JPPIPA 11(9) (2025)

Jurnal Penelitian Pendidikan IPA

http://jppipa.unram.ac.id/index.php/jppipa/index

Impact of Antipsychotic Therapy on Length of Stay and Excitement Symptoms in Patients with Schizophrenia

Rahmi Yosmar[1*], Dedy Almasdy[1], Rahmad Abdillah[1], Hudiyah Amni[2]

[1] Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Universitas Andalas, Padang, Indonesia.
[2] Undergraduate Pharmacy Study Program of Universitas Andalas, Padang, Indonesia.

Received: July 11, 2025
Revised: August 23, 2025
Accepted: September 25, 2025
Published: September 30, 2025

Corresponding Author:
Rahmi Yosmar
rahmiyosmar@phar.unand.ac.id

DOI: 10.29303/jppipa.v11i9.12125

Abstract: Schizophrenia is a complex psychiatric disorder treated primarily with antipsychotics, yet their impact on clinical outcomes such as hospital stay and excitement symptoms, measured by the Positive and Negative Syndrome Scale–Excitement Component (PANSS-EC), remains uncertain. This study examined the association between antipsychotic therapy, hospital stay duration, and PANSS-EC scores in patients with schizophrenia. A retrospective, cross-sectional analysis was conducted on 271 patients. Sociodemographic data were analyzed descriptively, and the Kruskal–Wallis test was applied for bivariate analysis across treatment groups. The results showed that patients were predominantly male (72.7%), most frequently diagnosed with paranoid-type schizophrenia (42.8%), and commonly aged 26–35 years (33.9%). No significant differences were found in hospital stay or PANSS-EC scores among the antipsychotic treatment groups. However, gender was significantly associated with PANSS-EC score changes, and schizophrenia subtype correlated with hospital stay duration. Antipsychotic therapy demonstrated no direct association with hospital stay or PANSS-EC outcomes. Instead, demographic and clinical factors, particularly gender and schizophrenia subtype, influenced treatment outcomes. These findings underscore the need for further investigation into patient-specific variables to optimize therapeutic strategies in schizophrenia care.

Keywords: Antipsychotic agents; Length of stay; PANSS-EC; Psychiatric; Schizophrenia

Introduction

Schizophrenia is a chronic psychiatric disorder characterized by a heterogeneous constellation of symptoms, including delusions, hallucinations, disorganized thinking, and impaired psychosocial functioning. Individuals with schizophrenia often exhibit a tendency to withdraw from reality and social interactions, retreating into a world of their own creation.

According to the 2018 report by the Data and Information Center of the Ministry of Health of the Republic of Indonesia, schizophrenia ranks third among mental disorders contributing to disability in the country, following depression and anxiety disorders. The national prevalence of schizophrenia is 6.7 per 1,000 households, with West Sumatra ranking fourth among Indonesia's 34 provinces. In Padang, one of the major cities in West Sumatra, 7% of households have at least one family member affected by a mental disorder, including schizophrenia or psychosis. Furthermore, according to the Indonesia Health Survey (SKI, 2023), the prevalence of households with family members affected by schizophrenia, either based on symptoms or diagnosis, was approximately 3.0 per 1,000 households at the national level. In contrast, the prevalence in West Sumatra was higher than the national figure, with 4.8 per 1,000 households based on symptoms and 4.5 per 1,000

How to Cite:
Yosmar, R., Almasdy, D., Abdillah, R., & Amni, H. (2025). Impact of Antipsychotic Therapy on Length of Stay and Excitement Symptoms in Patients with Schizophrenia. *Jurnal Penelitian Pendidikan IPA*, *11*(9), 934–942. https://doi.org/10.29303/jppipa.v11i9.12125

households based on diagnosis (Kementerian Kesehatan Republik Indonesia, 2023).

The primary treatment for schizophrenia is pharmacotherapy using antipsychotic medications, which are categorized into first-generation (typical) and second-generation (atypical) antipsychotics. The effectiveness of both monotherapy and combination therapy, involving typical and/or atypical antipsychotics, remains a subject of ongoing debate among clinicians. Although treatment algorithms exist, several additional factors must be considered in clinical practice, such as the specific type of schizophrenia, side effect profiles, patient history, and family treatment responses. A study by Purwandityo et al. (2018) reported that the choice of antipsychotic significantly influenced the reduction in symptom severity by up to 73.80%.

The dopamine hypothesis of schizophrenia provides a foundational explanation for the pharmacological treatment of the disorder. It posits that hyperactivity of dopaminergic transmission in the mesolimbic pathway contributes to positive symptoms such as hallucinations and delusions, while hypoactivity in the mesocortical pathway is linked to negative symptoms and cognitive impairment (Howes & Kapur, 2009). Antipsychotic medications, both typical and atypical, act primarily through dopamine D2 receptor antagonism, with atypical agents also modulating serotonergic activity, which may improve negative and cognitive symptoms. This neurobiological framework justifies the use of antipsychotic therapy as the mainstay of treatment in schizophrenia.

Therapeutic response in schizophrenia is typically assessed through clinical outcome measures. In Indonesia, the Positive and Negative Syndrome Scale (PANSS) and its Excitement Component (PANSS-EC) are commonly used to evaluate clinical improvement. The PANSS-EC, a simplified subset of the PANSS, is frequently applied in clinical settings due to its brevity, ease of use, and established validity. The Positive and Negative Syndrome Scale–Excitement Component (PANSS-EC) is a validated tool for assessing agitation and excitement symptoms in schizophrenia (Montoya et al., 2011). Its simplicity and clinical utility make it highly relevant in Indonesian healthcare settings, where time and resources may be limited. Assessing therapeutic outcomes using PANSS-EC provides objective, standardized measures to evaluate treatment efficacy.

The length of hospital stay has been widely recognized as an important health outcome indicator, reflecting both the severity of illness and the effectiveness of treatment strategies. Prolonged hospitalization increases healthcare costs and the burden on families, while premature discharge risks incomplete stabilization and higher relapse rates (Cañas et al., 2013). Thus, studying the relationship between antipsychotic use and hospital stay can provide valuable insights for optimizing resource utilization and patient care.

Schizophrenia is one of the top three mental health conditions contributing to disability in Indonesia, with West Sumatra ranking among the provinces with the highest prevalence (Ministry of Health Republic of Indonesia, 2018). Padang, as a major city, has a significant proportion of households affected. Although both typical and atypical antipsychotics are widely prescribed, evidence on their differential impact on clinical outcomes such as hospital stay and PANSS-EC scores in Indonesian populations remains limited. This study helps fill that gap. Previous studies suggest that factors such as gender and schizophrenia subtype influence treatment outcomes (Purwandityo et al., 2018), yet these associations have not been adequately studied in the Indonesian context.

Prof. Dr. HB Saanin Mental Hospital was selected as the research site due to its specialization in mental health care and the relatively high prevalence of schizophrenia in Padang. This study aims to analyze the relationship between antipsychotic therapy and two key therapeutic outcomes: length of hospital stay and PANSS-EC scores. Additionally, the study seeks to examine the sociodemographic characteristics of patients and their association with these clinical outcomes. By analyzing hospital stay and treatment outcomes, this research contributes to improving resource allocation and cost-effectiveness in psychiatric care, particularly in specialized hospitals such as Prof. Dr. HB Saanin Mental Hospital. Findings from this study will provide clinicians with data-driven insights, supporting more personalized and effective antipsychotic prescribing practices.

Method

This research is observational by using cross sectional analysis design. Data collection was carried out retrospectively, where data are collect from medical records of schizophrenic patients who were hospitalized at Prof. Mental Hospital. Dr. HB Saanin Padang in 2021.

The sample in this study was adjusted based on inclusion criteria, such as patients diagnosed with schizophrenia, undergoing hospitalization, patients receiving antipsychotic therapy, and patients aged 17-55 years. While the exclusion criteria were patients with incomplete medical record data, suffering from comorbidities, pregnant women, and patients who did not complete treatment (forcibly discharged or died). The number of samples was determined using the WHO sample size calculation for cross sectional analysis using the finite population correction formula as outlined by Lwanga et al.(1991).

$$n = [Z^2_{1-\alpha/2} \times P(1 - P) \times N] / [d^2(N - 1) + Z^2_{1-\alpha/2} \times P(1 - P)]$$

where N is the total population, n is the number of samples, Z is the standard deviation = 1.96 (standard error), P is the proportion of the population (0.50), and d is the error rate 5% = 0.05. Based on a total population of 912 individuals, the required sample size was determined to be 271 using the formula.

Data were tabulated and analyzed using statistical methods to characterize the sociodemographic profile of patients with schizophrenia and to examine the effect of different antipsychotic regimens on length of hospital stay and PANSS-EC scores collected from the medical report. Normality of the data was assessed using the Kolmogorov–Smirnov test. For normally distributed variables, parametric analysis was performed using one-way ANOVA. For non-normally distributed data, the non-parametric Kruskal–Wallis test was applied.

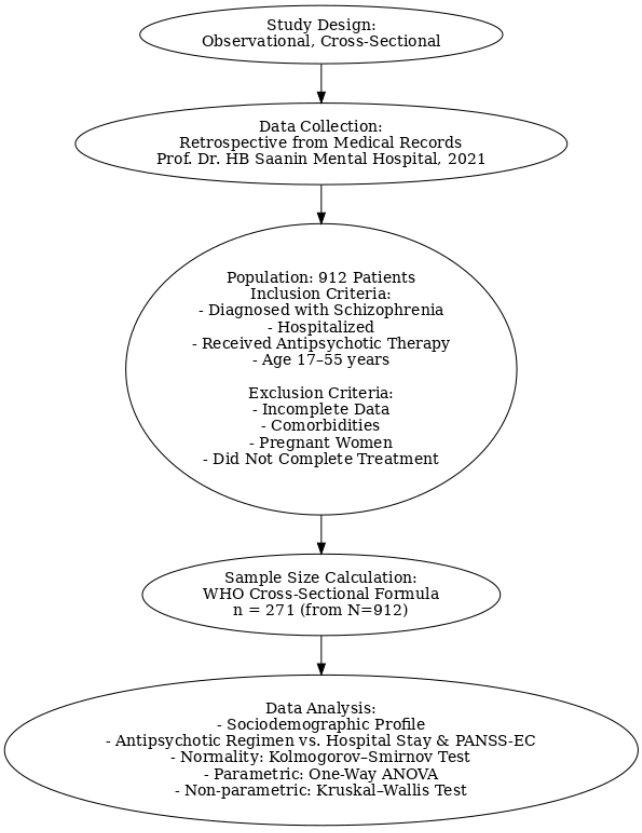

Figure 1. Research methodology flowchart

Result and Discussion

Based on research conducted at the Medical Records Department of Prof. Dr. HB Saanin Hospital Padang, a total of 271 patient records meeting the inclusion criteria were selected, in accordance with the sample size determined using the Lemeshow and Lwanga formula. The data obtained from these samples were then analyzed statistically, yielding the following results:

Table 1. Sociodemographic Characteristics of Schizophrenic Patients

Criteria	Quantity (n)	Percentage (%)
Schizophrenia Type:		
a. Depressive type schizophrenia	14	5.2
b. Depressive and Manic Type Schizophrenia	38	14
c. Manic Type Schizophrenia	62	22.9
d. Unidentified Acute and Temporary Psychotic Schizophrenia	8	3
e. Unclassified Schizophrenia	33	12.2
f. Paranoid Schizophrenia	116	42.8
Gender:		
a. Male	197	72.7
b. Female	74	27.3
Age:		
a. 17 – 25 years old	71	26.2
b. 26 – 35 years old	92	33.9
c. 36 – 45 years old	72	26.6
d. 46 – 55 years old	36	13.3
Last education:		
a. Elementary school	85	31.4
b. Junior high school	56	21.4
c. Senior high school	108	39.9
d. Academy	8	3
e. Bachelor	9	3.3
f. Not going to school	3	1.1
Marital status:		
a. Not married yet	154	56.8
b. Married	59	21.8
c. Widow	30	11.1
d. Widower	28	10.3

Several key points can be highlighted regarding the sociodemographic characteristics of hospitalized patients with schizophrenia at Prof. Dr. HB Saanin Hospital, Padang as detailed in Table 1 showed that the majority of patients were diagnosed with the paranoid subtype of schizophrenia, accounting for 116 individuals (42.8%). This finding is consistent with a study by (Hariyanto et al., 2016), which reported that paranoid schizophrenia was the most prevalent subtype among patients. Similarly, an article by the University of Michigan Health System in the field of epidemiology also indicates that the paranoid type is the most common form of schizophrenia globally.

In the gender-based distribution of schizophrenia cases, male patients were more frequently affected, with 197 individuals (72.7%) compared to 74 female patients (27.3%). This disparity may be attributed to several biological and developmental factors. Research suggests that increased vulnerability in the male brain—due to higher susceptibility to injury, slower brain maturation,

and greater exposure to trauma—may contribute to the higher incidence of schizophrenia among men compared to women (Aleman et al., 2003).

Table 2. Average Length of Stay by Antipsychotic Therapy Group in Patients with Schizophrenia

Group of Antipsychotic	Average length of hospitalization (days)
Risperidone	23
Risperidone Trifluoperazine	24
Risperidone Clozapine	26
Risperidone Haloperidol	22
Risperidone Clozapine Haloperidol Chlorpromazine	26
Risperidone Haloperidol Chlorpromazine	25
Risperidone Flufenazine	22
Risperidone Chlorpromazine	19
Risperidone Haloperidol Olanzapin	24
Risperidone Trifluoperazine Chlorpromazine	19
Risperidone Olanzapin	25

In this study, individuals aged 26–35 years represented the highest proportion of schizophrenia cases compared to other age groups. This finding aligns with the typical age of onset for schizophrenia, which peaks around 25 years in men and 27 years in women (Jablensky, 2000). When classified by educational background, the majority of patients had completed senior high school, totaling 108 individuals (39.9%). Marital status was also examined, with patients categorized as unmarried, married, divorced, or widowed. The largest group consisted of unmarried individuals, comprising 154 patients (56.8%). This may be attributed to the fact that schizophrenia often develops during late adolescence to early adulthood—approximately 15–25 years in men and 25–35 years in women—which are critical years for forming long-term relationships and establishing families (American Psychiatric Association, 2013). The early onset and chronic nature of the illness may hinder social functioning and interpersonal relationships, reducing the likelihood of marriage.

At Prof. Dr. HB Saanin Hospital Padang, antipsychotic therapy was administered in eleven different regimens, either as monotherapy or in combination, as detailed in Table 2 showed that an evaluation of the mean duration of hospitalization among different antipsychotic treatment groups demonstrated a relatively narrow range, spanning from 19 to 26 days. The longest average lengths of stay were observed in patients administered Risperidone in combination with Clozapine, as well as those receiving a four-drug regimen comprising Risperidone, Clozapine, Haloperidol, and Chlorpromazine (both averaging 26 days). Conversely, the shortest hospitalizations were recorded in patients treated with Risperidone–Chlorpromazine and Risperidone–Trifluoperazine–Chlorpromazine, each with an average of 19 days. These patterns may indicate a tendency for Clozapine-containing regimens to be associated with prolonged inpatient care; however, further inferential statistical analysis is warranted to confirm the significance of these observations.

The distribution of the dependent variable, length of hospital stay, was tested for normality across different antipsychotic treatment groups using both the Kolmogorov–Smirnov and Shapiro–Wilk tests. Given that several subgroups had sample sizes fewer than 50, the Shapiro–Wilk test was prioritized due to its higher sensitivity for small samples. Results showed that several groups, including Risperidone ($n = 136$; $p < 0.001$), Risperidone–Haloperidol ($n = 52$; $p < 0.001$), and Risperidone–Clozapine ($n = 13$; $p = 0.002$), did not follow a normal distribution. While some smaller subgroups met the assumption of normality (e.g., Risperidone–Trifluoperazine, $p = 0.743$), the presence of multiple non-normally distributed groups led to the decision to apply non-parametric statistical methods in subsequent analyses. Therefore, the Kruskal–Wallis test was used to assess the differences in Length of Stay and PANSS-EC score reduction among treatment groups. This non-parametric test was selected as an alternative to ANOVA due to the non-normal distribution of the data. Based on the obtained p-value of 0.323, the analysis indicates no statistically significant variation in hospital length of stay among the different antipsychotic treatment groups. These findings imply that the choice of antipsychotic regimen did not exert a significant effect on the duration of hospitalization in patients diagnosed with schizophrenia within the scope of this study.

Several factors may account for the lack of observed effect. First, the patterns of antipsychotic therapy administered may not have adhered strictly to recommended treatment algorithms. Although some patients received combination therapy, it is possible that these combinations were introduced prematurely—before the use of clozapine, which is typically

recommended prior to initiating polypharmacy in treatment-resistant cases (Hariyanto et al., 2016). This deviation from the standard algorithm may have reduced therapeutic effectiveness. Second, the increased risk of adverse effects associated with combination antipsychotic therapy may also contribute to prolonged or inconsistent lengths of stay. Side effects tend to be more frequent and severe when multiple antipsychotics are used concurrently, potentially complicating clinical management and delaying discharge (Hariyanto et al., 2016).

Table 3. Average PANSS-EC Score Reduction According to Antipsychotic Therapy Group in Patients with Schizophrenia

Antipsychotic Therapy Group	Average PANSS-EC Score Reduction
Risperidone	6.882
Risperidone Trifluoperazine	6.083
Risperidone Clozapine	6.077
Risperidone Haloperidol	6.846
Risperidone Clozapine Haloperidol Chlorpromazine	9
Risperidone Haloperidol Chlorpromazine	5.750
Risperidone Flufenazine	9
Risperidone Chlorpromazine	5.400
Risperidone Haloperidol Olanzapin	7
Risperidone Trifluoperazine Chlorpromazine	6.714
Risperidone Olanzapin	7

Recent studies suggest that supportive attitudes from family members and the surrounding community can contribute significantly to improved treatment outcomes for hospitalized patients with mental illness (Smith et al., 2015). However, in Indonesia, it is not uncommon for family members to leave their relatives in psychiatric hospitals for extended periods, especially when the patient's condition deteriorates. This lack of family involvement can lead to prolonged hospitalization, as continued support and engagement are often crucial to a patient's recovery and discharge readiness (Putra et al., 2019).

Based on the data in Table 3, it can be concluded that an examination of the mean reductions in PANSS-EC scores across different antipsychotic therapy groups demonstrated a moderate degree of symptom improvement, ranging from 5.4 to 9 points. The most substantial decreases in PANSS-EC scores were observed in patients receiving either the combination of Risperidone, Clozapine, Haloperidol, and Chlorpromazine or Risperidone with Flufenazine, each showing an average reduction of 9 points. In contrast, the least pronounced improvements were found in the Risperidone–Chlorpromazine group (5.4 points) and the Risperidone–Haloperidol–Chlorpromazine group (5.75 points). While some intergroup variability was evident, the overall differences in score reductions were relatively limited. These findings suggest that although the specific composition of antipsychotic regimens may impact the extent of symptom reduction, the influence appears to be minimal. Further inferential analysis is required to assess the statistical significance of these observed differences.

Normality testing was conducted for the PANSS-EC score reduction across different antipsychotic treatment groups using both the Kolmogorov–Smirnov and Shapiro–Wilk tests. Given that several groups contained fewer than 50 subjects, interpretation primarily relied on the Shapiro–Wilk test, which is more appropriate for small sample sizes.

The results showed that most treatment groups exhibited normally distributed data ($p > 0.05$). For instance, the Shapiro–Wilk test showed non-significant values in groups such as Risperidone–Trifluoperazine ($p = 0.149$), Risperidone–Clozapine ($p = 0.585$), and Risperidone–Clozapine–Haloperidol–Chlorpromazine ($p = 0.995$), indicating normal distribution. However, some groups, including Risperidone–Haloperidol ($p = 0.002$) and Risperidone alone ($p = 0.001$), showed statistically significant p-values, suggesting deviations from normality.

Based on the Kruskal–Wallis test, the analysis yielded a p-value of 0.650, indicating no statistically significant differences in the reduction of PANSS-EC scores across the various antipsychotic treatment groups. This suggests that the type of antipsychotic regimen administered did not significantly affect changes in excitement symptoms among hospitalized patients with schizophrenia in this study.

A meta-analysis conducted by Saeed et al. (2017) found that clozapine was significantly more effective than chlorpromazine in reducing symptom severity in patients with schizophrenia. However, these findings may not be directly applicable to the present study, as clozapine was not administered as a monotherapy to any of the patients included in the sample at Prof. Dr. HB Saanin Hospital Padang. On the other hand, a study

conducted by Saucedo et al. (2020) compared first-generation (typical) and second-generation (atypical) antipsychotics administered as long-acting injectable (LAI) formulations, excluding clozapine. The findings were consistent with those of the present study, showing no significant difference between first- and second-generation antipsychotics in reducing PANSS scores.

Table 4. Association of Avarage Value PANSS-EC Scores and Avarage value Length of Hospitalization with Schizophrenia Type and Sociodemographic Characteristics

Sociodemographic Characteristics	Average Value PANSS-EC Score	p-value	Average Value Length of Hospitalization (days)	p-value
Schizophrenia type :				
Depressive Type Schizophrenia	6.929	0.330	19.21	0.016
Depressive and Manic Type Schizophrenia	6.351		20.24	
Manic Type Schizophrenia	6.048		21.61	
Unidentified Acute and Temporary Psychotic Schizophrenia	8.250		19.38	
Unclassified Schizophrenia	7.257		28.15	
Paranoid Schizophrenia	6.822		23.33	
Gender :				
Male	7.03	0.003	22.80	0.130
Female	5.68		22.66	
Age :				
17-25 years old	6.27	0.546	22.52	0.394
26-35 years old	6.74		21.88	
36-45 years old	7.00		24.99	
46-55 years old	6.53		21.03	
Last Education :				
Elementary school	7.19	0.461	24.73	0.913
Junior high school	6.10		21.02	
Senior high school	6.50		21.71	
Academy	7.38		32.63	
Bachelor	6.22		21.89	
Not going to school	7.33		14.67	
Marital Satus :				
Not married yet	6.67	0.840	24.42	0.283
Married	6.66		19.05	
Widow	5.50		23.33	
Widower	7.82		20.82	

Finally, the correlation between patients' sociodemographic characteristics, PANSS-EC scores, and length of hospital stay was analyzed. To assess this relationship, the researchers employed the Spearman correlation test using SPSS software. As shown in Table 4, gender demonstrated a statistically significant correlation with changes in PANSS-EC scores, with a p-value of 0.003, which is below the commonly accepted significance threshold of 0.05. A study by Lanzi et al. (2020) supports this finding, noting that although schizophrenia is more prevalent among men, women tend to exhibit slightly higher PANSS-EC scores. This may be attributed to the higher levels of anxiety observed in female patients, even when there is a general reduction in symptom severity.

Furthermore, based on the obtained significance value, it was found that the patient's diagnosis or subtype of schizophrenia had an impact on the length of hospital stay with a p-value of 0.016. Research indicates that schizophrenia subtypes characterized by prominent positive symptoms—such as hallucinations, delusions, and psychomotor agitation—tend to respond more favorably to antipsychotic treatment, leading to quicker clinical improvement. In contrast, subtypes dominated by negative symptoms—such as social withdrawal, apathy, and flattened affect—exhibit poorer treatment response and generally necessitate longer hospitalization to achieve clinical stabilization (González-Rodríguez et al., 2013; Rabinowitz et al., 2012).

The absence of significant differences in hospital stay duration and PANSS-EC outcomes across antipsychotic treatment groups may be explained by the complex pathophysiology of schizophrenia. Dysregulation of dopaminergic pathways, including mesolimbic hyperactivity and mesocortical hypofunction, underlies positive and negative symptoms, respectively (Howes & Kapur, 2009).

Antipsychotics exert their effects primarily through dopamine D2 receptor antagonism, while atypical agents also block 5-HT2A receptors, improving tolerability and potentially targeting negative symptoms (Kapur & Mamo, 2003; Miyamoto et al., 2012).

However, therapeutic response is influenced not only by pharmacodynamics but also by clinical factors such as dose adequacy, treatment adherence, and side-effect profiles. Poor compliance, suboptimal dosing, and adverse drug reactions—such as extrapyramidal symptoms or metabolic disturbances—may diminish treatment effectiveness and prolong hospitalization (Leucht et al., 2013). Moreover, inter-individual variability, including pharmacokinetics and genetic factors, contributes to heterogeneous outcomes (Zhang & Malhotra, 2013).

Previous studies have also reported mixed findings. Lieberman et al. (2005) observed no clear superiority of atypical over typical antipsychotics, Tiihonen et al. (2017) emphasized the role of adherence with long-acting formulations reducing relapse risk, and Leucht et al. (2017) highlighted inter-individual variability as a major determinant of treatment response. These findings, consistent with the present study, indicate that while antipsychotics remain the cornerstone of schizophrenia management, personalized strategies—such as optimizing dosage, enhancing adherence, and managing side effects—are essential to improve therapeutic outcomes.

Conclusion

The findings of this study indicate that the majority of hospitalized schizophrenia patients at Prof. Dr. HB Saanin Hospital Padang were diagnosed with the paranoid type, predominantly male, most commonly within the 26–35 age group, with senior high school as the highest educational background, and largely unmarried. Analysis of antipsychotic therapy showed no significant differences in either length of hospitalization or PANSS-EC score reduction across treatment groups, although some variations were observed in average symptom improvement and duration of stay. Sociodemographic factors, particularly gender, were significantly associated with changes in PANSS-EC scores, while schizophrenia subtype influenced the length of hospitalization. These findings highlight that the effectiveness of antipsychotic therapy is shaped by the complex pathophysiology of schizophrenia, treatment adherence, dosage, and side-effect profiles, underscoring the importance of personalized therapeutic approaches to achieve optimal clinical outcomes.

Acknowledgments

The authors sincerely acknowledge the Faculty of Pharmacy, Universitas Andalas, for supporting this research through funding as part of a grant scheme designed for academic researchers. The authors also extend their gratitude to the staff of Prof. Dr. HB Saanin Hospital for their participation in this study.

Author Contributions

Conceptualization, R.Y.; methodology, R.Y., R.A., and D.A.; data analysis, R.Y. and H.A.; investigation, H.A and R.Y.; resources, R.Y.; writing—original draft preparation, R.Y. and H.A.; writing—review and editing, R.Y.; supervision, R.Y. and R.A;. All authors have read and agreed to the published version of the manuscript.

Funding

This research was funded by DIPA Faculty of Pharmacy Universitas Andalas with contract number: 13/UN16.10.D/PJ.01./2022 as part of a grant scheme designed for academic researchers.

Conflicts of Interest

The authors declare no conflict of interest

References

Ahmed, S., Khan, A. M., Mekala, H. M., Venigalla, H., Ahmed, R., Etman, A., Esang, M., & Qureshi, M. (2017). Combined use of electroconvulsive therapy and antipsychotics (both clozapine and non-clozapine) in treatment resistant schizophrenia: A comparative meta-analysis. *Heliyon*, *3*(11). https://doi.org/10.1016/j.heliyon.2017.e00429

Aleman, A., Kahn, R. S., & Selten, J.-P. (2003). Sex Differences in the Risk of Schizophrenia. *Archives of General Psychiatry*, *60*(6), 565. https://doi.org/10.1001/archpsyc.60.6.565

American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). American Psychiatric Association. https://doi.org/10.1176/appi.books.9780890425596

Buchy, L., Makowski, C., Malla, A., Joober, R., & Lepage, M. (2017). Longitudinal trajectory of clinical insight and covariation with cortical thickness in first-episode psychosis. *Journal of Psychiatric Research*, *86*, 46–54. https://doi.org/10.1016/j.jpsychires.2016.11.008

Campos, R. N., Angst, J., Cordas, T. A., & Moreno, R. A. (2011). ESPECTRA: Searching the Bipolar Spectrum in Eating Disorder patients. *BMC Psychiatry*, *11*(1), 59. https://doi.org/10.1186/1471-244X-11-59

Cañas, F., Alberich, S., & Díaz-Marsá, M. (2013). Length of hospital stay in schizophrenia and related disorders: A critical review. *Actas Españolas de Psiquiatría*, *41*(5), 269–278.

Hariyanto, Putri, R. A., & Untari, E. K. (2016). Different Type of Antipsychotic Therapies on Length of Stay of Acute Schizophrenia Patients in Sungai Bangkong Regional Mental Hospital Pontianak. *Indonesian Journal of Clinical Pharmacy*, *5*(2), 115–122. https://doi.org/10.15416/ijcp.2016.5.2.115

Howes, O. D., Kapur, S., & A. (2009). The dopamine hypothesis of schizophrenia: Version III—the final common pathway. *Schizophrenia Bulletin*, *35*(3), 549–562. https://doi.org/10.1093/schbul/sbp006Jablensky

Julaeha, Ananda, V. D., & Pradana, Di. A. (2016). Gambaran Efek Samping Antipsikotik Pada Pasien Skizofrenia Pada Bangsal Rawat Inap Di Rs. Grhasia Yogyakarta. *Farmasains*, *3*(1), 35–41. Retrieved from https://journal.uhamka.ac.id/index.php/farmasains/article/view/122/103

Kapur, S., & Mamo, D. (2003). Half a century of antipsychotics and still a central role for dopamine D2 receptors. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *27*(7), 1081–1090. https://doi.org/10.1016/j.pnpbp.2003.09.004

Kementerian Kesehatan Republik Indonesia. (2023). *Survei Kesehatan Indonesia (SKI) 2023: Laporan utama Badan Kebijakan Pembangunan Kesehatan*. Retrieved from https://kemkes.go.id

Lachenbruch, P. A., Lwanga, S. K., & Lemeshow, S. (1991). Sample Size Determination in Health Studies: A Practical Manual. *Journal of the American Statistical Association*, *86*(416), 1149. https://doi.org/10.2307/2290547

Lanfumey, L., Mongeau, R., & Hamon, M. (2013). Biological rhythms and melatonin in mood disorders and their treatments. *Pharmacology & Therapeutics*, *138*(2), 176–184. https://doi.org/10.1016/j.pharmthera.2013.01.005

Lanzi, R., Menculini, G., Bachetti, M. C., Moretti, P., & Tortorella, A. (2020). Differential gender severity expression of symptoms in patients with dual diagnosis: An in-patient observational study. *Psychiatria Danubina*, *32*, S70–S74. Retrieved from https://pubmed.ncbi.nlm.nih.gov/32890366/

Lee, S.-Y., Lee, S.-J., Han, C., Patkar, A. A., Masand, P. S., & Pae, C.-U. (2013). Oxidative/nitrosative stress and antidepressants: Targets for novel antidepressants. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *46*(2), 224–235. https://doi.org/10.1016/j.pnpbp.2012.09.008

Leucht, S., Cipriani, A., Spineli, L., Mavridis, D., Örey, D., Richter, F., Samara, M., Barbui, C., Engel, R. R., Geddes, J. R., Kissling, W., Stapf, M. P., Lässig, B., Salanti, G., & Davis, J. M. (2013). Comparative efficacy and tolerability of 15 antipsychotic drugs in schizophrenia: a multiple-treatments meta-analysis. *The Lancet*, *382*(9896), 951–962. https://doi.org/10.1016/S0140-6736(13)60733-3

Leucht, S., Tardy, M., Komossa, K., Heres, S., Kissling, W., Salanti, G., & Davis, J. M. (2013). Antipsychotic drugs versus placebo for relapse prevention in schizophrenia: A systematic review and meta-analysis. *The Lancet*, *382*(9893), 2203–2211. https://doi.org/10.1016/S0140-6736(13)62670-7

Lieberman, J. A., Stroup, T. S., McEvoy, J. P., Swartz, M. S., Rosenheck, R. A., Perkins, D. O., Keefe, R. S. E., Davis, S. M., Davis, C. E., Lebowitz, B. D., Severe, J., & Hsiao, J. K. (2005). Effectiveness of Antipsychotic Drugs in Patients with Chronic Schizophrenia. *New England Journal of Medicine*, *353*(12), 1209–1223. https://doi.org/10.1056/NEJMoa051688

Masturoh, I., & Nauri, T. A. (2018). *Health Research Methodology*. Jakarta: Ministry of Health of the Republic of Indonesia.

Meena, S. Z., Rahman, M. A., Bagga, P., & Mujahid, M. (2018). Hepatoprotective activity of Tamarindus indica Linn stem bark ethanolic extract against hepatic damage induced by co-administration of antitubercular drugs isoniazid and rifampicin in Sprague Dawley rats. *Journal of Basic and Clinical Physiology and Pharmacology*, *30*(1), 131–137. https://doi.org/10.1515/jbcpp-2017-0173

Miyamoto, S., Miyake, N., Jarskog, L. F., Fleischhacker, W. W., & Lieberman, J. A. (2012). Pharmacological treatment of schizophrenia: a critical review of the pharmacology and clinical effects of current and future therapeutic agents. *Molecular Psychiatry*, *17*(12), 1206–1227. https://doi.org/10.1038/mp.2012.47

Purwandityo, A. G., Febrianti, Y., Sari, C. P., Ningrum, V. D. A., & Sugiyarto, O. P. (2018). The Influence of Antipsychotic to Decrease the Score of The Positive and Negative Syndrome Scale-Excited Component. *Indonesian Journal of Clinical Pharmacy*, *7*(1), 19–29. https://doi.org/10.15416/ijcp.2018.7.1.19

Rabinowitz, J., Levine, S., & Garmezy, N. (2011). Subscription. *Schizophrenia Bulletin*, *37*(6). https://doi.org/10.1093/schbul/sbr159

Saucedo Uribe, E., Carranza Navarro, F., Guerrero Medrano, A. F., García Cervantes, K. I., Álvarez Villalobos, N. A., Acuña Rocha, V. D., Méndez Hernández, M., Millán Alanís, J. M., Hinojosa Cavada, C. M., Zúñiga Hernández, J. A., & Fernández Zambrano, S. M. (2020). Preliminary efficacy and tolerability profiles of first versus second-generation Long-Acting Injectable Antipsychotics in schizophrenia: A systematic

review and meta-analysis. *Journal of Psychiatric Research*, *129*, 222–233. https://doi.org/10.1016/j.jpsychires.2020.06.013

Tiihonen, J., Mittendorfer-Rutz, E., Majak, M., Mehtälä, J., Hoti, F., Jedenius, E., Enkusson, D., Leval, A., Sermon, J., Tanskanen, A., & Taipale, H. (2017). Real-World Effectiveness of Antipsychotic Treatments in a Nationwide Cohort of 29 823 Patients With Schizophrenia. *JAMA Psychiatry*, *74*(7), 686. https://doi.org/10.1001/jamapsychiatry.2017.1322

Wollina, U., Schmidt, N., Schönlebe, J., Vojvodic, A., Hansel, G., Koch, A., & Lotti, T. (2019). Large B - Cell Lymphoma of the Leg – Unfavourable Course with Rituximab/Bendamustin. *Open Access Macedonian Journal of Medical Sciences*, *7*(18), 3006–3008. https://doi.org/10.3889/oamjms.2019.565

Wright, K. M. (2015). Maternalism: a healthy alliance for recovery and transition in eating disorder services. *Journal of Psychiatric and Mental Health Nursing*, *22*(6), 431–439. https://doi.org/10.1111/jpm.12198