

Research Article



## PROFILE OF DRUG RELATED PROBLEMS (DRPS) IN OUTPATIENT HYPERTENSION PATIENTS AT BAYUNG LENCIR PUBLIC HEALTH CENTER IN 2024

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### ABSTRACT

**Background;** Drug-related problems (DRPs) are events associated with drug therapy, whether actual or potential, that may hinder the achievement of intended health outcomes. This study describes the profile of DRPs occurrences among outpatient hypertensive patients at Bayung Lencir Community Health Center in 2024, based on the Pharmaceutical Care Network Europe (PCNE) classification version 9.1.

**Methods:** A non-experimental, cross-sectional design with retrospective data collection was employed, utilizing purposive sampling. The identification and evaluation of DRP incidents were conducted based on the PCNE V9.1 classification.

**Results:** The results show that antihypertensive drug use was predominantly from the Calcium Channel Blocker (CCB) class, particularly amlodipine (86.59%). Among the 82 patients who met the inclusion criteria, 52 experienced DRPs. The primary DRP categories identified were potential suboptimal drug treatment effects (13.89%), untreated indications or symptoms (8.33%), potential adverse drug events (72.22%), and unnecessary drug therapy (4.17%). The incidence of drug-related problems (DRPs) among outpatients with hypertension at the Bayung Lencir Community Health Center remains relatively high, with the most common category being potential adverse drug events.

**Conclusion:** The results of this study highlight the importance of comprehensive evaluation to improve treatment effectiveness and patient safety.

**Keywords:** Community Health Center, drug-related problems, DRPs, PCNE, Hypertension, Outpatient.

## INTRODUCTION

Hypertension is a condition when systolic blood pressure reaches  $\geq 140$  mmHg and/or diastolic blood pressure  $\geq 90$  mmHg. Globally, the prevalence of hypertension in 2015 was estimated to reach 1.13 billion people, with an incidence rate of around 30–45% in the adult population. The increased risk of hypertension is known to occur gradually as a person gets older <sup>1</sup>.

In Indonesia, the incidence of hypertension also shows an increasing trend. Data from the Basic Health Research (Riskesdas) the prevalence of hypertension 25.8% in 2013 to 34.1% in 2018 <sup>1</sup>. At the regional level, the South Sumatra Provincial Health Office informed that in 2023 there will be 2,068,432 cases of hypertension, with the highest incidence percentage in Musi Banyuasin Regency of 6.82% <sup>2</sup>.

Hypertension is one of the health problems that has received a lot of attention and become a priority for treatment, both in Indonesia and in various countries around the world. This is because blood pressure that continues to increase gradually in the long term can increase the risk of cardiovascular, cerebrovascular, and renovascular disorders <sup>3</sup>. This condition often makes hypertensive patients need many drugs to overcome and prevent these complications. The general term for this is polypharmacy. Polypharmacy can increase the possibility of DRPs <sup>4</sup>.

Although polypharmacy is necessary to control symptoms and prevent the condition from worsening, the use of a number of drugs for a long time can increase the risk of DRPs. This is closely related to DRPs, which is an event related to drug therapy, both actual and potential, so that it can affect the success of therapy and the expected patient's health results <sup>5</sup>. DRPs can cause various

impacts, such as therapy failure, the emergence of new side effects, interactions between drugs, the use of excessive doses that are at risk of causing overdose, or doses that are too low so that the therapeutic goals are not achieved <sup>6</sup>.

Research conducted by Amrina *et al.*, (2020) on outpatient hypertension patients at the Tanjung Karang Health Center of Mataram City showed that from 197 patients studied, as many as 149 patients (75,63%) experienced DRPs. The types of DRPs found include ADR (Advance Drug Reactions) (69,59%), drug selection not in accordance with the guidelines (18,12%), untreated indications (3,50%), inappropriate dose frequency of (3,50%), too low drug dose of (2,34%), drug use without indication of (1,75%), and symptoms that do not get therapy of (1,17%).

Hypertensive patients often require long-term therapy and multiple medications to control blood pressure and manage comorbid conditions. The use of multiple drugs may increase the risk of DRPs, including ineffective therapy, untreated indications, adverse drug reactions, and unnecessary drug therapy. These DRPs may affect therapeutic outcomes, patient safety, and treatment effectiveness. Therefore, evaluating DRPs is important to optimize pharmacological therapy and improve the quality of healthcare services.

Although several studies have evaluated DRPs in hypertensive patients, studies conducted in primary healthcare facilities using the PCNE V9.1 classification system are still limited, especially at the community health center level. In addition, no previous study has specifically evaluated the profile of DRPs among outpatient hypertensive patients at Bayung Lencir Community Health Center. Therefore, this

study is important to provide local data regarding DRPs and to support the optimization of antihypertensive therapy in primary healthcare services.

Based on the monthly report of the Bayung Lencir Community Health Center with an average of 146 patients/month, it was found that hypertension ranked first with a rate of 28.4% of 20 non-communicable diseases. Until now, no one has analyzed DRPs in hypertensive patients at the Bayung Lencir Community Health Center. Based on this, researchers are interested in conducting research on "Profile of DRPs in Outpatient Hypertension Patients at the Bayung Lencir Community Health Center".

## METHODS

This research is a non-experimental study using retrospective data with a cross-sectional approach. Data were obtained from medical records of hypertensive patients to identify and describe the profile of DRPs. This research was conducted in the Medical Records section of the Bayung Lencir Community Health Center from January to February 2026. The total number of hypertensive patients in 2024 was 438 patients, and the sample was selected based on inclusion and exclusion criteria. The inclusion criteria included outpatients with primary hypertension, with or without comorbidities, who had complete medical

record data for at least the last 3 months, aged 25–65 years, received at least one antihypertensive medication, and had recorded blood pressure data. The exclusion criteria included pregnant patients, patients with incomplete medical records, and patients who had never received antihypertensive therapy.

The data obtained were analyzed using descriptive quantitative methods. Patient characteristics, including age, gender, blood pressure, and antihypertensive drug use, were analyzed using frequency and percentage distribution. DRPs were analyzed based on the PCNE V9.1 classification, and drug interactions were assessed using the Drugs.com application. This research has received ethical approval from the Ethics Committee of the Ministry of Health, Palembang, with letter number No.01272/KEPK/Adm2/XI/2025.

## RESULTS

### Patient Characteristics

The data in this study was obtained from the medical records of hypertensive patients at the Bayung Lencir Community Health Center during the period of January - December 2024. The determination of the number of samples was carried out using the Slovin formula, resulting in 82 patients who met the inclusion criteria.

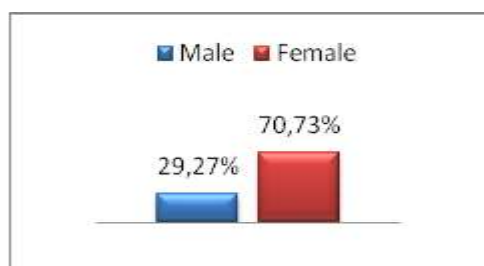


Figure 1. Patient Characteristics Based on Gender

Based on the gender distribution of hypertensive patients at the Bayung Lencir Community Health Center, the majority of patients are female, totaling 58 patients (70.73%). Meanwhile, there are 24 male patients (29.27%).

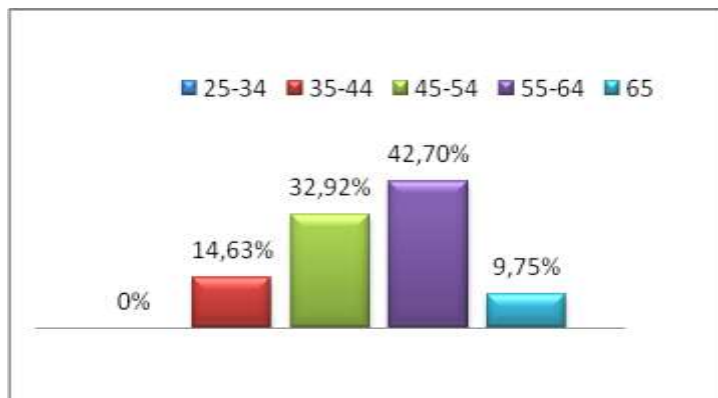


Figure 2. Patient Characteristics Based on Age

Based on the age characteristics of hypertensive patients at the Bayung Lencir Community Health Center, the majority of patients were in the 55–64 age group, totaling 35 patients (42.7%). Next was the 45–54 age group with 27 patients (32.92%), followed by the 35–44 age group with 12 patients (14.63%). There were 8 patients (9.75%) aged 65 years or older, while no patients (0%) were found in the 25–34 age group.

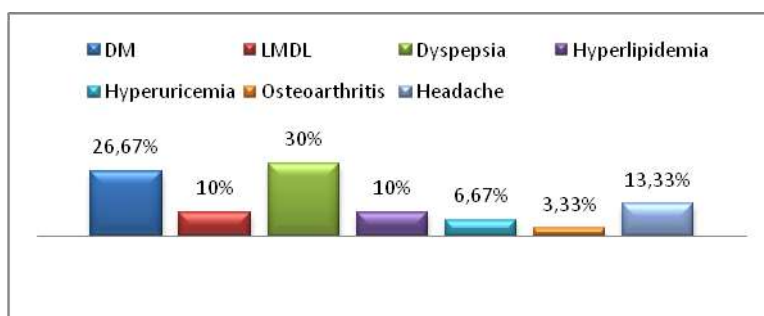


Figure 3. Patient Characteristics Based on Comorbidities

Based on the study results, the most common comorbid condition was dyspepsia, affecting 9 patients (30%). Next, diabetes mellitus was found in 8 patients (26.67%), followed by headaches (dizziness) in 4 patients (13.33%). Lipoprotein metabolism disorders, dyslipidaemia and hyperlipidaemia were each found in 3 patients (10%). In addition, hyperuricaemia was found in 2 patients (6.67%), whilst other

forms of osteoarthritis were the least patient (3.33%).  
common comorbid condition, affecting 1

### Profile of Antihypertensive Therapy

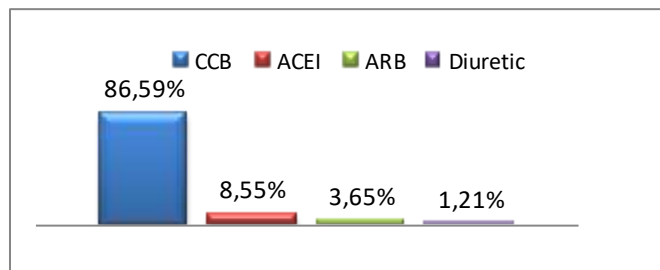


Figure 4. Profile of Antihypertensive Therapy

Based on the results of a study of 82 hypertensive patients at the Bayung Lencir Community Health Centre, a profile of antihypertensive therapy use by drug class was established. Calcium channel blockers (CCBs) were the most commonly used class of medication, prescribed to 77 patients (86.59%). Next, the use of angiotensin

receptor blockers (ARBs) was recorded in 7 patients (8.55%), followed by angiotensin-converting enzyme inhibitors (ACEIs) in 3 patients (3.65%). Meanwhile, diuretics were the least commonly used class of medication, with only 1 patient (1.21%) receiving this treatment.

### Identification of *Drug Related Problems* (DRPs)

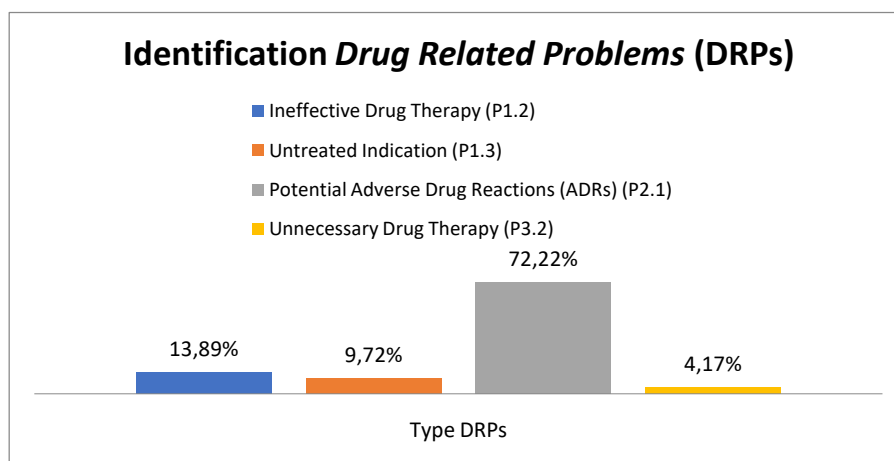


Figure 5. Identification *Drug Related Problems* (DRPs)

Based on the research findings, a total of 72 instances of DRPs were identified among hypertensive patients at the Bayung

Lencir Community Health Centre. The distribution of DRPs showed that the most common category was potentially harmful

medication, accounting for 52 instances (72.22%). Suboptimal therapeutic effects were found in 10 cases (13.89%), whilst untreated symptoms or indications accounted

for 7 cases (9.72%). Unnecessary treatment was the category with the lowest number of cases, totalling 3 cases (4.17%).

### Potential Adverse Drug Reactions (ADRs)

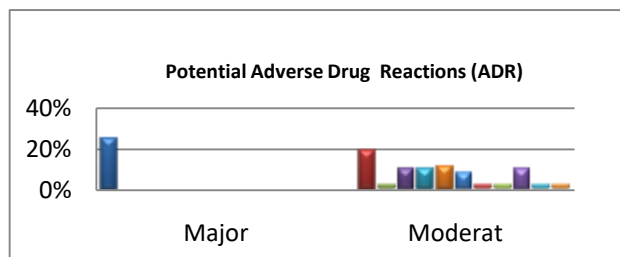


Figure 6. Potential Adverse Drug Reactions (ADRs)

Based on the study results, a total of 52 cases of drug interactions were identified, all of which fell under the category of DRPs. Major drug interactions were found in the amlodipine–simvastatin combination, accounting for 13 cases (25,00%). Meanwhile, moderate-category drug interactions were the most frequently found across various drug combinations. The amlodipine–mefenamic acid combination was the most common, with 10 cases (19,23%), followed by amlodipine–meloxicam with 6 cases (11,54%) amlodipine–diclofenac sodium with 5 cases (9,62%), and amlodipine–ibuprofen and metformin–glimepiride with 5 cases each (9.62%). Additionally, the amlodipine–methylprednisolone combination was found in 4 cases (7.69%). Several other combinations with lower frequencies, each with 1 case (1.92%), included amlodipine–dexamethasone, candesartan–mefenamic acid, furosemide–metformin, methylprednisolone–meloxicam, and

sucralfate–lansoprazole.

## DISCUSSION

### Patient Characteristics

#### Patient Characteristics Based on Gender

Based on the results of the research that has been carried out, from 82 hypertensive patients, the majority are women (70.73%) compared to men (29,27%). This finding be associatehord with monal factors, postmenopausal women have a higher risk because of the decrease in the estrogen hormone which previously functioned to protect the heart by increasing the level of High Density Lipoprotein (HDL)<sup>8:9</sup>.

#### Patient Characteristics Based on Age

Based on the results of the study obtained from the age characteristics diagram, it shows that out of 82 patients showed that hypertension was dominated by

the age group of 55-64 years as many as 35 patients (42.7%). In line with other research at the Dharmarini Temanggung Yogyakarta Health Center, it is stated that the highest cases of hypertension in the age range of 55-64 years are 32 patients (44,44%)<sup>10</sup>. The increased risk of hypertension in old age is related to physiological changes in blood vessels that tend to experience a decrease in elasticity, so that systolic blood pressure increases more easily<sup>11</sup>.

### **Patient Characteristics Based on Comorbidities**

Based on the research results, the characteristics of patients who suffer from hypertension reviewed from comorbid diseases show that dyspepsia is the most comorbid disease, with a percentage of 30%. The cause of the high number of dyspepsia cases is usually due to irregular eating patterns, stress, and the use of certain drugs such as non-steroidal anti-inflammatory drugs (NSAIDs)<sup>12</sup>.

In addition to dyspepsia, diabetes mellitus is also a concomitant disease that is often found in hypertensive patients, with a percentage of 26.67%. This result is in accordance with previous research which states that the incidence of hypertension is more common in diabetes mellitus patients, with a frequency of about 1.5–3 times higher than in individuals who do not suffer from diabetes<sup>13</sup>. This condition occurs because diabetes mellitus causes insulin resistance, hyperinsulinemia, and chronic hyperglycemia, which can lead to endothelial dysfunction and activation of the renin–angiotensin system, thereby triggering increased blood pressure<sup>14</sup>.

Furthermore, hyperlipidemia and lipoprotein metabolism abnormalities are each found at 10%. Dyslipidemia can cause

endothelial dysfunction and decreased baroreflex sensitivity, thereby increasing blood pressure regulation mechanisms<sup>15</sup>. This condition is characterized by decreased nitric oxide (NO) production and increased vasoconstrictor substances such as angiotensin II and endothelin, which lead to increased vascular tone and peripheral resistance<sup>16</sup>.

Headache (dizziness) is found in 13.33% of patients and is a common symptom, especially when blood pressure is not well controlled. Hyperuricemia is also found in 6.67% of patients. This finding is in accordance with previous research which shows that the risk of hypertension can increase up to 8 times in patients with hyperuricemia<sup>18</sup>.

Hyperuricemia was found in 6.67% of patients and is associated with an increased risk of hypertension<sup>17</sup>. This condition occurs due to increased uric acid production or decreased excretion, which can reduce nitric oxide (NO) production, increase reactive oxygen species (ROS), and trigger vascular inflammation, leading to increased peripheral vascular resistance and elevated blood pressure<sup>19</sup>. In addition, arthritis is found in 3.33% of patients, especially in the elderly, where decreased blood flow due to hypertension can reduce nutrient supply to cartilage and cause joint damage<sup>20</sup>.

### **Profile of Antihypertensive Therapy**

Based on the research results, the profile of antihypertensive therapy at Bayung Lencir Community Health Center shows that amlodipine from the Calcium Channel Blockers (CCB) group is the most widely used drug, with a percentage of 86.59%. This result is in line with research conducted by Puspitasari *et al.*, (2022), which shows that amlodipine is the most dominant

antihypertensive drug compared to other groups, with a percentage of 47.42%. Amlodipine, as a dihydropyridine group that is vasculoselective, works by relaxing arterioles. It has a long half-life and a slow absorption process, which helps maintain blood pressure stability and reduce the risk of a sudden decrease in blood pressure<sup>21</sup>. In addition, amlodipine is relatively safe to be used in combination with other drugs, especially in hypertensive patients with comorbid diseases<sup>4</sup>.

### Identification Drug Related Problems (DRPs)

#### Ineffective Drug Therapy (P1.2)

According to the Pharmaceutical Care Network Europe (PCNE V9.1) classification, non-optimal drug therapy effects occur when the therapy given has not achieved the expected clinical outcomes despite being administered according to indications<sup>5</sup>. Based on the research results from patient medical records, 10 events (13.89%) of DRPs in this category were identified. This condition can reduce patient quality of life and increase the risk of morbidity and mortality<sup>22</sup>. Non-optimal drug therapy effects are also significantly associated with failure to achieve target blood pressure, which may worsen the patient's condition<sup>23</sup>.

Based on data in Appendix 2, all patients experiencing non-optimal therapy effects used amlodipine at doses of 5–10 mg/day. Most patients had received the maximum dose of 10 mg/day; however, after one month of treatment, the target blood pressure was not achieved. For example, patient An (159/96 to 189/83 mmHg) and Hr (140/90 to 156/105 mmHg), indicating that the therapy was not effective in controlling blood pressure. This finding is consistent

with research Wildan *et al*, (2025), which shows that not all hypertensive patients achieve target blood pressure despite receiving antihypertensive therapy.

In addition, the use of monotherapy such as amlodipine does not always provide optimal results in some patients, so evaluation of therapy and consideration of combination treatment are necessary. Besides drug-related factors, patient non-compliance is also a crucial variable contributing to uncontrolled blood pressure<sup>25</sup>. Therefore, periodic evaluation through dose adjustment or optimization of drug combinations is important to ensure the effectiveness of therapy and successful clinical outcomes.

#### Untreated Indication (P1.3)

In addition to therapy effectiveness, 7 incidents (9.72%) were found in the form of indications without medication, especially in cases of inguinal hernia, headache, and dyspepsia. Indication without drugs is a clinical condition where patients require drug therapy for new symptoms, chronic diseases, or risk prevention but have not received the necessary treatment (Cipolle, 2014 in Tuloli, *et al* 2021)

Inguinal hernia occurs due to weakness in the transversal fascia accompanied by increased intra-abdominal pressure. Hypertension is often found as a comorbid condition in these patients. Management generally involves operative treatment and non-pharmacological therapy, including patient education to avoid activities that increase intra-abdominal pressure<sup>27</sup>.

Headaches in hypertensive patients can occur due to blood vessel damage caused by increased blood pressure, which affects the vascular system. Changes in small arteries and arterioles can cause narrowing or

blockage of blood vessels, leading to impaired blood flow<sup>28</sup>. This condition reduces oxygen supply and increases carbon dioxide levels, triggering anaerobic metabolism and lactic acid accumulation that increases pain sensitivity<sup>29</sup>. In therapy, paracetamol is preferred over NSAIDs because NSAIDs can cause sodium and water retention, increasing blood volume and potentially worsening hypertension<sup>28</sup>.

Dyspepsia can be triggered by stress, which increases gastric acid production and irritates the gastric mucosa<sup>30</sup>. It is also associated with the use of NSAIDs, which have irritating effects on the gastric mucosa<sup>28</sup>. Recommended therapies include Proton Pump Inhibitors (PPIs) such as omeprazole and lansoprazole, as well as H2 blockers such as cimetidine and ranitidine<sup>31</sup>. Indications without therapy in hypertensive patients indicate the need for comprehensive evaluation so that each clinical condition can be managed appropriately according to patient needs.

### **Potential Adverse Drug Reactions (ADRs) (P2.1)**

The most dominant DRPs category found was the potential adverse drug reactions caused by drug interactions, with 52 cases (72.22%). Assessment of interaction severity (major, moderate, minor) is important to balance the risks and benefits of therapy<sup>4</sup>. The major interaction most frequently found was between amlodipine and simvastatin, which may increase simvastatin levels through CYP3A4 inhibition and raise the risk of myopathy<sup>32,33</sup>. Management includes using a low dose, limiting simvastatin to a maximum of 20 mg/day, or replacing it with another statin if the therapeutic target is not achieved (Stockley, 2008 in Amrina *et al* 2020).

In addition, a moderate interaction between amlodipine and mefenamic acid was found (25,00%), which has the potential to trigger hyperglycemia<sup>34</sup>. Moderate interactions were also found between amlodipine and NSAIDs such as mefenamic acid, diclofenac sodium, and ibuprofen, which may reduce the antihypertensive effect of amlodipine through sodium and water retention mechanisms<sup>30</sup>. The adverse effects identified in this study are potential due to the use of retrospective data, so the actual clinical effects cannot be directly assessed.

### **Unnecessary Drug Therapy (P3.2)**

In addition to drug interactions, 3 incidents (4.17%) of drug use without a clear indication were also found. One of the main findings involves the use of gastric acid-suppressing drugs such as ranitidine and omeprazole in patients without gastrointestinal complaints, such as dyspepsia, gastritis, or GERD. The use of these drugs without proper indications does not provide therapeutic benefits and may increase polypharmacy and treatment costs<sup>35</sup>.

In addition, methylprednisolone was used without a clear indication such as severe allergies or autoimmune diseases, making it irrational and increasing the risk of metabolic and systemic side effects<sup>36</sup>. Methylprednisolone can interact with amlodipine through a pharmacodynamic mechanism, especially with use longer than one week, which may cause sodium and water retention and affect CYP3A4 enzyme activity involved in drug metabolism<sup>34</sup>. For better therapeutic outcomes, drugs without strong medical indications such as methylprednisolone should be discontinued and replaced with safer alternatives such as paracetamol<sup>38</sup>. This is in accordance with

the principle of rational therapy, which considers long-term risks in hypertensive patients, including sodium retention and iatrogenic hypertension<sup>39; 37</sup>.

## CONCLUSION

Based on the results of a study on 82 patients, it was found that 52 patients (63,41%) experienced DRPs while 30 patients (36.58%) had no DRPs identified. The profile of the use of antihypertensive drugs in outpatients at the Bayung Lencir Health Center in 2024, shows that the most widely used drug group is CCB, especially amlodipine (86,59%), followed by ARB group (8,55%), ACEI (3,65%), and Diuretics (1,21%). Meanwhile, the occurrence profile of DRPs in outpatient hypertension patients at the Bayung Lencir Community Health Center is dominated by the category of the Ineffective Drug Therapy (13.89%), Untreated Indication (8.33%), Potential Adverse Drug Reactions (ADRs) (72,22%), and Unnecessary Drug Therapy (4.17%).

The high incidence of DRP among hypertensive patients at the Bayung Lencir Community Health Center underscores the importance of strengthening the role of pharmacists in therapy monitoring. Interventions such as medication reviews, patient education, and interprofessional collaboration are essential for minimizing treatment risks and optimizing treatment outcomes.

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