

# Evaluation of the Use and Cost of Psychotropic Drugs in BPJS Schizophrenia Patients Using the ATC/DDD & DU 90% Method at Dr. Loekmono Hadi Kudus Regional Hospital

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**Abstract.** People with Mental Disorders (ODGJ) are people who experience disorders of thinking, behavior, and emotions that are manifested in a series of symptoms or significant changes that include behavior and can cause suffering and obstacles in carrying out people's functions as human beings. Schizophrenia is one of the most complex and challenging of mental disorders. Schizophrenia is a heterogeneous syndrome that is irregular and behavioral disorders strange behavior, delusions, hallucinations, inappropriate emotions, and disorders of major psychosocial functions. Someone who experiences mental health disorders can be treated by administering psychotropic drugs. This study aims to determine the pattern of use and costs of psychotropic drugs in BPJS schizophrenia inpatients with the ATC/DDD and DU 90% methods at Dr. Loekmono Hadi Kudus Regional Hospital for the period January-December 2023. This study uses a quantitative method with a non-experimental descriptive design, whose data is taken retrospectively using secondary data in the form of medical records of schizophrenia patients. The sampling technique used is Total Purposive Sampling. Psychotropic use data was calculated using the formula DDD/100 days of care and DU 90%. The results showed that there were 213 medical records of schizophrenia patients who met the inclusion criteria with the number of male gender of 153 patients (71.83%), the most age was adult (26-45 years) 139 patients (65.26%), the average LOS was 14 to 15 days with a total LOS of 2981 days, the use of psychotropics with the highest value was risperidone at 38.05 DDD/100 days of care. Psychotropic drugs included in the 90% DU segment include risperidone (20.68%), olanzapine (15.86%), chlorpromazine (14.17%), trihexyphenidyl (12.68%), fluoxetine (6.16%), sertraline (5.69%), haloperidol (5.64%), lithium (3.22%), aripiprazole (2.49%), trifluoperazine (2.38%), and clozapine (2.35%). The highest cost of psychotropic drugs is aripiprazole 10 mg, with a total cost of Rp 3,444,000 for one year, with a total of 205 tablets used.

**Keywords:** Fees, DDD, DU 90%, Psychotropics, Schizophrenia.

## INTRODUCTION

Health is a vital asset in human life, encompassing good physical and mental health, social well-being, and the ability to meet all life's needs to create a decent standard of living (Law of the Republic of Indonesia, 2009). The Social Security Administration (BPJS) is the body established to provide health protection (Presidential Decree of the Republic of Indonesia, 2018).

According to the World Health Organization, in 2022, 300 million people worldwide experienced mental disorders such as depression, bipolar disorder, and dementia, including 24 million with schizophrenia. The prevalence of severe mental disorders (psychotics) in Indonesia was 450,000 people with severe mental disorders (ODGJ). Furthermore, the prevalence of depression in the population aged 15 years and older was 6.1%, and the prevalence of emotional mental disorders was 9.8% (Risksedas, 2018).

People with Mental Disorders (ODGJ) are individuals who experience disorders of thinking, behavior, and emotions that are manifested in a series of symptoms or significant changes that include behavior and can cause suffering and obstacles in carrying out people's functions as human beings (Law of the Republic of Indonesia, 2014). One of the most common mental illnesses is schizophrenia. Schizophrenia is one of the most complex and challenging of mental disorders. Schizophrenia is a heterogeneous syndrome of irregular and disordered behaviors that include bizarre behaviors, delusions, hallucinations, inappropriate emotions, and major psychosocial dysfunction (Ikawati, 2014). Someone experiencing mental health disorders can be treated with psychotropic drugs. According to researchers Litama et al. (2019), trihexyphenidyl and risperidone are most often prescribed for patients with mental disorders.

The EPO method is an identification analysis method used to compare two drugs with different

values. Drug Utilization Evaluation (EPO) functions as a review and evaluation of pharmaceutical services aimed at quality control. Drug Utilization (DUT) 90% can be determined from drug use patterns by assessing drugs included in the 90% DU. The EPO developed by the WHO is the Anatomical Therapeutic Chemical (ATC)/Defined Daily Dose (DDD) method. The ATC/DDD system is a system for classifying and measuring drug use (NIPH, 2022). Assessment of drugs included in the 90% DU segment is necessary to emphasize the drug segment in terms of evaluating drug use, planning, and procurement (Khoiriyah et al., 2020).

## METHODS

### Types and Design of Research

This study employed a quantitative, non-experimental descriptive design, with data collected retrospectively. The study employed a cross-sectional design. The study began with a research ethics application, which met the requirements of the Health Research Ethics Committee of Muhammadiyah University of Purwokerto, under the number KEP/UMP/165/III/2024.

### Time and Place

This research was conducted at Dr. Loekmono Hadi Kudus Regional Hospital and was carried out in March-April 2024.

### Population and Sample

The population used in this study was all medical records of BPJS patients undergoing schizophrenia treatment and hospitalized at Dr. Loekmono Hadi Kudus Regional Hospital in 2023. The sample was determined using the Total Purposive Sampling method and met the inclusion criteria, namely 213 patients.

The inclusion criteria in this study were medical records of BPJS inpatients diagnosed with schizophrenia and receiving psychotropic therapy, complete medical records of BPJS inpatients (age, gender, length of stay, and drug data in the form of psychotropic name, dosage and usage rules), BPJS schizophrenia inpatients without other comorbidities, BPJS schizophrenia inpatients aged >12 years. The exclusion criteria were inpatients included in BPJS but not diagnosed with schizophrenia, illegible medical records of BPJS schizophrenia inpatients, incomplete medical records of BPJS schizophrenia inpatients, and forced discharge.

### Data analysis

Data analysis was performed using Microsoft Excel.

- Grouping data based on gender, age, use of psychotropic drugs and length of hospitalization using Microsoft Excel.
- Here's how to analyze data using the ATC/DDD and DU 90% methods:  
Search for ATC code classification for psychotropic drugs that has been determined by WHO using the web link [https://www.whocc.no/atc\\_ddd\\_index/](https://www.whocc.no/atc_ddd_index/)  
The type of psychotropic drug was identified using the DDD formula (Ministry of Health of the Republic of Indonesia, 2017):

$$\text{Drug Use In DDD} = \frac{\text{Quantity Used} \times \text{Strength}}{\text{DDD}}$$

Drug usage data for inpatients is calculated based on the DDD/100 days of treatment calculation using the following formula:

$$\text{DDD/100 Days of Treatment} = \frac{\text{Total DDD}}{\text{Total Days of Treatment}} \times 1000$$

Determination of DU 90% is done by converting each DDD/100 days of psychotropic drug treatment into a percentage from the highest to the lowest drug use and then determining the cumulative percentage that falls into the DU 90% segment.

- The calculation of the cost of psychotropic drugs is obtained by multiplying the total for each drug by the purchase cost, then calculating the total cost based on each drug.

## RESULTS AND DISCUSSION

### Patient Characteristics

This study was conducted at Dr. Loekmono Hadi Kudus Regional Hospital between January and December 2023. The subjects met the inclusion and exclusion criteria. The characteristics of the study subjects are shown in the following table:

**Table 1.** Characteristics of Schizophrenia Patients.

| Characteristics         | Number of Patients | Percentage (%) |
|-------------------------|--------------------|----------------|
| <b>Gender</b>           |                    |                |
| Man                     | 153                | 71.83          |
| Woman                   | 60                 | 28.17          |
| <b>Age</b>              |                    |                |
| Teenagers (12-25 Years) | 29                 | 13.62          |
| Adults (26-45 Years)    | 139                | 65.26          |
| Elderly (46-65 Years)   | 44                 | 20.66          |
| Seniors (>65 Years)     | 1                  | 0.47           |

*Source: Primary data*

Table 1 shows that schizophrenia patients are predominantly male, with 153 patients (71.83%), due to poor communication skills and a preference to suppress problems when under stress. Other research also indicates that men are at 56.7% greater risk of developing schizophrenia than women (Abdulah et al., 2023). Generally, the reason for the higher prevalence in men is that men tend to experience higher levels of stress in life, both in education and work (Li et al., 2017).

Factors contributing to schizophrenia are more prevalent in men because they are more private about their problems, unlike women, who tend to share their concerns. Men view problems as shameful mistakes, leading them to battle with themselves, refuse to seek help, and withdraw from their environment (Nofriyanto, 2019).

The majority of patients with schizophrenia were in the adult age range (26-45 years), with 139 patients (65.26%). This occurs because in adulthood, individuals experience difficulty understanding situations with those around them and experience financial problems. Psychosocial changes tend to occur in late adulthood. Emotional health in late adulthood is related to an individual's ability to define and separate personal and social tasks. Midlife crises, which involve changes in a person's partner, marriage, lifestyle, and work, are usually caused by stress from repeated exams (Nababan et al., 2023).

The results of this study align with research conducted by Amalia et al. (2022), which showed that schizophrenia is more common in adults than adolescents or children, with a peak age of 30-39, the productive age range. This is because adult schizophrenia is often caused by divorce, abandonment by a partner, sibling disputes over inheritance, and bankruptcy (Nababan et al., 2023).

### Therapy Regimen and Drug Classes

The research results show that there are various single and combination psychotropic therapies for schizophrenia patients. In this study, the most commonly used single psychotropic therapy was clozapine from the atypical antipsychotic group, with a total of 2 patients. This does not align with the schizophrenia pharmacotherapy algorithm. Because all atypical antipsychotic agents except clozapine are first-line in treating schizophrenia (Dipiro et al., 2015). Clozapine can decrease water levels and increase serum sodium in schizophrenia patients. However, patients receiving clozapine require monitoring, as clozapine carries a significant risk of metabolic syndrome (Burns et al., 2016).

After a single drug is unable to provide a good response, the patient will be given a combination of 2 psychotropic therapy. In this study, the most common combination of 2 psychotropics was risperidone and cepezet from the atypical antipsychotic and typical antipsychotic groups with a total of 13 patients. The administration of combination therapy depends on the severity of schizophrenia. The use of combination therapy is often used in the treatment of schizophrenia because different types and agents have different affinities, so it is hoped that they can complement each other for receptors and function better in psychosis compared to monotherapy (Blessing et al., 2013).

The combination of risperidone and cepezet can reduce positive symptoms and behavioral disturbances in schizophrenia patients (Purwandityo et al., 2018). This is because typical antipsychotics can improve positive symptoms but not negative symptoms. Atypical antipsychotics can improve both

positive and negative symptoms of schizophrenia and are more effective in treating resistant patients (Galletly et al., 2017).

Risperidone has a greater affinity for the dopamine D2 receptor than clozapine. Risperidone is indicated for the treatment of schizophrenia, both negative and positive symptoms (Susilowati et al., 2021). Cepezet is a typical antipsychotic drug containing chlorpromazine. Its mechanism of action is nonspecific on norepinephrine, dopamine, acetylcholine, and histamine receptors (Nuryati, 2017). The affinity of chlorpromazine binding to the D2 receptor in the striatum is 70%, making it effective when combined with risperidone in patients who do not respond well to risperidone, especially those with positive symptoms and sleep disorders. However, its high affinity for the D2 receptor causes extrapyramidal side effects such as tardive dyskinesia, tremor, akinesia, and others (Dipiro et al., 2008).

The most common combination of psychotropic therapy is risperidone, cepezet, and trihexyphenidyl. Extrapyramidal side effects from antipsychotic use can be managed with the anticholinergic trihexyphenidyl, which inhibits centrally acting acetylcholine. Trihexyphenidyl is an antagonist to typical phenothiazine antipsychotics (chlorpromazine and trifluoperazine). Trihexyphenidyl's effects on the central nervous system cause restlessness, agitation, delusions, hallucinations, and altered thinking (Stockley, 2009).

### Length of Stay (LOS)

**Table 2.Length of Hospitalization**

| Length c<br>Treatme<br>t | Number of<br>Patients | Percentage (%) | LOS<br>(Day) |
|--------------------------|-----------------------|----------------|--------------|
| 3                        | 2                     | 0.94%          | 6            |
| 4                        | 2                     | 0.94%          | 8            |
| 6                        | 1                     | 0.47%          | 6            |
| 8                        | 3                     | 1.41%          | 24           |
| 9                        | 4                     | 1.88%          | 36           |
| 10                       | 5                     | 2.35%          | 50           |
| 11                       | 4                     | 1.88%          | 44           |
| 12                       | 11                    | 5.16%          | 132          |
| 13                       | 28                    | 13.15%         | 364          |
| 14                       | 55                    | 25.82%         | 770          |
| 15                       | 59                    | 27.70%         | 885          |
| 16                       | 22                    | 10.33%         | 352          |
| 17                       | 9                     | 4.23%          | 153          |
| 18                       | 6                     | 2.82%          | 108          |
| 21                       | 1                     | 0.47%          | 21           |
| 22                       | 1                     | 0.47%          | 22           |
| Total                    | 213                   | 100            | 2981         |

Source: Primary data

Table 2 shows that the average LOS for schizophrenia patients at Dr. Loekmono Hadi Kudus Regional Hospital between January and December 2023 was 14 to 15 days, with a total LOS of 2,981 days. This figure does not meet the Ministry of Health's standard, which states the ideal AVLOS value is 6-9 days (Ministry of Health, 2006). This is because schizophrenia patients require long treatment times and it is difficult to predict when they can go home. Therefore, the hospital has not been able to establish a standard length of stay for schizophrenia patients who have other disorders related to their illness.

### Quantity of Psychotropic Drug Use Based on ATC/DDD Classification

**Table 3.** Quantity of Psychotropic Drug Use in DDD Units

| No    | ATC Code | Types of Psychotropics | Active Ingredient | Total DDD | DDD/100 Day of Care |
|-------|----------|------------------------|-------------------|-----------|---------------------|
| 1     | N05AX08  | Risperidone            | Risperidone       | 1,134.40  | 38.05               |
| 2     | N05AH03  | Olanzapine             | Olanzapine        | 870.00    | 29.18               |
| 3     | N05AA01  | Cepezet                | Chlorpromazine    | 777.67    | 26.09               |
| 4     | N04AA01  | Trihexyphenidyl        | Trihexyphenidyl   | 695.40    | 23.33               |
| 5     | N06AB03  | Fluoxetine             | Fluoxetine        | 338.00    | 11.34               |
| 6     | N06AB06  | Fridep                 | Sertraline        | 312.00    | 10:47               |
| 7     | N05AD01  | Haloperidol            | Haloperidol       | 309.38    | 10:38               |
| 8     | N05AN01  | Frimania               | Lithium           | 176.39    | 5.92                |
| 9     | N05AX12  | Aripiprazole           | Aripiprazole      | 136.67    | 4.58                |
| 10    | N05AB06  | Trifluoperazine        | Trifluoperazine   | 130.50    | 4.38                |
| 11    | N05AH02  | Clozapine              | Clozapine         | 128.75    | 4.32                |
| 12    | N05BA01  | Diazepam               | Diazepam          | 115.90    | 3.89                |
| 13    | N06AA09  | Amitriptyline          | Amitriptyline     | 89.67     | 3.01                |
| 14    | N05BA09  | Clobazam               | Clobazam          | 75.00     | 2.52                |
| 15    | N06AA21  | Sandepril              | Maprotiline       | 71.00     | 2.38                |
| 16    | N05AH04  | Seroquel Xr            | Quetiapine        | 69.50     | 2.33                |
| 17    | N05BA06  | Lorazepam              | Lorazepam         | 56.00     | 1.88                |
| Total |          |                        |                   | 5,486.22  | 184.04              |

*Source: Primary Data*

Based on Table 3, the highest DDD value in this study was for the use of risperidone with ATC code N05AX08, which was 38.05 DDD/100 days of treatment. Risperidone is a class of atypical antipsychotic drugs derived from benzoxazole derivatives indicated for the treatment of schizophrenia for both negative and positive symptoms. Risperidone has the ability to occupy D2 receptors (63% to 89%) (Yulianty et al., 2017). This study is in line with the study of Zahnia & Sumekar (2016) which stated that risperidone is the most widely used antipsychotic, and its extrapyramidal side effects are usually milder compared to typical antipsychotics. It is known that the use of therapy with risperidone, which works on serotonin and histamine receptors, can affect body weight (Dewi et al., 2013).

The second highest use of psychotropic drugs is olanzapine with ATC code N05AH03, amounting to 29.18 DDD/100 hospital days. Olanzapine is a safe and effective drug for the treatment of diagnosed schizophrenia. The specific mechanism of action of olanzapine is by blocking 5HT<sub>2A</sub>, dopamine (D<sub>1</sub>, D<sub>2</sub>, D<sub>4</sub>), muscarinic (M<sub>1</sub>), H, 5HT<sub>2E</sub>, 5HT<sub>3</sub>, and 5HT<sub>6</sub> receptors with eight times greater potency compared to dopamine receptors. Olanzapine also has the ability to block phencyclidine (PCP), which is an N-methyl-D-aspartate (NMDA) receptor antagonist that induces positive and negative symptoms and is related to cognition in schizophrenia patients (Elvira et al., 2017).

The lowest use of psychotropic drugs was lorazepam with ATC code N05BA06, which was 1.88 DDD/100 hospital days. Lorazepam is a 3-hydroxybenzodiazepine derivative used as a therapy for

anxiety and insomnia (Griffin et al., 2013). Lorazepam binds to the benzodiazepine receptor of postsynaptic  $\gamma$ -aminobutyric acid (GABA)-A ligand-bound neuronal chloride channels in several locations in the central nervous system (CNS). This drug enhances the effect of GABA, thereby increasing chloride ion conductance in cells. As a result, the shift in chloride ions causes hyperpolarization and stabilization of the cell plasma membrane (Vinkers et al., 2012).

**Table 4.** DU profile 90%.

| No    | ATC Code | Types of Psychotropics     | Active Ingredient | DDD/100 Days of Care | %     | Cumulative | DU 90% |
|-------|----------|----------------------------|-------------------|----------------------|-------|------------|--------|
| 1     | N05AX08  | Risperidone                | Risperidone       | 38.05                | 20.68 | 20.68      | 90     |
| 2     | N05AH03  | Olanzapine<br>Olanzapine   | Olanzapine        | 29.18                | 15.86 | 36.54      |        |
| 3     | N05AA01  | Cepezet<br>Chlorpromazine  | Chlorpromazine    | 26.09                | 14.17 | 50.71      |        |
| 4     | N04AA01  | Trihexyphenidyl            | Trihexyphenidyl   | 23.33                | 12.68 | 63.39      |        |
| 5     | N06AB03  | Fluoxetine                 | Fluoxetine        | 11.34                | 6.16  | 69.55      |        |
| 6     | N06AB06  | Fridep<br>Sertraline       | Sertraline        | 10:47                | 5.69  | 75.23      |        |
| 7     | N05AD01  | Haloperidol<br>Lodomer     | Haloperidol       | 10:38                | 5.64  | 80.87      |        |
| 8     | N05AN01  | Frimania<br>Frimania       | Lithium           | 5.92                 | 3.22  | 84.09      |        |
| 9     | N05AX12  | Aripiprazole               | Aripiprazole      | 4.58                 | 2.49  | 86.58      |        |
| 10    | N05AB06  | Trifluoperazine            | Trifluoperazine   | 4.38                 | 2.38  | 88.96      |        |
| 11    | N05AH02  | Clozapine<br>Clozapine     | Clozapine         | 4.32                 | 2.35  | 91.30      | 10     |
| 12    | N05BA01  | Diazepam<br>Diazepam       | Diazepam          | 3.89                 | 2.11  | 93.42      |        |
| 13    | N06AA09  | Amitriptyline              | Amitriptyline     | 3.01                 | 1.63  | 95.05      |        |
| 14    | N05BA09  | Clobazam                   | Clobazam          | 2.52                 | 1.37  | 96.42      |        |
| 15    | N06AA21  | Sandepril<br>Seroquel Xr   | Maprotiline       | 2.38                 | 1.29  | 97.71      |        |
| 16    | N05AH04  | Seroquel Xr<br>Seroquel Xr | Quetiapine        | 2.33                 | 1.27  | 98.98      |        |
| 17    | N05BA06  | Lorazepam                  | Lorazepam         | 1.88                 | 1.02  | 100        |        |
| Total |          |                            |                   | 184.04               | 100   | 100        |        |

Source: Primary Data

Table 4 shows that psychotropic drugs included in the 90% DU segment include risperidone (20.68%), olanzapine (15.86%), chlorpromazine (14.17%), trihexyphenidyl (12.68%), fluoxetine (6.16%), sertraline (5.69%), haloperidol (5.64%), lithium (3.22%), aripiprazole (2.49%), trifluoperazine (2.38%), and clozapine (2.35%). Meanwhile, psychotropic drugs included in the 10% DU segment include diazepam (2.11%), amitriptyline (1.63%), clobazam (1.37%), maprotiline (1.29%), quetiapine (1.27%), and lorazepam (1.02%). The use of psychotropic drugs in the 90% segment indicates the most widely used, while those in the 10% segment indicate the least frequently prescribed (WHO, 2024). A good 90% DU result is when the number of drugs in the 90% DU category is less than the number of drugs in the 10% DU segment (Pratiwi et al., 2024).

Data on the use of psychotropic drugs with a 90% DU can be used when compiling a list of essential drugs for planning purposes (Kulkarni et al., 2016). Therefore, the ultimate goal of this evaluation is to assess the effectiveness of drug use at Dr. Loekmono Hadi Kudus Regional Hospital to ensure drug availability and avoid drug shortages. Therefore, it is expected that drugs included in the 90% DU

segment need to be given more attention to their availability (Pratiwi et al., 2024). Thus, the data obtained can be used in terms of drug evaluation, measuring psychotropic drug consumption by schizophrenia patients at Dr. Loekmono Hadi Kudus Regional Hospital. Therefore, the use of the 90% DU method indirectly provides suggestions for further drug control and procurement by considering psychotropic prescribing patterns.

### Analysis of the Cost of Using Psychotropic Drugs

**Table 5.** Psychotropic Costs

| No     | ATC Code | Types of Psychotropics | Active Ingredients | Number of Drug | Price per tablet (Rp) | Usage Price (Rp) |
|--------|----------|------------------------|--------------------|----------------|-----------------------|------------------|
| 1      | N06AA09  | Amitriptyline          | Amitriptyline      | 269            | 300                   | 80,700           |
| 2      | N05AX12  | Aripiprazole           | Aripiprazole       | 205            | 16,800                | 3,444,000        |
| 3      | N05AA01  | Cepezet                | Chlorpromazine     | 1348           | 600                   | 808,800          |
|        |          | Chlorpromazine         |                    | 985            | 350                   | 344,750          |
| 4      | N05BA09  | Clobazam               | Clobazam           | 150            | 1,150                 | 172,500          |
|        |          |                        |                    | 267            | 1,200                 | 320,400          |
| 5      | N05AH02  | Clozapine              | Clozapine          | 477            | 600                   | 286,200          |
|        |          | Clozapine              |                    | 169            | 300                   | 50,700           |
| 6      | N05BA01  | Diazepam               | Diazepam           | 157            | 225                   | 35,325           |
|        |          | Diazepam               |                    | 338            | 500                   | 169,000          |
| 7      | N06AB03  | Fluoxetine             | Fluoxetine         | 49             | 1,950                 | 95,550           |
| 8      | N06AB06  | Fridep                 | Sertraline         | 241            | 1,650                 | 433,950          |
|        |          | Sertraline             |                    | 70             | 2,650                 | 638,650          |
| 9      | N05AN01  | Frimania               | Lithium            | 421            | 4,575                 | 320,250          |
|        |          | Frimania               |                    | 185            | 275                   | 115,775          |
| 10     | N05AD01  | Haloperidol            | Haloperidol        | 70             | 235                   | 43,475           |
|        |          | Lodomer                |                    | 518            | 1,500                 | 105,000          |
| 11     | N05BA06  | Lorazepam              | Lorazepam          | 704            | 4,800                 | 2,486,400        |
| 12     | N05AH03  | Olanzapine             | Olanzapine         | 2836           | 1,800                 | 1,267,200        |
|        |          | Olanzapine             |                    | 142            | 200                   | 567,200          |
| 13     | N05AX08  | Risperidone            | Risperidone        | 263            | 8,525                 | 1,210,550        |
| 14     | N06AA21  | Sandepril              | Maprotiline        | 38             | 10,850                | 412,300          |
| 15     | N05AH04  | Seroquel Xr            | Quetiapine         | 14             | 9,500                 | 133,000          |
|        |          | Seroquel Xr            |                    | 42             | 9,350                 | 392,700          |
| 16     | N05AB06  | Seroquel Xr            | Trifluoperazine    | 522            | 300                   | 156,600          |
|        |          | Trifluoperazine        |                    | 3477           | 200                   | 695,400          |
| 17     | N04AA01  | Trihexyphenidyl        | Trihexyphenidyl    |                |                       |                  |
| Amount |          |                        |                    |                | 80,385                | 14,786,375       |

*Source: Primary Data*

The results obtained in Table 5 show that the highest psychotropic cost is aripiprazole 10 mg, with a total usage cost of Rp. 3,444,000 for one year with a total usage of 205 tablets. The cost of aripiprazole is quite high compared to trihexyphenidyl and risperidone, at Rp. 16,800 per tablet. The second highest price is olanzapine 10 mg, with a total usage cost of Rp. 2,486,400 for one year with a total usage of 518 tablets.

The costs of psychotropic medications used in schizophrenia patients above are appropriate, as all medications prescribed in this study are listed in the BPJS Kesehatan e-catalog. The cost of psychotropic medications is calculated by adding the individual costs of each medication, multiplying the purchase price, and then calculating the total for each medication.

## CONCLUSION

Based on the evaluation study of the use and costs of psychotropic drugs in BPJS schizophrenia patients at Dr. Loekmono Hadi Kudus Regional Hospital for the period January-December 2023, the following conclusions can be drawn:

1. The use of psychotropic drugs based on the ATC/DDD method obtained a total value of 184.04 DDD/100 days of hospitalization, and the psychotropic with the highest value was risperidone at 38.05 DDD/100 days of hospitalization. The use of psychotropic drugs based on the 90% DU included in the 90% DU segment includes risperidone (20.68%), olanzapine (15.86%), chlorpromazine (14.17%), trihexyphenidyl (14.17%), and phenytoin (14.17%).  
(12.68%), fluoxetine (6.16%), sertraline (5.69%), haloperidol (5.64%), lithium (3.22%), aripiprazole (2.49%), trifluoperazine (2.38%), and clozapine (2.35%).
2. The highest cost of psychotropic medication use during the January-December 2023 period was aripiprazole 10 mg, at Rp 3,444,000, with a total of 205 tablets used.

## REFERENCES

- Abdulah, AZ, Suerni, T. & Nurochmah, E. (2023). Mental Health Problems of Generation Z in Mental Hospitals. *Journal of Mental Health Nursing (JKJ): Indonesian National Nurses Association*, 11(2):267–72.
- Amalia, I., Wilson, & Hermawati, E. (2022). The Relationship between Characteristics of Schizophrenia Patients and Relapse Rates at the Sungai Bangkong Regional Mental Hospital, Pontianak. *Cerebellum Journal*, 8(2):1–6.
- Blessing, IO, GBS, I., George, E.O., Okajie, F.O. & Solomon, AO (2013). Effect of Chlorpromazine and Haloperidol Combination on Lipid Profile in Nigerian Schizophrenic Patients. *Biochimica Clinica*, 37(12):S263.
- Burns, MAC, Wells, BG, Schwinghammer, TL, Malone, PM, Kolesar, JM, Rotschafer JC & Dipiro, JT (2016). *Pharmacotherapy Principles & Practice*. The Mc-Graw-Hill Companies: United States.
- Ministry of Health of the Republic of Indonesia. (2006). *Guidelines for the Implementation and Procedures of Indonesian Hospital Medical Records, Revision II*. Jakarta: Ministry of Health of the Republic of Indonesia.
- Dewi, S., Elvira, SD & Budiman, R. (2013). Overview of the Life Needs of People with Schizophrenia. *J Indon Med Assoc*, 63(3): 84-90.
- Dipiro, J.T., Talbert, R.L., Yee, G.C., Matzke, G.R., Wells, B.G. & Posey LM (2008). *Pharmacotherapy a Pathophysiology Approach Seventh Edition*. Vol. 53. The Mc-Graw-Hill: United States.
- Dipiro, J.T., Wells, B.G., Schwinghammer, T.L., & Dipiro, CV (2015). *Pharmacotherapy Handbook Ninth Edition-Section 13*. The Mc-Graw-Hill Education: United States.
- Elvira, SD & Hadisukanto, G. (2017). *Textbook of Psychiatry, 3rd Edition*. Jakarta: Publishing Board of the Faculty of Medicine, University of Indonesia.
- Galletly, C., Castle, D., Dark, F., Humberstone, V., Jablensky, A., Killackey, E., Kulkarni, J., McGorry, P., Nielssen, O. & Tran, N. (2017). Royal Australian and New Zealand College of Psychiatrists Clinical Practice Guidelines for the Management of Schizophrenia and Related Disorders. *Australian and New Zealand Journal of Psychiatry*, 51(3):289–90.
- Griffin, C.E., Kaye, FraA.M., Bueno, F.R. & Kaye, A.D. (2013). Benzodiazepine Pharmacology and Central Nervous System-Mediated Effects. *Ochsner Journal*, 13(2):214–23.
- Ikawati, Z. (2014). *Pharmacotherapy of Central Nervous System Diseases*. Yogyakarta: Bursa Ilmu. Ministry
- Ministry of Health of the Republic of Indonesia. (2017). *Technical Guidelines for Evaluation of Drug Use in Health Facilities*. Jakarta: Ministry of Health of the Republic of Indonesia.
- Kulkarni D., N, KB, Sahu, SK & G, RK (2016). Drug Utilization 90%: An Innovative Method in Assessing Quality of Drug Prescription with Specific Reference to Non-Steroidal Anti-Inflammatory Drugs Prescription. *International Journal of Basic and Clinical Pharmacology*,

- 5(5):1746–51.
- Li, R., Ma, X., Wang, G., Yang, J. & Wang C. (2017). Why Sex Differences in Schizophrenia. *Physiology & Behavior*, 176(5):139–48.
- Litama, K., Robiyanto, & Susanti, R. (2019). Characteristics of Psychiatric Drug Therapy Classes in Adolescent Patients at Sungai Bangkong Regional Mental Hospital, Pontianak, 2018-2019. *International Applied Biology*, 3(1): 81-87.
- Nababan ED, Kamariyah, Yuliana. (2023). Overview of Family Support for Mentally Ill Patients at the Mental Health Polyclinic of Jambi Province Mental Hospital. *Pinang Masak Nursing Journal*, 2:23–37.
- NIPH (Norwegian Institute of Public Health). (2022). Guidelines for ATC classification and DDD assignment 2023. Oslo Norway: Norwegian Institute of Public Health.
- Nofriyanto, A. (2019). The Relationship between Psychological Characteristics of Gender and the Frequency of Relapse in Schizophrenia Patients at the Grhasia Mental Hospital Polyclinic in Yogyakarta. *'Aisyiyah University*, 2(1):1–11.
- Nuryati. (2017). *Medical Records and Health Information Teaching Materials*. Jakarta: Ministry of Health of the Republic of Indonesia.
- Presidential Regulation of the Republic of Indonesia. (2018). Presidential Regulation of the Republic of Indonesia Number 82 of 2018 Concerning National Health Insurance. Jakarta: Presidential Regulation of the Republic of Indonesia.
- Pratiwi, Y., Asro, IK, Wildayanti, Pratitis, MP, Rahmawaty, A. & Tunggadewi, AP (2024). Evaluation of the Use and Cost of Oral Antidiabetic Drugs in the Referral Program Using the ATC/DDD & DU 90% Method at Sana Farma Pharmacy, Kudus Regency. *Cendekia Journal of Pharmacy*, 8(2):145–61.
- Purwandityo, AG, Febrianti, Y., Sari, CP, Ningrum, VDA & Sugiyarto, OP (2018). The Effect of Antipsychotics on Reducing the Score of the Positive and Negative Syndrome Scale-Excited Component. *Indonesian Journal of Clinical Pharmacy*, 7(1):19–29.
- Basic Health Research. (2018). National Report on RISKESDAS 2018. Jakarta: Health Research and Development Agency, Ministry of the Republic of Indonesia.
- Stockley. (2009). Stockley's Drug Interactions.” *Analytical Biochemistry*, 11(1):1–5.
- Aditya, M. & Yoedistira, CD (2021). The Effect of Combination Antipsychotic Therapy on Depression Levels in Schizophrenia Patients at the Talun Community Health Center, Blitar Regency.” *Sainsbertek Scientific Journal of Science & Technology* 2(1):201–7.
- Law of the Republic of Indonesia. (2009). Law of the Republic of Indonesia Number 36 of 2009 concerning Health. Jakarta: Law of the Republic of Indonesia.
- Law of the Republic of Indonesia. (2014). Law of the Republic of Indonesia Number 18 of 2014 concerning Mental Health. Jakarta: Law of the Republic of Indonesia.
- Vinkers, CH, Tijdkink, JK, Luykx, JJ & Vis R. (2012). Kiezen Voor de Juiste Benzodiazepine. *Nederlands Tijdschrift Voor Geneeskunde*, 156(35):1–7.
- WHO (World Health Organization). (2024). Guidelines for ATC Classification and DDD Assignment. Oslo: Norwegian Institute of Public Health.
- Yulianty, MD, Cahaya, N. & Srikartika. VM (2017). Study of Antipsychotic Use and Side Effects in Schizophrenia Patients at Sambang Lihum Mental Hospital, South Kalimantan. *Journal of Pharmaceutical & Clinical Sciences*, 3(2):153.
- Zahnia, S. & Sumekar, DW (2016). Epidemiological Study of Schizophrenia. *Majority*, 5(4). 160-166.