



Drug-Related Problems (DRPs) and Treatment Costs in Schizophrenia Patients at a Community Pharmacy in Yogyakarta

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ABSTRACT

Schizophrenia requires long-term antipsychotic therapy, which may increase the risk of drug-related problems (DRPs) and potentially contribute to a higher treatment cost burden. This study aimed to describe the profile of DRPs and treatment cost components among schizophrenia patients receiving medication services at a community pharmacy in Yogyakarta. A descriptive observational study with a cross-sectional design and retrospective data collection was conducted using patient medical records from January to December 2025. Medical records were selected using purposive sampling based on predefined inclusion and exclusion criteria. DRPs were identified using the Pharmaceutical Care Network Europe (PCNE) Classification Version 9.01, while treatment costs were analysed descriptively in Indonesian Rupiah (IDR). A total of 43 patient medical records met the study criteria. Most patients were male (60.47%), aged 26-35 years (41.86%), and diagnosed with paranoid schizophrenia (F20.0) (62.79%). Potential treatment safety problems or potential adverse drug reactions (P2.1) were identified in 27 patients (62.79%). The identified cause domains included therapeutic duplication (C1.4) in 8 patients (18.60%), treatment duration that was too short (C4.1) in 5 patients (11.63%), and insufficient dosing frequency (C3.3) in 3 patients (6.98%). The total recorded treatment cost was IDR 39,855,000, consisting of routine treatment costs of IDR 28,095,000, including primary antipsychotic therapy, additional medications, consultation, and therapy monitoring, as well as DRP-related costs of IDR 11,760,000, including the management of medication side effects, therapeutic duplication, insufficient dosing frequency, and short treatment duration. Potential treatment safety problems and medication-related causes were frequently identified among schizophrenia patients evaluated in this study. Systematic medication review, adverse effect monitoring, and evaluation of antipsychotic regimens by pharmacists may support safer and more efficient schizophrenia treatment. Further studies are required to evaluate direct and avoidable costs specifically attributable to DRPs using more comprehensive health economic analysis approaches.



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ABSTRAK

Skizofrenia memerlukan terapi antipsikotik jangka panjang yang dapat meningkatkan risiko terjadinya masalah terkait obat atau *drug-related problems* (DRPs) serta berpotensi meningkatkan beban biaya pengobatan. Penelitian ini bertujuan untuk menggambarkan profil DRPs dan komponen biaya pengobatan pada pasien skizofrenia yang memperoleh pelayanan obat di sebuah apotek komunitas di Yogyakarta. Penelitian observasional deskriptif dengan rancangan potong lintang dan pengumpulan data retrospektif dilakukan menggunakan rekam medis pasien periode Januari–Desember 2025. Rekam medis dipilih melalui teknik *purposive sampling* berdasarkan kriteria inklusi dan eksklusi yang telah ditetapkan. Identifikasi DRPs dilakukan menggunakan klasifikasi *Pharmaceutical Care Network Europe* (PCNE) versi 9.01, sedangkan biaya pengobatan dianalisis secara deskriptif dalam Rupiah (Rp). Sebanyak 43 rekam medis pasien memenuhi kriteria penelitian. Sebagian besar pasien berjenis kelamin laki-laki (60,47%), berusia 26–35 tahun (41,86%), dan didiagnosis skizofrenia paranoid dengan kode F20.0 (62,79%). Potensi masalah keamanan terapi atau potensi reaksi obat yang merugikan (P2.1) ditemukan pada 27 pasien (62,79%). Domain penyebab yang teridentifikasi meliputi duplikasi terapi (C1.4) pada 8 pasien (18,60%), durasi terapi yang terlalu singkat (C4.1) pada 5 pasien (11,63%), dan frekuensi pemberian dosis yang tidak mencukupi (C3.3) pada 3 pasien (6,98%). Total biaya pengobatan yang tercatat sebesar Rp39.855.000, yang terdiri atas biaya terapi rutin sebesar Rp28.095.000 meliputi biaya antipsikotik utama, obat tambahan, serta konsultasi dan pemantauan terapi, serta biaya yang berkaitan dengan DRP sebesar Rp11.760.000 meliputi biaya penanganan efek samping obat, duplikasi terapi, frekuensi dosis yang tidak memadai, dan durasi terapi yang terlalu singkat. Potensi masalah keamanan terapi dan penyebab terkait penggunaan obat cukup sering ditemukan pada pasien skizofrenia yang dievaluasi. Pelaksanaan *medication review*, pemantauan efek samping, dan evaluasi regimen antipsikotik secara sistematis oleh apoteker dapat mendukung terapi skizofrenia yang lebih aman dan efisien. Penelitian lebih lanjut diperlukan untuk mengevaluasi biaya langsung dan biaya yang dapat dihindari secara spesifik akibat DRPs dengan pendekatan analisis ekonomi kesehatan yang lebih komprehensif.

Kata Kunci: Skizofrenia; *Drug-related problems*; Antipsikotik; Pelayanan kefarmasian; Biaya pengobatan

1. Introduction

Schizophrenia is a severe, chronic mental disorder characterised by disturbances in the patient's thought processes, perception, emotions, behaviour, and social functioning. This 'disorder is one of the world's major mental health issues due to its far-reaching impact on the quality of life of patients, their families, and the healthcare system [1]. According to the World Health Organization (WHO), schizophrenia affects approximately 24 million people worldwide, or around 1 in 300 people [2]. In Indonesia, the prevalence of schizophrenia, based on the results of the 2018 Basic Health Research (Riskesdas), indicates a prevalence of households with a member suffering from

schizophrenia/psychosis of 7 per 1,000 households. This figure has increased compared to 2013, which stood at 1.7 per 1,000 households. The Special Region of Yogyakarta is one of the regions with the highest prevalence of schizophrenia in Indonesia, at 10 per 1,000 households, higher than the national average [3]. This high prevalence indicates that schizophrenia remains a serious public health issue and imposes a significant economic burden, both directly and indirectly.

The primary treatment for schizophrenia patients involves the use of antipsychotic medications, both typical and atypical, aimed at controlling positive and negative symptoms, as well as preventing relapse [8]. Treatment for schizophrenia is generally long-term, often lifelong, and therefore requires strict therapeutic monitoring to ensure the effectiveness and safety of medication use. However, in clinical practice, the use of antipsychotics is often accompanied by various drug-related *problems* (DRPs), such as inappropriate drug selection, incorrect dosing, drug interactions, adverse effects, patient non-adherence, and unmet needs for additional therapy [4].

Drug-Related Problems (DRPs) are events or conditions involving drug therapy that may, either actually or potentially, interfere with the achievement of the expected therapeutic outcomes [5]. In patients with schizophrenia, the incidence of DRPs is relatively high because treatment is often administered in the form of antipsychotic combinations, the use of additional medication for comorbidities, long-term therapy, and patients' limited understanding of the treatment regimen. Research by Mekonnen et al. (2021) indicates that DRPs in patients with mental disorders are associated with an increased risk of readmission, poorer clinical outcomes, and higher treatment costs [6].

Pharmacies, as community-level pharmaceutical care facilities, play a crucial role in monitoring the treatment of schizophrenia patients, particularly outpatients undergoing long-term treatment. Pharmacists have a responsibility to identify, prevent, and resolve DRPs through *patient-oriented pharmaceutical care* to improve treatment success and reduce the cost burden of treatment [7]. However, research on the profile of DRPs in patients with schizophrenia at the community pharmacy level, particularly in Yogyakarta, remains relatively limited. Most previous studies have been conducted in hospitals, so the picture of DRPs in community pharmacy services still needs to be developed.

Yogyakarta, as a region with good access to healthcare services, has a relatively high number of patients with mental disorders, including schizophrenia patients undergoing continuous antipsychotic therapy at community pharmacies. The high prevalence of schizophrenia in this region makes pharmacies a relevant setting for evaluating DRP profiles and their impact on patients' treatment costs. This evaluation is expected to provide a realistic picture of medication-related issues occurring in schizophrenia patients and serve as a basis for improving the quality of clinical pharmacy services.

Based on the above, this study was conducted to determine the profile of *Drug-Related Problems* (DRPs) and treatment costs among schizophrenia patients at a pharmacy in Yogyakarta. It is hoped that the findings of this study will serve as a basis for optimising antipsychotic therapy, improving the quality of pharmaceutical services, and ensuring more effective and efficient control of treatment costs for schizophrenia patients.

2. Methods

Study Design, Setting, and Period

This descriptive observational study used a cross-sectional design with retrospective data collection. The study was conducted at a community pharmacy in Yogyakarta using medical records of outpatients with schizophrenia who received antipsychotic therapy from January to December 2025. Data were collected between January and March 2026. Drug-related problems (DRPs) were identified using the **Pharmaceutical Care Network Europe (PCNE) Classification Version 9.01**, with the operational definitions presented in Table 1.

The unit of analysis was individual patients, and 43 eligible patient medical records were included. As a patient could experience more than one DRP, each record was independently assessed for all potential DRPs according to the PCNE V9.01 criteria. Patient characteristics and DRP frequencies were calculated using the total study population (n = 43) as the denominator, with each patient counted once within each DRP category.

DRPs were identified by reviewing prescribed medications, drug selection, dosage, dosing frequency, treatment duration, concomitant therapy, and documented clinical information in the medical records. DRP classification was based on the PCNE V9.01 criteria and supported by current evidence-based treatment guidelines. Data were analysed descriptively and presented as frequencies, percentages, and treatment-cost components.

Table 1. Operational classification of drug-related problems based on PCNE V9.01

No	DRP Category	V9.01 Code	Issue
1.	Treatment Effectiveness	P1.3	Symptoms or indications not treated
2.	Therapeutic Safety	P2.1	Adverse drug reactions may occur
3.	Drug Selection	C1.1	Medication not in accordance with guidelines/formulary
		C1.2	Medication without indication
		C1.3	Inappropriate combination of medicines or medicines with herbal remedies
		C1.4	Duplication of treatment
		C1.6	Too many medicines prescribed for a single indication
4.	Dosage form	C2.1	Inappropriate dosage form (for the patient)
5.	Dosage Selection	C3.1	Medication dose too low
		C3.2	Medication dose too high
		C3.3	Insufficient frequency of administration
		C3.4	Dosage administered too frequently
6.	Duration of treatment	C4.1	Treatment duration too short
		C4.2	Treatment duration too long
7.	Dispensing	C5.3	Incorrect medication, strength of formulation or recommended dose
8.	Medication Use Process	C6.1	Time of administration and/or between doses are incorrect

Source: Pharmaceutical Care Network Europe, PCNE Classification for Drug-Related Problems V9.01

The frequency of each drug-related problem was calculated using the following formula:

$$\text{Percentage of DRP occurrence} = \frac{\text{Number of DRP events}}{\text{Total number of patients}} \times 100\%$$

Population and Sample

The study population comprised all patients diagnosed with schizophrenia who received treatment at the pharmacy in Yogyakarta between January and December 2025. Samples were selected using purposive sampling based on predefined eligibility criteria. Patients were included if they had a documented diagnosis of schizophrenia, had received antipsychotic therapy for at least three months, and had complete medical records containing information on patient characteristics, diagnosis, medication, dosage, administration instructions, and treatment costs. Patients were excluded if their medical records were incomplete, if they transferred to another healthcare facility during the treatment period, or if they had another psychiatric disorder without schizophrenia as the primary diagnosis. Based on these criteria, 43 patient medical records were included in the study.

Ethical Approval

This study was approved by the Health Research Ethics Committee of Jendral Achmad Yani Yogyakarta University with approval number No.Skep/534/KEP/VIII/2025. Permission to access patient medical records was obtained from the management of the study site. All patient data were anonymized and coded before analysis to ensure confidentiality. Because this study used retrospective secondary data without direct patient intervention, informed consent was waived by the ethics committee.

3. Results and Discussion

Patient Characteristics

Based on the results of the study using patient medical record data from the Yogyakarta Pharmacy, 43 patients with a diagnosis of schizophrenia were identified as meeting the criteria. Furthermore, data on patient characteristics, including gender, age, and diagnostic results, were obtained. The characteristics of schizophrenia patients based on the study results are shown in **Table 2**.

Table 2. Patient Characteristics Data

Characteristics	Number (N)	Percentage (100%)
Gender		
Male	26	60.47%
Female	17	39.53%
Total	43	100%
Age		
18-25 (Late teens)	8	18.60%
26-35 (Early Adults)	18	41.86%
36-45 (Late Adulthood)	10	23.26%
46-55 (Early elderly)	5	11.63%
56-60 (Late elderly)	2	4.65%
Total	43	100%

Diagnostic Results		
F20.0 Paranoid schizophrenia	27	62.79%
F20.1 Hebephrenic schizophrenia	9	20.93%
F20.3 Schizophrenia, unspecified	7	16.28%
Total	43	100

Source : Fathurrahman, 2026

Based on **Table 2** regarding patient characteristics, a total sample of 43 schizophrenia patients undergoing treatment was obtained. The distribution by gender shows that male patients were more prevalent than female patients, with 26 patients (60.47%), whilst female patients numbered 17 (39.53%). These findings are consistent with various studies indicating that schizophrenia is more commonly found in men than in women, particularly regarding earlier age of onset and more severe symptom presentation. Men also tend to have a poorer clinical prognosis, higher relapse rates, and lower treatment adherence compared to women [16]. Hormonal, genetic, and social factors are thought to contribute to these differences, with the female hormone oestrogen known to have a protective effect against psychotic disorders [8].

By age group, the majority of patients were in the 26–35 age range (early adulthood), totalling 18 patients (41.86%), followed by the 36–45 age group with 10 patients (23.26%), the 18–25 age group with 8 patients (18.60%), the 46–55 age group comprising 5 patients (11.63%), and the 56–60 age group comprising 2 patients (4.65%). This distribution indicates that the majority of patients are of working age, which aligns with the epidemiological characteristics of schizophrenia as a chronic mental disorder that typically begins to emerge from late adolescence through to early adulthood. The early onset of schizophrenia generally occurs between the ages of 15 and 35, making the early adult age group the population with the highest prevalence. This condition has a significant impact on patients' social functioning, work productivity, and quality of life, as the disorder occurs during a phase of life that is critically important both socially and economically [9] [10]

In terms of diagnostic characteristics, paranoid schizophrenia (F20.0) was the most common diagnosis, accounting for 27 patients (62.79%), followed by hebephrenic schizophrenia (F20.1) in 9 patients (20.93%), and unspecified schizophrenia (F20.3) in 7 patients (16.28%). The predominance of paranoid schizophrenia in this study is consistent with the literature, which states that the paranoid type is the most frequently encountered subtype in clinical practice. Paranoid schizophrenia is characterised by a predominance of delusions and auditory hallucinations without prominent affective disturbances or behavioural disorganisation, meaning patients often retain relatively better cognitive functioning compared to other subtypes. This condition makes patients easier to identify when positive psychotic symptoms manifest clearly [11].

Meanwhile, hebephrenic schizophrenia is characterised by prominent affective disturbances, disorganised behaviour, and incoherent speech, whilst unspecified schizophrenia is a diagnostic category when a patient's symptoms do not meet the specific criteria for any particular subtype. These diagnostic differences are crucial in determining the pharmacotherapy approach, the selection of antipsychotics, and the monitoring of Drug-Related Problems (DRPs), as each subtype may exhibit different therapeutic responses and treatment requirements [12].

Overall, these patient characteristics indicate that the schizophrenia patient population is predominantly composed of young adult males with a diagnosis of

paranoid schizophrenia. These findings underscore the importance of clinical pharmacy services focused on optimising the therapeutic of antipsychotic therapy, improving treatment adherence, preventing adverse drug reactions, and the early identification of DRPs to enhance patient therapeutic outcomes.

Identification Problem of DRPs

The incidence problem of Drug-Related Problems (DRPs) among schizophrenia patients at the Yogyakarta Pharmacy in 2025 can be seen in **Table 3**.

Table 3. Identification Problem of DRPs

No	Type of DRPs	V9.01 Code	Number of Incidents	Percentage (%)
1.	Symptoms or indications not treated	P1.3	0	0
2.	Adverse drug reactions may occur	P2.1	27	62.79
3.	Medication not in accordance with guidelines/formulary	C1.1	0	0
4.	Medicines without indication	C1.2	0	0
5.	Inappropriate combination of medicines or medicines with herbal remedies	C1.3	0	0
6.	Duplication of therapy	C1.4	8	18.60
7.	Too many medicines prescribed for the indication	C1.6	0	0
8.	Inappropriate dosage form (for the patient)	C2.1	0	0
9.	Medication dose too low	C3.1	0	0
10.	Medication dose too high	C3.2	0	0
11.	Frequency of use is insufficient	C3.3	3	6.98
12.	Frequency of use: too frequent	C3.4	0	0
13.	Treatment duration too short	C4.1	5	11.63
14.	Treatment duration too long	C4.2	0	0
15.	Medication, strength of preparation or recommended dose incorrect	C5.3	0	0
16.	Inappropriate timing and/or dosing interval	C6.1	0	0
Total			43	100%

Source : Pharmaceutical care Network Europe v9.00, 2020 [5]

Based on Table 3 regarding the identification of *Drug-Related Problems* (DRPs) in schizophrenia patients at the Yogyakarta Pharmacy in 2025, it was found that the most prevalent DRP was the occurrence of potential adverse drug reactions (P2.1), accounting

for 27 cases (62.79%). This finding indicates that the majority of schizophrenia patients are at high risk of experiencing side effects from antipsychotic therapy, whether first-generation or second-generation antipsychotics. Common side effects include extrapyramidal symptoms (EPS), sedation, weight gain, metabolic syndrome, hyperprolactinaemia, and cardiovascular disorders such as QT interval prolongation. This risk is heightened because schizophrenia treatment is typically long-term, involves polypharmacy, and often entails high doses, particularly in outpatients with a history of recurrent relapse [11][12]

Identification Cause of DRPs

The incidence cause of Drug-Related Problems (DRPs) among schizophrenia patients at the Yogyakarta Pharmacy in 2025 can be seen in **Table 4**.

Table 4. Identification Cause of DRPs

No	Type of DRPs	V9.01 Code	Number of Incidents	Percentage (%)
1.	Symptoms or indications not treated	P1.3	0	0
2.	Adverse drug reactions may occur	P2.1	27	62.79
3.	Medication not in accordance with guidelines/formulary	C1.1	0	0
4.	Medicines without indication	C1.2	0	0
5.	Inappropriate combination of medicines or medicines with herbal remedies	C1.3	0	0
6.	Duplication of therapy	C1.4	8	18.60
7.	Too many medicines prescribed for the indication	C1.6	0	0
8.	Inappropriate dosage form (for the patient)	C2.1	0	0
9.	Medication dose too low	C3.1	0	0
10.	Medication dose too high	C3.2	0	0
11.	Frequency of use is insufficient	C3.3	3	6.98
12.	Frequency of use: too frequent	C3.4	0	0
13.	Treatment duration too short	C4.1	5	11.63
14.	Treatment duration too long	C4.2	0	0
15.	Medication, strength of preparation or recommended dose incorrect	C5.3	0	0
16.	Inappropriate timing and/or dosing interval	C6.1	0	0
Total			43	100%

Source : Pharmaceutical care Network Europe v9.00, 2020

Based on **Table 4** largest category of DRPs was therapeutic duplication (C1.4), accounting for 8 cases (18.60%). Therapeutic duplication in schizophrenia patients generally occurs due to the use of two or more antipsychotics with similar mechanisms of action without clear clinical indication. This practice is still frequently observed in clinical practice, particularly in patients with refractory symptoms or a history of recurrent relapse. Although the combination of antipsychotics may be considered in certain conditions, most international guidelines continue to recommend monotherapy as the primary option, as combination therapy increases the risk of adverse effects, drug interactions, reduced patient adherence, and higher treatment costs [9][13].

second, treatment duration that was too short (C4.1) was identified in 5 cases (11.63%). This condition can lead to failure to achieve therapeutic targets, particularly during the acute phase or the maintenance phase of schizophrenia. Premature discontinuation of medication is often a primary cause of relapse, rehospitalisation, and worsening of psychotic symptoms. Treatment guidelines recommend that following the first episode, antipsychotic therapy should be continued for at least 1–2 years, whilst patients with a history of recurrent relapse may require long-term or even lifelong therapy [14].

The next issue is the frequency of inadequate dosing (C3.3), observed in 3 cases (6.98%). This condition can result in plasma drug levels failing to reach the therapeutic range, leading to suboptimal clinical response. In patients with schizophrenia, inaccuracies in dosing frequency may arise from prescribing errors, patient non-adherence, or limited patient understanding of the treatment regimen. This is particularly important as the success of antipsychotic therapy is highly dependent on adherence and consistent medication use [1].

Meanwhile, other categories of DRPs such as off-label use, excessive dosage, insufficient dosage, inappropriate dosage form, or inappropriate dosing intervals were not identified in this study. This suggests that, generally, the prescribing process in pharmacies is already quite sound in terms of the basic rationality of therapy, but still requires significant attention to aspects of drug safety monitoring and evaluation of treatment continuity.

The predominance of DRPs in the categories of adverse effects and therapeutic duplication underscores the importance of the clinical pharmacist's role in conducting *medication reviews*, monitoring adverse effects, patient education, and pharmaceutical interventions to prevent therapeutic issues that could potentially reduce patients' quality of life. The application of the PCNE version 9.01 classification in this study also provides a systematic approach to identifying and evaluating DRPs, thereby improving the quality of pharmaceutical care for patients with schizophrenia.

Overall, the results of this study indicate that the primary focus of clinical pharmacy services for patients with schizophrenia is not only on the appropriate selection of medication, but also on monitoring long-term treatment safety, optimising antipsychotic regimens, and preventing relapse through improved treatment adherence.

Cost Components of Treatment Related to DRPs in Schizophrenia Patients

The framework for treatment cost analysis from the healthcare provider perspective, including the cost perspective, price year, data source, cost categories, and calculation methods present in **Table 5**. Based on this framework, **Table 6** classifies treatment costs into routine treatment costs and DRP-related costs. Routine treatment costs included primary antipsychotics, additional medications, and consultation and therapy monitoring, whereas DRP-related costs comprised the management of

medication side effects, duplicate therapy, insufficient dosage frequency, and treatment duration that was too short. This classification distinguishes routine healthcare expenditures from costs attributable to drug-related problems, thereby improving the interpretation of treatment costs.

Table 5. Framework for Treatment Cost Analysis from the Healthcare Provider Perspective

No	Routine Treatment Costs	Frequency (N)	Total Cost (Rp)
1.	Primary antipsychotics	43	18,275,000
2.	Additional medicines	31	5,735,000
3.	Consultation and Therapy Monitoring Costs	43	4,085,000
Total			28,095,000

Source : Fathurrahman, 2026

The treatment cost components incurred by schizophrenia patients from the healthcare provider perspective. The total direct medical cost for the 43 patients was IDR 39,855,000. These costs comprised both routine treatment costs, which represent standard pharmacotherapy and pharmaceutical care provided to patients, and DRP-related costs, which were associated with medication-related problems identified during treatment.

Routine treatment costs represented the largest proportion of total expenditure. The cost of primary antipsychotic therapy accounted for IDR 18,275,000 (46.32%), making it the largest single cost component. This finding is expected because antipsychotic medications constitute the cornerstone of schizophrenia management and are generally administered continuously for relapse prevention and symptom control. Long-term pharmacotherapy, particularly with second-generation antipsychotics, contributes substantially to healthcare expenditure because of prolonged treatment duration and the need for continuous monitoring [9] [11] [15].

Additional medications, including anticholinergics, sedatives, and vitamins, accounted for IDR 5,735,000 (14.53%) of the total treatment cost. These medications are routinely prescribed to manage extrapyramidal symptoms, insomnia, anxiety, or other conditions accompanying antipsychotic therapy. Previous studies have shown that the use of concomitant medications is common among patients with schizophrenia and contributes to increased overall medication costs while potentially increasing treatment complexity [15] [16].

Consultation and therapy monitoring represented IDR 4,085,000 (10.35%) of the total cost. Regular follow-up, medication review, patient counselling, and monitoring of treatment effectiveness and adverse drug reactions are essential components of pharmaceutical care for patients receiving long-term antipsychotic therapy. Clinical guidelines recommend continuous monitoring to improve medication adherence, optimize therapeutic outcomes, and reduce preventable medication-related complications [13] [17].

Table 6. Classification of Routine Treatment Costs and Drug-Related Problem (DRP)-Related Costs among Schizophrenia Patients

No	Routine Treatment Costs	Frequency (N)	Total Cost (Rp)
1.	Management of medication side effects	27	5,670,000
2.	Duplicate treatment	8	3,000,000
3.	Insufficient dosage frequency	3	840,000
4.	Treatment duration being too short	5	2,250,000
Total			11,760,000

Source: Fathurrahman, 2026

The remaining expenditure consisted of DRP-related costs, which included the management of medication side effects, duplicate therapy, insufficient dosing frequency, and treatment duration that was too short. Among these, the cost of managing medication side effects was the largest, amounting to IDR 5,670,000 (14.36%). This finding is consistent with the high frequency of potential treatment-safety problems (P2.1) identified in this study and reflects the additional healthcare resources required to manage adverse drug reactions associated with long-term antipsychotic use [16].

Costs associated with duplicate therapy reached IDR 3,000,000 (7.60%), indicating potential inefficiencies in medication utilization. Antipsychotic polypharmacy may occasionally be justified in treatment-resistant schizophrenia; however, routine duplication of therapy is generally discouraged because it increases the risk of adverse drug reactions, drug interactions, and unnecessary healthcare expenditure [16] [17].

Furthermore, the costs attributed to treatment duration being too short (IDR 2,250,000; 5.70%) and insufficient dosing frequency (IDR 840,000; 2.13%) suggest that suboptimal medication use may require additional healthcare resources to restore therapeutic effectiveness. According to the PCNE Classification Version 9.01, these categories represent potential causes of drug-related problems that should be identified through medication review to optimize treatment outcomes [18].

Overall, these findings demonstrate that routine pharmacotherapy remains the principal contributor to treatment costs, whereas drug-related problems generate additional avoidable expenditures that may be minimized through systematic medication review, pharmacist intervention, and adherence to evidence-based antipsychotic treatment guidelines. Strengthening pharmaceutical care services may therefore improve both medication safety and the efficiency of healthcare resource utilization [17] [19] [20].

Study Limitations

This study has several limitations. First, the retrospective design relied on the completeness and accuracy of medical records, which may have limited the identification of actual and potential drug-related problems. Second, the study was conducted at a single community pharmacy with a relatively small sample size, limiting the generalisability of the findings. Third, the identification of DRPs was based on documented medication data without direct clinical confirmation from patients or prescribers. In addition, the cost analysis was descriptive and did not distinguish clearly between routine treatment costs and potentially avoidable costs directly attributable to DRPs. Therefore, the findings should be interpreted cautiously, and further multicentre prospective studies with more comprehensive clinical and economic data are recommended.

4. Conclusion

Based on the evaluation of 43 schizophrenia patients at a community pharmacy in Yogyakarta in 2025, the patient characteristics were predominantly male (26 patients; 60.47%), with the largest age group being 26–35 years (18 patients; 41.86%). The most frequently recorded diagnosis was paranoid schizophrenia (F20.0), identified in 27 patients (62.79%). Identification of Drug-Related Problems (DRPs) using the PCNE V9.01 classification showed that potential adverse drug reactions (P2.1) were the most frequently identified problem domain, occurring in 27 patients (62.79%). The identified cause domains included therapeutic duplication (C1.4) in 8 patients (18.60%), treatment duration being too short (C4.1) in 5 patients (11.63%), and insufficient dosing frequency (C3.3) in 3 patients (6.98%). These findings highlight the need for continuous monitoring of antipsychotic therapy, particularly regarding treatment safety, medication appropriateness, and adherence to long-term treatment. The total treatment cost recorded in this study was Rp39,855,000, consisting of routine treatment costs and costs related to identified DRPs. The largest cost component was primary antipsychotic therapy (Rp18,275,000; 46.32%), followed by additional medicines (Rp5,735,000; 14.53%) and management of medication side effects (Rp5,670,000; 14.36%). DRP-related costs contributed Rp11,760,000, including costs associated with medication side effects, duplicate therapy, insufficient dosing frequency, and inappropriate treatment duration. These findings indicate that DRPs and their related management may contribute to additional treatment costs; however, further analytical studies are required to determine the direct economic impact attributable to DRPs.

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Conflicts of Interest:

The authors declare no conflicts of interest related to this study or its publication.

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