacist present daily at specific hours (morning, afternoon, evening); Score 3: Pharmacist present 2–3 times a week; Score 2: Pharmacist present once a week; Score 1: Pharmacist present once a month; Score 0: Pharmacist never presen), calculating the number of days pharmacists were present within a week, then dividing the accumulated points by the maximum possible score (maximum score: the number of respondent x 5) and multiplying by 100 to obtain the pharmacist attendance percentage (Dominica et al., 2016).

The pharmacist attendance scoring system used in this study is adapted from Dominica et al. (2016), which examined 68 pharmacies in Denpasar using a structured attendance scale. Their findings showed a positive correlation between pharmacist presence and service quality: pharmacies with higher attendance levels reported better service quality (21.0% at level 1, 57.1% at level 2, and 64.3% at level 3). This supports the construct and predictive validity of the scoring system, as increased pharmacist presence was associated with improved outcomes. The structured categories offer content validity, while the use of objective, replicable criteria enhances reliability across studies and settings. Although multivariate analysis showed that ownership had the strongest effect, pharmacist attendance remained a contributing factor in service quality, validating its inclusion as a key variable in this review (Dominica et al., 2016).

RESULTS OF STUDY

The review encompassed studies published between 2003 and 2021, focusing on community pharmacy practices in Indonesia across 14 provinces, including regions in Java, Sumatra, Kalimantan, Sulawesi, Nusa Tenggara, Maluku, and Papua. The number of pharmacies sampled in these studies ranged from 4 to 70, with population sizes between 7 and 1,123 pharmacies, reflecting notable variation in study scope and regional coverage. The majority of research was concentrated on Java Island, particularly in Central and East Java, which may be attributed to higher pharmacy density and easier accessibility in these regions. Nevertheless, the number of studies conducted in eastern Indonesia has gradually increased in recent years, indicating a growing nationwide commitment to evaluating pharmacy practices across diverse settings. It is important to note that several datasets were incomplete, particularly regarding the total pharmacy population and compliance percentages, as some manuscripts did not report these details and updated data could not be retrieved from other sources.

From the literature search process (Figure 1), a total of 1,548 records were initially identified through database searching. After removing duplicates and screening process based on title and abstract screening, 548 records were excluded, leaving 51 full-text articles for Full text assessment. Following full-text review, 8 articles were excluded because more recent studies covering similar data or regions were available (3 articles), the pharmacy in the specific group (BPJS (2 articles), Franchise (3)). Ultimately, 43 studies met all inclusion criteria and were included in the qualitative synthesis. a total of 43 studies met the inclusion criteria and were subsequently summarized in Table 2. Each study was evaluated based on the parameters and aspects of pharmaceutical services defined in the Ministry of Health Regulation No. 73 of 2016, encompassing drug supply management, clinical pharmacy services, and pharmaceutical human resources. A summary of the evaluation results for these parameters is presented in Figure2, while more detailed information is provided in Supplementary Table 1.

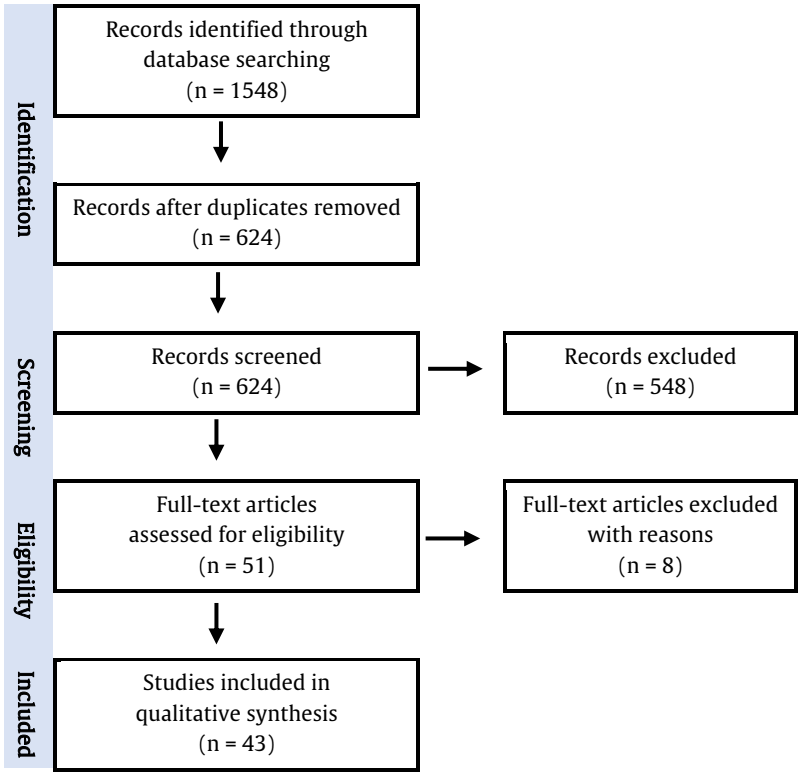

Figure 1. Literature selection process

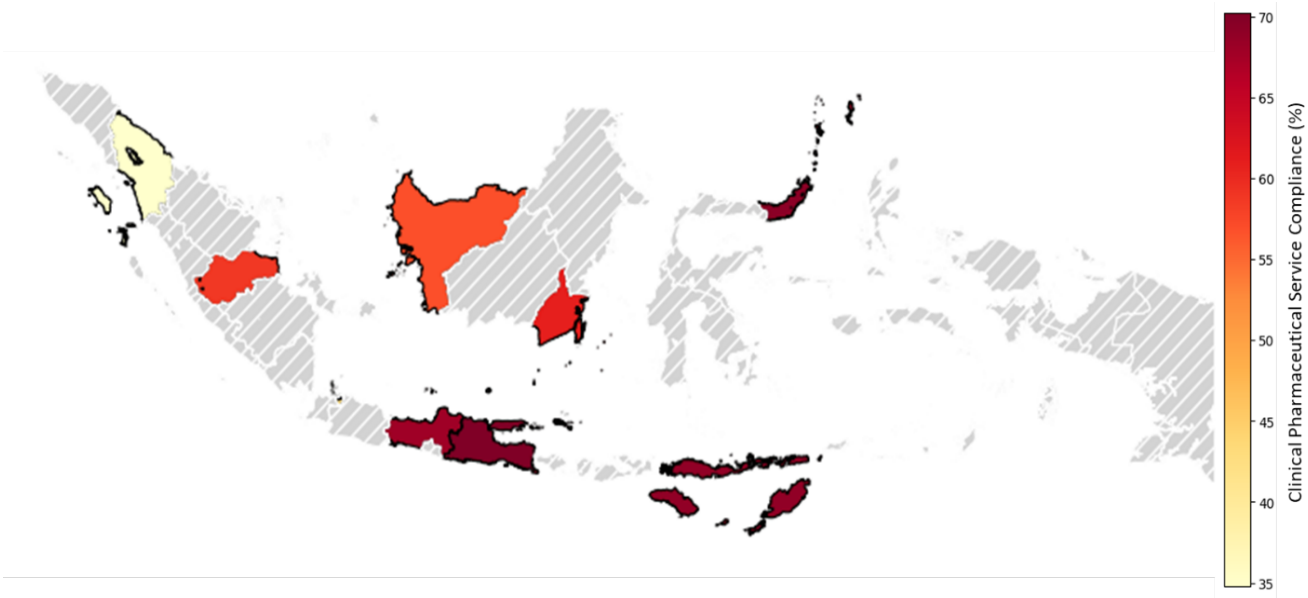

Figure 2. The distribution of Clinical Pharmacy compliance of Pharmacy Percentage

Table 2. Summary of the selected literatures

No	Year	Region		Number of Pharmacy		Reference
		Province	City/Regency	Sample	Population	
1	2007	DIY	Gunung Kidul Regency	9	9	(Isdaryatmo & Trijatmiko, 2008)
2	2007	DIY	Kulon Progo Regency	6	60	(Prasetyo & Totok, 2007)
3	2012	DIY	Bantul Regency	32	108	(Fauziyah & Satibi, 2012)

4	2016	DIY	Sleman Regency	33	143	(Hadiyana, 2016)
5	2018	DIY	Sleman Regency (Gamping District)	13	N/A	(Urthamea & Ghozali, 2019)
6	2019	DIY	Yogyakarta	28	128	(Dwi Saputra et al., 2019)
7	2003	Jakarta	Jakarta	68	1123	(Purwanti et al., 2004)
8	2017	Jambi	Jambi	17	105	(Mulyagustina et al., 2017)
9	2019	Central Java	Pekalongan Regency	23	23	(Destyana et al., 2019)
10	2010	Central Java	Sragen Regency	25	29	(Fitrianto, 2010)
11	2010	Central Java	Purwokerto	4	N/A	(Anisah et al., 2010)
12	2011	Central Java	Salatiga	16	26	(Maryati & Yulianti, 2011)
13	2013	Central Java	Tegal (Adiwerna District)	7	7	(Bertawati, 2013)
14	2015	Central Java	Rembang	4	N/A	(Utami & Cholisoh, 2019)
15	2016	Central Java	Magelang	15	50	(Latifah et al., 2016)
16	2018	Central Java	Magelang (Metroyudan District)	15	15	(Rochmah, 2018)
17	2019	Central Java	Pemalang Regency	31	121	(Elfrida Kusumaningrum et al., 2021)
18	2019	Central Java	Wonosobo Regency (Kertek District)	4	4	(Suratni, 2019)
19	2014	Central Java	Banyumas Regency	63	N/A	(Pratiwi et al., 2020)
20	2013	East Java	Malang	25	215	(Widyaningrum, 2013)
21	2017	East Java	Surabaya	70	830	(Waso, 2018)
22	2019	East Java	Kediri (South District)	10	10	(Kusumawati & Lukitasari, 2024)
23	2020	East Java	Pamekasan Regency	28	49	(Ach Faruk Alrosyidi & Kurniasari, 2020)
24	2020	East Java	Sidoarjo	34	N/A	(Wahyuni et al., 2020)
25	2021	East Java	Malang (Dau District)	7	7	(Nurhastuti et al., 2022)
26	2016	West Borneo	Ketapang	6	17	(Anditasari, 2015)
27	2018	West Borneo	Kubu Raya Regency	17	30	(Hairunnisa et al., 2021)
28	2019	West Borneo	Pontianak (Pontianak Kota District)	18	18	(Sahadi, 2019)
29	2019	West Borneo	Singkawang	18	33	(Yulidarsih et al., 2019)
30	2019	South Borneo	Baru Regency (North Pulau Laut District)	10	10	(Yuniar, 2019)
31	2015	South Borneo	Banjarbaru	21	N/A	(Kartinah et al., 2015)
32	2021	South Borneo	Banjarmasin	52	N/A	(Sari, 2021)
33	2017	Riau island	Tanjungpinang	12	51	(Aristantya, 2017)
34	2021	North Maluku	North Halmahera Regency (Tobelo District Tobelo)	11	11	(Tuwongena et al., 2021)
35	2019	West Nusa Tenggara	Mataram	52	91	(Nur Radiah, 2019)
36	2018	West Nusa Tenggara	Central Lombok Regency	38	67	(Ningrum et al., 2018)
37	2017	East Nusa Tenggara	West Lombok Regency	40	44	(Ningrum & Yuliana, 2021)
38	2016	East Nusa Tenggara	East Flores Regency	7	7	(Somi & Ardiningtyas, 2016)
39	2021	East Nusa Tenggara	Kupang	52	90	(Parera et al., 2021)
40	2015	Papua	Sorong	25	25	(Sukowati, 2015)
41	2019	Central Sulawesi	Palu	56	162	(Diana et al., 2019)
42	2021	North Sulawesi	Kotamobagu	7	7	(Mokoginta et al., 2021)
43	2008	North Sumatra	Medan	68	617	(Hasibuan, 2019)

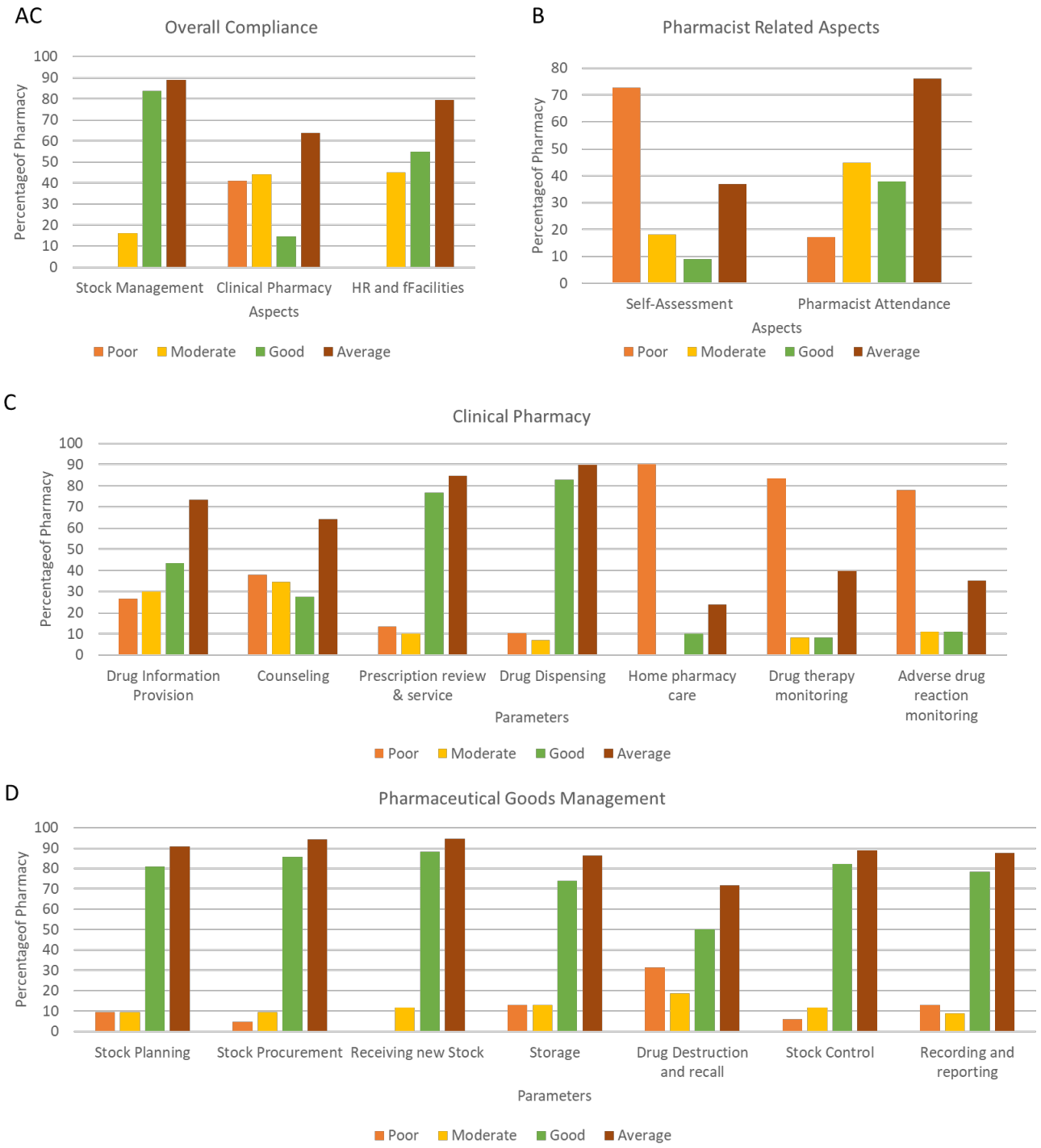

Figure 3. Summary of the Accumulated Results for Each Parameter

The findings indicate that drug supply management was the most widely implemented and achieved the highest performance scores, whereas clinical pharmacy services demonstrated the lowest performance levels. The percentage of service implementation was classified into three categories: good (≥80%), moderate (60–79%), and poor (<60%). Pharmacy services exhibited strong performance in logistical and dispensing activities, with average scores ranging from 84% to 94%, reflecting efficient management of drug supply and distribution. In contrast, clinical and patient-centered services recorded considerably lower performance, with scores between 23% and 40%, underscoring the need for significant improvement in pharmaceutical care quality and patient-oriented practices (Figure 2).

Furthermore, the pharmacist attendance evaluation conducted in 30 regions with complete data showed significant variation. Pharmacist attendance of more than five hours per day was categorized as good (≥ 80%), moderate (60–79%), and poor (< 60%). The average pharmacist attendance across 29 observation points was 17.24% (poor category), 41.37% (moderate), and 41.37% (good). Additional data revealed that in 13 regions observed, less than 50% of responsible pharmacists had no other job

outside the pharmacy, meaning most pharmacists consider their pharmacy work as a secondary occupation. This factor is likely one of the reasons for the suboptimal implementation of clinical pharmacy services, which require full-time involvement of pharmacists.

Correlation analysis showed that pharmacies conducting self-assessment were more likely to implement clinical pharmacy services, have adequate human resources, and sufficient facilities (Table 3). Integration of correlation analysis provides deeper insight into compliance determinants. Self-assessment scores were moderately correlated with overall performance (Kendall's tau = 0.778, p = 0.004; R^2 = 0.497), indicating that pharmacists' perceptions of their service quality align moderately with observed practices. Clinical pharmacy services showed a strong correlation with overall performance (tau = 0.745, p = 0.001; R^2 = 0.623), highlighting that patient-centered activities are key drivers of pharmacy performance. In contrast, human resources and facility scores were weakly correlated with overall performance (R^2 = 0.140), and pharmacist presence alone did not significantly predict prescription review quality (tau = -0.327, p = 0.125). These findings suggest that while adequate staffing and infrastructure are necessary, the substantive delivery of clinical services is the main determinant of overall service quality. This reinforces the need to prioritize interventions that support active clinical service provision rather than focusing solely on structural inputs.

Table 3. Correlation Analysis Results

Parameter		Kendall's tau			Linear regression				
		Correlation Coefficient	Sig. (2-tailed)	N	R	R Square	Adjusted R Square	Std. Error of the Estimate	strength
Independent Self-Assessment	Overall	.778**	0.004	9	.705a	.497	.434	3.84832	Moderate
	HR and Facility	.778**	0.004	9	.374a	.140	.017	9.96629	Low
	Clinical Pharmacy Service	.745**	0.001	11	.789a	.623	.585	12.81606	Strong
Prescription Review	Pharmacist Presence	-0.327	0.125	13	.696a	.485	.438	18.12895	Moderate

Notes. ** Significant Correlation

DISCUSSION

Dominance of the Business Paradigm and Compliance Patterns

This study demonstrates that community pharmacies in Indonesia exhibit markedly higher compliance with business- and logistics-related functions than with clinical services. Compliance was strongest in stock procurement (85.71% good), stock control (82.35%), receipt of new stock (88.24%), drug dispensing (82.76%), and prescription review (76.67%). These operational activities directly influence profitability and efficiency, which explains their prioritization. Conversely, patient-centered services such as drug information provision (43.33% good), counseling (27.59% good), home pharmacy care (10% good), drug therapy monitoring (8.33% good), and adverse drug reaction monitoring (11.11% good) were rarely implemented. This pattern reflects a prevailing business-oriented model, in which pharmacies emphasize measurable and revenue-driven tasks while neglecting labor-intensive clinical services that require expertise and time but yield limited financial return. Although national regulations such as *Permenkes No. 73/2016* and *Permenkes No. 9/2017* clearly mandate clinical service provision, the persistently low compliance rates highlight that regulation alone does not guarantee implementation (Kementrian Kesehatan Indonesia, 2016). Similar cases also occurred in hospital setting with the implementation of the standards of clinical pharmacy ranged only around 53.5% and predominantly worse in terms of monitoring of drug blood level (Yuniar, 2019).

Indonesia's community pharmacy landscape—comprising more than 26,000 outlets, about 60% of which are located on Java Island—is largely dominated by private ownership. Importantly, pharmacy ownership is not restricted to pharmacists; non-pharmacist entrepreneurs may operate pharmacies provided that a licensed pharmacist is employed to fulfill legal requirements (Mizranita et al., 2024). Consequently, most pharmacies depend heavily on medicine sales as their main source of income rather than on remunerated professional services. This structural condition incentivizes compliance with logistics and stock management processes that directly sustain profitability while discouraging the consistent delivery of clinical services (Mizranita et al., 2024).

Why Regulation Alone Does Not Ensure Compliance

The persistent gap between regulatory intent and real-world implementation can be better understood through organizational theory. Institutional theory (Meyer & Rowan, 1977) posits that organizations respond not only to coercive pressures (such as laws and inspections) but also to professional norms and market expectations. In Indonesia, although coercive mechanisms exist, the professional and economic incentives to deliver clinical services remain weak. This leads to *symbolic compliance*, where pharmacies maintain formal documentation and procedures primarily to satisfy regulatory audits rather than to achieve substantive clinical outcomes.

Similarly, street-level bureaucracy theory highlights the discretionary behavior of front-line workers. Pharmacists often prioritize tasks that are simpler, more measurable, or economically beneficial (Lipsky, 1980). Despite legal requirements under Indonesia's *Pharmacy Practice Act* and *Community Pharmacy Decree* for pharmacists to deliver

counseling, home care, and therapy monitoring, these services are not financially compensated. The absence of remuneration for time- and expertise-intensive activities discourages meaningful implementation (Mizranita et al., 2024). Without structured support–such as continuous training, adequate infrastructure, performance monitoring, or financial incentives–regulation alone is insufficient to achieve substantive compliance or behavioral change in practice.

Economic and Remuneration Barriers: Lessons from Switzerland and Canada

Economic constraints are a critical determinant of compliance behavior. Across several regions, more than 40% of pharmacists-in-charge reported holding a second job, implying that their primary income from pharmacy work is inadequate. This correlates with the finding that only 37.93% achieved good compliance for pharmacist attendance. National data corroborate these findings: around 67% of pharmacists earn only IDR 2–5 million per month, with 93% relying primarily on fixed monthly salaries rather than service-based income. Only 44% receive professional fees for services such as dispensing, counseling, or medication review, and fewer than half obtain profit-sharing or performance-based incentives (Hermansyah et al., 2021). Although 82% of pharmacists agreed they should be remunerated for clinical services, sustainable mechanisms involving pharmacy owners, patients, or the national health insurance agency (NHI) remain undeveloped (Hermansyah et al., 2021). This remuneration gap likely contributes to low compliance in patient-centered activities, including home pharmacy care (10% good), drug therapy monitoring (8.33%), and adverse drug reaction monitoring (11.11%). These services demand significant professional effort but lack financial return.

In contrast, countries such as Switzerland and Canada demonstrate that linking remuneration with service provision enhances compliance and service quality. Switzerland's *Rémunération Basée sur les Prestations (RBP)* system reimburses pharmacists for services including medication reviews, counseling, and generic substitution, under agreements between insurers and the Swiss Society of Pharmacists (Paris & Docteur, 2007). Likewise, in Canada, provincial programs such as Ontario's *MedsCheck* and Alberta's care-planning initiatives compensate pharmacists for annual medication reviews, adherence monitoring, and patient follow-ups (McMaster Health Forum, 2022). Adapting such models to Indonesia's JKN system is both promising and challenging. The JKN framework, managed by BPJS Health, already includes capitation payments for primary care providers such as doctors and midwives, but pharmacists are not yet integrated into this payment flow. An adapted version could involve two tiers: (1) a fixed capitation fee for essential services (e.g., prescription review, chronic therapy monitoring), and (2) a variable, fee-for-service component for specific interventions such as medication review or ADR follow-up, submitted through digital platform claim system. However, successful adaptation would require regulatory and infrastructural adjustments–such as defining pharmacist service codes, setting national tariff standards, ensuring digital claim traceability, and establishing professional accreditation systems. Without these, there is a risk that reimbursement mechanisms may create administrative burdens or inequitable payment distribution between urban and rural pharmacies. Nevertheless, introducing even a modest fee-for-service pilot within JKN–targeting high-burden conditions such as hypertension or diabetes–could demonstrate economic and clinical benefits. Evidence from Switzerland and Canada shows that reimbursing pharmacists for structured interventions reduces hospital admissions, improves medication adherence, and generates cost savings at the system level. Over time, such data could support scaling up a sustainable remuneration model under JKN, bridging Indonesia's current compliance and income gaps. In Indonesia, where approximately 80% of medicines are distributed through private channels and only 15% are generics (Fauziyah & Satibi, 2012; Hatah et al., 2014; Mizranita et al., 2024; Satibi et al., 2016), this remains a fundamental challenge. The dominance of commercial interests limits space for non-remunerated professional services, underscoring the need for financial reform.

Patient Willingness to Pay and Service Quality

Patient willingness to pay (WTP) further illustrates the connection between perceived service value and economic viability. In Indonesia, WTP for pharmacist consultations appears to depend more on income level, perceived service quality, and privacy than on satisfaction alone. Harlianti et al. (2016) found that even satisfied patients were not necessarily willing to pay extra for counseling, suggesting that perceived value and affordability play a stronger role than the counseling experience itself (Harlianti et al., 2019). Comparable findings have been reported in other developing countries, where WTP increases substantially when pharmacist services are personalized, confidential, and yield tangible health benefits (Jackson et al., 2023; Soodi et al., 2023). Enhancing consultation quality, ensuring privacy, and fostering patient engagement may therefore increase service acceptance and help lay the groundwork for service-based remuneration.

As telepharmacy and online consultation platforms expand, these could serve as entry points for new reimbursement models within Indonesia's National Health Insurance (NHI) system (Mizranita et al., 2024). Incorporating pharmacist-led activities such as counseling, medication reviews, and therapy monitoring into NHI reimbursement–facilitated through digital claim systems–would strengthen compliance and service quality. Although the constrained BPJS Health budget may initially limit the scope of such models, global evidence indicates that pharmacist interventions can reduce drug-related problems (DRPs), improve adherence, and enhance therapeutic outcomes, yielding long-term cost savings (Hermansyah et al., 2021; Paris & Docteur, 2007). These savings could justify reinvestment into pharmacist remuneration, simultaneously addressing income insufficiency and compliance gaps.

Human Resource and Capacity Constraints

Compliance challenges are further exacerbated by human resource limitations and infrastructural deficits. Pharmacist attendance was rated good in only 37.93% of cases, and overall human resources and facilities achieved just 55% good compliance. Many pharmacies operate without full-time pharmacists or private counseling spaces, restricting their ability to deliver patient-centered care. Moreover, uneven pharmacist distribution and reliance on pharmacy technicians–or even unqualified personnel–for dispensing roles further constrain service delivery (Mizranita et al., 2024). In numerous community settings, pharmacists are employed part-time or relegated to administrative duties,

while technicians manage dispensing. This operational reality makes it difficult to implement comprehensive services such as drug therapy monitoring or home pharmacy care.

From Symbolic to Substantive Compliance: Policy Implications

Overall, compliance with pharmaceutical service regulations in Indonesia remains largely *symbolic* rather than *substantive*. Pharmacies fulfill visible, business-related requirements but often neglect clinical services that are more resource-intensive and less financially rewarding. Achieving substantive compliance requires a multidimensional approach that integrates regulation with capacity building, infrastructure improvement, systematic monitoring, and—critically—financial incentives.

Introducing service-based reimbursement mechanisms under the National Health Insurance (JKN) framework, supported by digital claim verification and standardized service codes, could motivate pharmacies to improve compliance in areas such as therapy monitoring and home pharmacy care. Aligning community pharmacy practice with emerging trends in telepharmacy, chronic disease management, and clinical intervention—as envisioned in Indonesia's pharmacy development roadmap—can help reposition pharmacists as integral healthcare providers rather than mere dispensers (Mizranita et al., 2024). Over time, stronger professional norms, institutional incentives, and peer expectations could reinforce these behaviors, fostering a shift from symbolic to substantive compliance and ultimately enhancing the quality of community pharmacy services nationwide.

Limitations

This study has several limitations. As a scoping review, it maps existing literature rather than establishing causal relationships, and the included studies were heterogeneous in design, sampling, and reporting. Most studies originated from Java, limiting generalizability to other regions. The reliance on grey literature, such as undergraduate theses, introduces variability in methodological rigor, although baseline quality checks were applied. Additionally, the pharmacist attendance scoring system reflects only physical presence and not qualitative aspects of service delivery. Consequently, compliance and service quality measures should be interpreted as proxies, and future research should include broader geographic coverage, standardized indicators, and combined quantitative–qualitative assessments to better evaluate pharmacist performance and policy impact.

CONCLUSIONS AND RECOMMENDATION

The implementation of pharmaceutical service standards in Indonesian community pharmacies is uneven. Pharmacies consistently comply with supply management tasks driven by business priorities, while patient-centered clinical services—such as counseling, drug information, home pharmacy care, and therapy monitoring—remain poorly implemented. Limited pharmacist presence, lack of incentives, and insufficient capacity contribute to these gaps, undermining the role of pharmacies as healthcare providers.

Enhancing compliance requires integrating clinical pharmacy services into the National Health Insurance (JKN) system to provide financial incentives. Future research should evaluate sustainable business models, assess cost-effectiveness and patient satisfaction, and explore alternative delivery methods such as telepharmacy to improve access and service quality.

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DECLARATION

Ethics approval and consent to participate

Not applicable – this study did not involve human participants or animal subjects requiring ethical approval.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analyzed during this study are included in this published article.

Conflicts of Interest Statement

The authors declare no conflict of interest.

Statement on the Use of Artificial Intelligence (AI)

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Authors' contributions

Maulidwina Bethasari conducted the data analysis and wrote the manuscript.

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Maulidwina Bethasari had completed Master study at the Institut Teknologi Bandung on Pharmaceutical Biotechnology and published several studies on various pharmacy related subject before and after becoming a lecturer at Department of Pharmacy, Universitas Muhammadiyah Bandung. More recently she has begun research regarding e in-silico modelling of biomolecule, pharmacovigilance analysis, and herbal medicine formulation and activities.

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ADDITIONAL INFORMATION

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Supplementary Table 1a. Clinical Pharmacy Service Compliance Summary

No	Year	Region		Number of Pharmacies		Clinical Pharmacy Service Aspects						
		Province	City/Regency	Sample	Population	Drug Information Provision	Counselling	Prescription Review	Drug Dispensing	Home Pharmacy Care	Drug Therapy Monitoring	Drug Side Effect Monitoring
1	2007	DIY	Gunung kidul Regency	9	9	56.00	59.00	83.33	100.00	N/A	33.00	N/A
2	2007	DIY	kulon progo Regency	6	60	100.00	86.00	100.00	71.00	N/A	43.00	N/A
3	2012	DIY	Bantul Regency	32	108	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	2016	DIY	Sleman Regency	33	143	78.82	90.68	83.62	87.29	N/A	N/A	N/A
5	2018	DIY	sleman Regency (Gamping District)	13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	2019	DIY	Yogyakarta	28	128	78.57	78.57	81.75	97.62	N/A	40.48	N/A
7	2003	Jakarta	Jakarta	68	1123	62.00	15.00	34.45	100.00	N/A	N/A	0.00
8	2017	Jambi	Jambi	17	105	97.77	59.00	96.20	98.10	11.40	22.90	26.70
9	2019	Central Java	Pekalongan Regency	23	23	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	2010	Central Java	Sragen Regency	25	29	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	2010	Central Java	Purwokerto	4	N/A	93.18	75.00	100.00	100.00	0.00	75.00	N/A
12	2011	Central Java	Salatiga	16	26	93.75	93.75	79.68	N/A	N/A	N/A	N/A
13	2013	Central Java	Tegal (Adiwerna District)	7	7	92.85	100.00	100.00	100.00	14.30	N/A	N/A
14	2015	Central Java	Rembang	4	N/A	25.00	75.00	75.00	50.00	0.00	25.00	25.00
15	2016	Central Java	Magelang	15	50	73.00	N/A	53.00	100.00	N/A	N/A	N/A
16	2018	Central Java	Magelang (Metroyudan District)	15	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	2019	Central Java	Pemalang Regency	31	121	90.33	75.26	91.90	92.20	22.57	54.25	45.17
18	2019	Central Java	wonosobo Regency (Kertek District)	4	4	46.43	95.00	85.41	81.36	25.00	42.85	16.67
19	2014	Central Java	Banyumas Regency	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20	2013	East Java	Malang	25	215	N/A	N/A	93.06	56.04	N/A	N/A	N/A
21	2017	East Java	Surabaya	70	830	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	2019	East Java	Kediri (South District)	10	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A
23	2020	East Java	pamekasan Regency	28	49	90.00	75.00	95.00	100.00	10.00	15.00	15.00
24	2020	East Java	Sidoarjo	34	N/A	61.60			63.47		52.77	
25	2021	East Java	Malang (Dau District)	7	7	88.60	83.00	87.40	91.00	47.00	53.00	62.50
26	2016	West Borneo	Ketapang	6	17	N/A	N/A	N/A	N/A	N/A	N/A	N/A
27	2018	West Borneo	Kubu District Dau.	17	30	60.00	62.00	100.00	98.00	20.00	50.00	15.00
28	2019	West Borneo	Pontianak (Pontianak Kota District)	18	18	60.00	78.00	100.00	98.00	41.00	47.00	15.00
29	2019	West Borneo	Singkawang	18	33	53.00	79.00	92.00	98.00	12.00	12.00	22.00

30	2019	South Borneo	baru Regency (North Pulau Laut District)	10	10	30.00	50.00	85.00	92.00	25.00	44.30	13.30
31	2015	South Borneo	Banjarbaru	21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
32	2021	South Borneo	Banjarmasin	52	N/A	67.20	66.70	100.00	97.70	31.50	44.50	50.60
33	2017	Riau island	Tanjungpinang	12	51	100.00	16.67	100.00	100.00	8.33	8.33	8.33
34	2021	North Maluku	North Halmahera Regency (Tobelo District tobelo)	11	11	100.00	90.00	90.00	75.45	80.00	80.00	90.00
35	2019	West Nusa Tenggara	Mataram	52	91	N/A	N/A	N/A	N/A	N/A	N/A	N/A
36	2018	West Nusa Tenggara	Central Lombok Regency	38	67	100.00	16.28	100.00	100.00	2.33	N/A	N/A
37	2017	East Nusa Tenggara	West Lombok Regency	40	44	95.00	95.00	95.00	95.00	95.00	95.00	95.00
38	2016	East Nusa Tenggara	East Flores Regency	7	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
39	2021	East Nusa Tenggara	Kupang	52	90	46.90	57.80	46.90	90.60	17.20	23.40	17.20
40	2015	Papua	Sorong	25	25	47.60	22.00	70.00	100.00	N/A	0.00	N/A
41	2019	Central Sulawesi	Palu	56	162	38.90	62.90	86.20	94.20	N/A	21.70	10.10
42	2021	North Sulawesi	Mobagu	7	7	100.00	28.57	100.00	100.00	14.28	71.42	71.42
43	2008	North Sumatra	Medan	68	617	69.12	38.24	37.75	41.17	0.00	0.00	N/A

Supplementary Table 1b. Pharmaceutical Goods Management Compliance Summary

No	Year	Region		Number of Pharmacy		Pharmaceutical Goods Management Aspects						
		Province	City/Regency	Sample	Population	Planning	Procurement	Goods Receiving	Storage	Drug disposal and recall	Inventory Management	Inventory report and documentation
1	2007	DIY	Gunung kidul Regency	9	9	59.00	56.00	100.00	59.00	N/A	N/A	N/A
2	2007	DIY	kulon progo Regency	6	60	72.00	100.00	N/A	57.00	N/A	N/A	100.00
3	2012	DIY	Bantul Regency	32	108	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	2016	DIY	Sleman Regency	33	143	94.07	98.31	75.43	82.36	96.67	89.12	85.60
5	2018	DIY	Sleman Regency (Gamping District)	13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	2019	DIY	Yogyakarta	28	128	52.38	62.05	100.00	86.51	95.24	N/A	97.62
7	2003	Jakarta	Jakarta	68	1123	N/A	N/A	N/A	97.07	N/A	96.00	N/A
8	2017	Jambi	Jambi	17	105	95.25	100.00	100.00	100.00	79.50	95.20	93.15
9	2019	Central Java	Pekalongan Regency	23	23	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	2010	Central Java	Sragen Regency	25	29	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	2010	Central Java	Purwokerto	4	N/A	100.00	N/A	N/A	N/A	N/A	N/A	100.00
12	2011	Central Java	Salatiga	16	26		100.00	87.50	100.00	N/A	N/A	100.00
13	2013	Central Java	Tegal (Adiwerna District)	7	7	100.00	100.00	N/A	85.70	N/A	N/A	92.85

14	2015	Central Java	Rembang	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15	2016	Central Java	Magelang	15	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16	2018	Central Java	Magelang (Metroyudan District)	15	15	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	2019	Central Java	Pemalang Regency	31	121	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18	2019	Central Java	wonosobo Regency (Kertek District)	4	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	2014	Central Java	Banyumas Regency	63	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20	2013	East Java	Malang	25	215	N/A	N/A	N/A	N/A	N/A	N/A	N/A
21	2017	East Java	Surabaya	70	830	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	2019	East Java	Kediri (South District)	10	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A
23	2020	East Java	pamekasan Regency	28	49	100.00	100.00	100.00	N/A	55.00	95.00	90.00
24	2020	East Java	Sidoarjo	34	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
25	2021	East Java	Malang (Dau District)	7	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A
26	2016	West Borneo	Ketapang	6	17	N/A	N/A	N/A	N/A	N/A	N/A	N/A
27	2018	West Borneo	Kubu District Dau.	17	30	98.00	N/A	N/A	96.00	54.00	95.00	95.00
28	2019	West Borneo	Pontianak (Pontianak Kota District)	18	18		100.00	100.00	100.00	92.00	94.00	96.00
29	2019	West Borneo	Singkawang	18	33	89.00	100.00	94.00	94.00	67.00	67.00	81.00
30	2019	South Borneo	baru Regency (North Pulau Laut District)	10	10	100.00	100.00	100.00	100.00	50.00	100.00	73.30
31	2015	South Borneo	Banjarbaru	21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
32	2021	South Borneo	Banjarmasin	52	N/A	100.00	100.00	100.00	98.30	87.90	97.70	100.00
33	2017	Riau island	Tanjungpinang	12	51	100.00	100.00	100.00	100.00	100.00	100.00	91.67
34	2021	North Maluku	North Halmahera Regency (Tobelo District tobelo)	11	11	100.00	100.00	100.00	80.00	80.00	50.00	55.00
35	2019	West Nusa Tenggara	Mataram	52	91	N/A	N/A	N/A	N/A	N/A	N/A	N/A
36	2018	West Nusa Tenggara	Central Lombok Regency	38	67	100.00	100.00	100.00	100.00	N/A	N/A	100.00
37	2017	East Nusa Tenggara	West Lombok Regency	40	44	92.50	97.50	N/A	81.25	N/A	100.00	75.00
38	2016	East Nusa Tenggara	East Flores Regency	7	7	100.00	100.00	100.00	90.05	97.62	91.33	98.21
39	2021	East Nusa Tenggara	Kupang	52	90	78.10	77.00	67.70	62.50	22.70	81.00	47.00
40	2015	Papua	Sorong	25	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A
41	2019	Central Sulawesi	Palu	56	162	89.30	92.90	N/A	78.60	60.70	75.00	93.80
42	2021	North Sulawesi	Mobagu	7	7	100.00	100.00	100.00	78.57	100.00	100.00	100.00
43	2008	North Sumatra	Medan	68	617	88.24	98.53	84.17	98.53	N/A	85.30	94.12

Supplementary Table 1C. Summary of Goods Management, Clinical Pharmacy Service, Overall, Facility, and Self-assessment Parameter Compliance Summary

No	Year	Region		Number of Pharmacy		Aspects			Overall	Self-Assessment
		Province	City/Regency	Sample	Population	Goods Management	Clinical Pharmacy Services	Facilility and Human Resource		
1	2007	DIY	Gunung kidul Regency	9	9	92.00	48.44	80.75	**73.73**	14.60
2	2007	DIY	kulon progo Regency	6	60	82.25	80.00	68.60	**76.95**	24.00
3	2012	DIY	Bantul Regency	32	108	82.90	64.95	88.31	**78.72**	61.56
4	2016	DIY	Sleman Regency	33	143	88.79	85.10	N/A	N/A	N/A
5	2018	DIY	sleman Regency (Gamping District)	13	N/A	81.32	49.74	88.86	**73.31**	N/A
6	2019	DIY	Yogyakarta	28	128	82.30	75.40	N/A	N/A	N/A
7	2003	Jakarta	Jakarta	68	1123	N/A	42.29	N/A	N/A	N/A
8	2017	Jambi	Jambi	17	105	94.73	58.87	N/A	N/A	N/A
9	2019	Central Java	Pekalongan Regency	23	23	77.39	84.13	77.72	**79.75**	64.13
10	2010	Central Java	Sragen Regency	25	29	78.30	49.00	N/A	N/A	N/A
11	2010	Central Java	Purwokerto	4	N/A	100.00	73.86	87.50	**87.12**	N/A
12	2011	Central Java	Salatiga	16	26	94.00	64.37	89.58	**82.65**	N/A
13	2013	Central Java	Tegal (Adiwerna District)	7	7	94.64	81.43	N/A	N/A	N/A
14	2015	Central Java	Rembang	4	N/A	N/A	N/A	96.87	N/A	N/A
15	2016	Central Java	Magelang	15	50	N/A	75.33	N/A	N/A	N/A
16	2018	Central Java	Magelang (Metroyudan District)	15	15	78.44	68.41	N/A	N/A	N/A
17	2019	Central Java	Pemalang Regency	31	121	N/A	67.38	N/A	N/A	N/A
18	2019	Central Java	wonosobo Regency (Kertek District)	4	4	N/A	56.10	N/A	N/A	N/A
19	2014	Central Java	Banyumas Regency	63	N/A	93.64	60.04	N/A	N/A	55.05
20	2013	East Java	Malang	25	215	N/A	N/A	N/A	N/A	N/A
21	2017	East Java	Surabaya	70	830	84.53	79.20	77.38	**80.37**	N/A
22	2019	East Java	Kediri (South District)	10	10	78.63	71.40	72.00	**74.01**	N/A
23	2020	East Java	pamekasan Regency	28	49	90.00	57.14	N/A	N/A	N/A
24	2020	East Java	Sidoarjo	34	N/A	N/A	N/A	N/A	N/A	N/A
25	2021	East Java	Malang (Dau District)	7	7	N/A	73.21	N/A	N/A	N/A
26	2016	West Borneo	Ketapang	6	17	94.04	26.03	85.56	**68.54**	0.00
27	2018	West Borneo	Kubu District Dau.	17	30	87.60	57.86	88.50	**77.99**	N/A
28	2019	West Borneo	Pontianak (Pontianak Kota District)	18	18	97.00	75.00	85.00	**86.00**	N/A
29	2019	West Borneo	Singkawang	18	33	84.57	68.57	86.50	**79.88**	N/A
30	2019	South Borneo	baru Regency (North Pulau Laut District)	10	10	82.50	56.30	78.00	**78.00**	47.50
31	2015	South Borneo	Banjarbaru	21	N/A	N/A	N/A	N/A	**70.95**	N/A
32	2021	South Borneo	Banjarmasin	52	N/A	97.70	65.46	N/A	N/A	N/A
33	2017	Riau island	Tanjungpinang	12	51	98.81	48.81	88.88	**78.83**	41.66

34	2021	North Maluku	North Halmahera Regency (Tobelo District tobelo)	11	11	N/A	N/A	N/A	N/A	N/A
35	2019	West Nusa Tenggara	Mataram	52	91	96.67	52.80	62.50	**70.66**	17.00
36	2018	West Nusa Tenggara	Central Lombok Regency	38	67	100.00	63.72	N/A	N/A	32.94
37	2017	East Nusa Tenggara	West Lombok Regency	40	44	89.25	95.00	N/A	N/A	90.00
38	2016	East Nusa Tenggara	East Flores Regency	7	7	96.74	N/A	N/A	N/A	N/A
39	2021	East Nusa Tenggara	Kupang	52	90	62.29	42.86	N/A	N/A	N/A
40	2015	Papua	Sorong	25	25	N/A	47.92	N/A	N/A	N/A
41	2019	Central Sulawesi	Palu	56	162	N/A	N/A	N/A	N/A	N/A
42	2021	North Sulawesi	Mobagu	7	7	96.94	69.38	63.26	**76.53**	N/A
43	2008	North Sumatra	Medan	68	617	95.10	34.80	63.97	**64.95**	12.13

Supplementary Table 2. Summary of Pharmacist Presence

No	Region	Number of Pharmacy		Duration of pharmacist presence (Hours)							score	Percentage (%)	Category
		Sample	Population	<1	1	2	3	4	5	>5			
1	Salatiga	16	26	6.25	6.25		43.75			43.75	469.38	72.21	Moderate
2	Pontianak Kota District	18	18	16.70		27.80				55.60	460.94	70.91	Moderate
3	Pemalang Regency	31	121	16.10	32.30					51.60	433.91	66.76	Moderate
4	Pekalongan Regency	23	23	13.00		65.20				21.70	360.10	55.40	Poor
5	Medan	68	617	40.10						59.29	485.64	74.71	Moderate
6	Magelang	15	50			20.00				80.00	570.00	87.69	Good
7	Central Lombok Regency	38	67		4.65	32.56				62.79	494.19	76.03	Moderate
8	Yogyakarta	28	128				14.29			89.29	637.55	98.08	Good
9	Kulon Progo Regency	6	60							100.00	650.00	100.00	Good
10	Mobagu	7	7				28.57			71.42	578.51	89.00	Good
11	Ketapang	6	17	33.33						56.67	451.68	69.49	Moderate
12	Kubu Regency	17	30	11.00						89.00	606.00	93.23	Good
13	Tegal (Adiwerna District)	7	7		14.28	14.28				71.42	514.21	79.11	Moderate
14	Singkawang	18	33	16.70						83.40	583.85	89.82	Good
15	Sleman Regency	33	143		2.00	2.00				96.00	631.00	97.08	Good
16	Baru Regency (North Pulau Laut District)	10	10	10.00			50.00			40.00	465.50	71.62	Moderate
17	Pamekasan Regency	28	49			60.00				40.00	410.00	63.08	Moderate
18	Palu	56	162	21.42						78.58	575.03	88.47	Good
19	Jambi	17	105	2.90	23.80	32.40				40.80	370.29	56.97	Poor
20	Kupang	52	90	1.60			21.90			76.60	587.98	90.46	Good
21	Rembang	4	N/A	25.00		25.00			25.00	25.00	340.00	52.31	Poor

22	Jakarta	68	1123	21.19	43.91	9.79				23.50	218.36	33.59	Poor
23	Banjarbaru	21	N/A	28.57	28.57	14.29				28.58	574.45	88.38	Good
24	Gunung Kidul Regency	9	9				44.00			56.00	540.00	83.08	Good
25	North Jakarta	221	221	70.60						29.40	402.90	61.98	Moderate
26	West Lombok Regency	40	44		7.50	25.00				67.50	508.75	78.27	Moderate
27	North Halmahera Utara Regency (Tobelo District)	11	11	20.00		10.00				70.00	482.00	74.15	Moderate
28	Purwokerto	4	N/A							100.00	650.00	100.00	Good
29	Sidoarjo	34	N/A	79.41						20.59	372.06	57.24	Poor

Supplementary Table 3. Summary of Second job of Pramacist in charge and the pharmacy owner occupation

No	Region	Pharmacist In Charge Second Occupation (%)				Pharmacy Owner		
		Civil Servant	None	(Other) Bussiness Owner	Other	Pharmacist	Non-Pharmacist	Others
1	Salatiga	18.75	62.5	12.5	6.25	12.5	68.75	6.25
2	Mobagu	57.14	0	28.57	14.29	71.42	14.28	14.28
3	Sleman	0	78	7	15	27	65	15
4	Banyumas	0	73	0	27	50	0	50
5	Kupang	0	65.5	0	34.5	7.8	74.7	0
6	Gunung Kidul	0	56	0	44	27.27	54.54	0
7	Tanjungpinang	0	50	0	50	N/A	N/A	N/A
8	Malang	0	48	0	52	N/A	N/A	N/A
9	Purwokerto	0	25	0	75	N/A	N/A	N/A
10	North Halmahera Regency (Tobelo District)	0	10	0	90	10	0	90
11	Jakarta	0	7.7	0	92.3	14.7	73.5	0
12	Tegal (Adiwerna District)	0	0	0	100	28.57	71.43	0
13	Kulon Progo Regency	29	71	29	0	N/A	N/A	N/A
14	Yogyakarta	N/A	N/A	N/A	N/A	10.71	89.29	0
15	Jambi	N/A	N/A	N/A	N/A	7.6	83.8	0
16	Pekalongan Regency	N/A	N/A	N/A	N/A	65.2	26.1	0
17	Pemalang Regency	N/A	N/A	N/A	N/A	61.3	0	38.7
18	Pamekasan Regency	N/A	N/A	N/A	N/A	25	70	0
19	Ketapang	N/A	N/A	N/A	N/A	16.67	83.33	0
20	Kubu	N/A	N/A	N/A	N/A	12	59	0
21	Kecamatan Pontianak Regency	N/A	N/A	N/A	N/A	0	83.3	100
22	Singkawang	N/A	N/A	N/A	N/A	5.6	83.3	12.1
23	Baru Regency (North Pulau Laut District)	60	20	20	0	N/A	N/A	N/A
24	Medan	50	50	0	0	20.59	67.65	11.6