International Journal Of Health, Engineering And Technology (IJHET) E-ISSN 2829 - 8683
Volume 4, Number 6, March 2026, Page. 2700 - 2709
Email : editorijhess@gmail.com

Analysis Of Complication Treatment Design In Hepatitis B Patients In The Outpatient Facility Of Dr. Moewari Hospital, Surakarta

Afnisyah Nurcahyati[1)], Kharisma Jayak Pratama[2)], Niken Luthfiyanti[3)]
[1,2,3)] Universitas Duta Bangsa

*Corresponding Author
Email : afnisyahicha@gmail.com

Abstract

Hepatitis is an inflammation of the liver that is generally caused by a viral infection. There are five hepatitis viruses, namely Hepatitis A Virus (HAV), Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Hepatitis D Virus (HDV) and Hepatitis E Virus (HEV). Hepatitis B is a liver disease caused by the hepatitis B virus (HBV). HBV can cause acute or chronic liver inflammation, in a small number of cases it can progress to liver cirrhosis or liver cancer (Andriani et al., 2020). This study aims to determine the patient profile and use of hepatitis B drugs and evaluate Hepatitis B treatment in patients at the Outpatient Installation of Dr. Moewardi Regional Hospital using a non-experimental descriptive observational method with retrospective quantitative data collection. The results of the study showed that of the 99 hepatitis B patients, the majority were male (67.68%) and aged >55 years (46.5%). Most patients received antiviral therapy (60.61%), with tenofovir being the most commonly used drug (78.78%), followed by entecavir (17.17%). Evaluation of treatment suitability showed that all doses and frequencies of antiviral and hepatoprotective therapy administered were in accordance with national guidelines and MIMS references (100% compliance). Curcuma was the most frequently used hepatoprotective agent (64.64%). This indicates that the use of hepatitis B medications at Dr. Moewardi Regional Hospital is in accordance with applicable therapy standards. Based on a study of 99 hepatitis B patients, most patients received antiviral and supportive therapy according to guidelines. The use of medications, both antiviral and hepatoprotective, was appropriate in type, dose, and frequency. Patient management demonstrated rational and clinically appropriate therapy.

Keywords: Analys, Complication, Hepatitis B.

INTRODUCTION

Gestational hypertension is a common pregnancy complication and a leading cause of maternal and fetal morbidity and mortality in Indonesia. The global prevalence of hypertension in pregnancy is 5-10%, According to data from the Indonesian Health Survey (Ministry of Health, 2023), gestational hypertension reached 1,066 cases and ranked as the second leading cause of maternal death. Central Java contributed the fifth highest number of maternal deaths due to hypertension (4.2%) among 34 provinces, with the prevalence of maternal deaths among pregnant women reaching 9,571 cases. with the highest rate in West Java at 10.57%. In Kudus Regency, Central Java, 11 maternal deaths were recorded in 2023, of which 2 were due to hypertension. The Ngembal Kulon Community Health Center ranked sixth with 20% of preeclampsia cases out of the total childbirth complications.

In the second trimester, maternal blood pressure normally reaches its lowest point (systolic 100-110 mmHg, diastolic 60-70 mmHg) due to peripheral vasodilation. However, an increase after 20 weeks of gestation can indicate gestational hypertension. This phenomenon is increasingly worrying because it is associated with the risk of preterm birth, cesarean section, and perinatal death, as reported by the WHO in 2020 with a global prevalence of 0.51-38.4%. [Khedagi & Bello, 2021]

Although age and weight are known to influence gestational hypertension, early monitoring at the community health center level is still suboptimal, resulting in late detection. Pregnant women aged <20 or >35 years have a four-fold higher risk of developing hypertension compared to the ideal age of 20-35 years, while obesity (BMI ≥25 kg/m²) increases the risk through increased Mean Arterial Pressure (MAP). In areas such as the Ngembal Kulon Community Health Center, preliminary studies show that 3 out of 5 pregnant women experience hypertension in the second trimester, indicating a local problem that needs to be addressed.

The problem is further complicated by the fact that excess weight gain in the second trimester is positively correlated with gestational hypertension, with an OR of up to 28 for those at risk. [Bunga et al., 2023] This factor is exacerbated by low awareness of routine ANC and poor nutritional status, which leads to complications such as preeclampsia in Central Java. [Pratiwi, 2022] Therefore, regular age and BMI screening is needed to prevent risk escalation.

This study aims to analyze the relationship between age and weight with gestational hypertension in second-trimester pregnant women at the Ngembal Kulon Community Health Center using a case-control design. The urgency lies in reducing maternal mortality due to hypertension, which ranks second nationally (1,066 cases in 2023), as well as supporting primary ANC education. [Kudus District Health Office, 2023] The novelty of this study is its focus on the specific location of the Ngembal Kulon Community Health Center in 2026 with a total sampling of 60 second-trimester respondents, which has not been previously published, thus providing the latest data for local interventions.

RESEARCH METHODS

Research Design

This study used a descriptive, non-experimental observational method with retrospective quantitative data collection regarding the Evaluation of the Rationality of Hepatitis B Medication Use in hepatitis B patients at Dr. Moewardi Hospital from January to June 2025. This study was conducted through electronic medical records of hepatitis B patients at Dr. Moewardi Hospital.

Sampling Technique

The data collection technique used in this study was purposive sampling, a sampling technique based on specific considerations or criteria. In this study, data collected were those that met the inclusion and exclusion criteria.

Research Variables

According to research conducted by Naution (2017), variables are divided into two categories based on their role: dependent variables and independent variables. A dependent variable is a variable that is influenced by one or more other variables. An independent variable is a variable that influences another variable. In this study, the researcher classified the research variables into two categories:

1. Independent Variable
An independent variable is a variable that influences another variable, namely the treatment given to hepatitis B patients, such as the type of antiviral medication and dosage.
2. Dependent Variable
A dependent variable is a variable influenced by the independent variable. In this study, the dependent variable is the evaluation of Hepatitis B treatment outcomes.

RESULTS AND DISCUSSION

Based on patient characteristics

A retrospective study of medical records of Hepatitis B patients at the Outpatient Unit of Dr. Moewardi Regional Hospital between January and June 2025 yielded a population of 8,431 Hepatitis B patients. The population was then processed using the Slovin formula with a 10% error rate, resulting in 99 patients as a sample and meeting the inclusion criteria. The results of the study revealed gender, age, treatment profile, other drug therapies, and cirrhosis.

Table 4.1 shows that the number of male Hepatitis B patients was higher than female: 67 (67.68%) male patients and 32 (32.32%) female patients. This indicates that Hepatitis B cases in this study were more common in men than women. These results align with previous studies in Indonesia

that reported differences in Hepatitis B distribution by gender, with a higher proportion in men (Ventiani et al., 2012).

Research conducted by Ventiani et al. (2012) on blood donors at the Indonesian Red Cross (PMI) Padang Branch showed that HBsAg-positive cases were more prevalent in male donors than in female donors. This suggests that men are more likely to be exposed to the Hepatitis B virus, especially in populations at risk of blood contact. These findings are also supported by research conducted by Triana et al. (2023) at the PMI Blood Transfusion Unit in Bengkulu City. The study reported that the majority of Hepatitis B patients were male (84%), compared with only 16% of females. These findings reinforce the findings of current research that men are a more dominant group in Hepatitis B cases. The predominance of Hepatitis B cases in men may be influenced by various factors, including differences in behavior and risk exposure. Several studies in Indonesia have shown that men tend to be more frequently involved in activities that potentially increase the risk of Hepatitis B virus transmission, such as blood exposure, certain work activities, and other risky behaviors, thus increasing the chance of infection (Triana et al., 2023).

In addition to behavioral factors, differences in case distribution by gender are also related to patterns of health service utilization. Women generally undergo more regular health check-ups, including check-ups during pregnancy, which allows for earlier detection of Hepatitis B infection. Conversely, men tend to undergo health check-ups when the condition is more advanced, resulting in more Hepatitis B cases being identified in men (Ministry of Health of the Republic of Indonesia, 2020). Several domestic studies have also shown that treatment success depends on clinical factors and patient characteristics, such as gender, patient compliance with medication, and the stage of the disease at initial diagnosis. Men who present with more severe disease typically have higher baseline HBV DNA levels, requiring longer treatment to achieve optimal viral control (Pratama & Yuliana, 2022). This could be one reason why the higher number of cases is found in men.

Furthermore, pharmacokinetically, drug metabolism in the liver can be disrupted by liver cell function. In patients with fibrosis or cirrhosis, drug distribution and elimination may be altered, although tenofovir and entecavir are still considered relatively safe and have a low risk of resistance. Observational studies in Indonesian referral hospitals have shown that long-term antiviral treatment in chronic hepatitis B patients can significantly reduce the risk of developing cirrhosis and hepatocellular carcinoma, provided it is administered appropriately and controlled (Hidayat et al., 2023).

Therefore, pharmacologically, the high rate of Hepatitis B cases in men is not only due to risk exposure but also to patterns of delayed diagnosis, higher initial viral levels, and the need for long-term treatment to achieve effective viral control. Therefore, appropriate antiviral treatment regimens, regular monitoring of HBV DNA levels, and adherence to treatment are crucial for controlling Hepatitis B in Indonesia. The high number of male hepatitis B cases in this study can be understood as the result of a combination of behavioral factors, risk exposure, and differences in healthcare utilization. This is consistent with various local studies in Indonesia and suggests that gender is an important characteristic to consider in hepatitis B prevention and control efforts.

Based on patient age

The age characteristics of hepatitis B patients are grouped into several age ranges: 15–24 years, 25–34 years, 35–44 years, 45–54 years, and >55 years. Based on the analysis, the >55 age group represents the group with the largest number of patients. This indicates that hepatitis B infections are more frequently identified in individuals from late adulthood to the elderly. This condition is related to the nature of hepatitis B as a chronic infectious disease that can persist for long periods without clear symptoms, so diagnosis is often only made at an older age (Ministry of Health of the Republic of Indonesia, 2018).

The Ministry of Health of the Republic of Indonesia states that the course of chronic hepatitis B can progress with age and has the potential to cause serious complications, such as liver cirrhosis and hepatocellular carcinoma (Ministry of Health of the Republic of Indonesia, 2020). Furthermore,

with advancing age, there is a physiological decline in immune system function, which reduces the body's ability to control viral replication and increases the risk of disease worsening (Nugroho & Handayani, 2021). The 45–54 age group also represented a significant proportion in this study. This may be attributed to the late productive age phase, where individuals have experienced long-term exposure to hepatitis B risk factors, such as invasive medical procedures, a history of blood transfusions, and exposure before the national hepatitis B immunization program was implemented in Indonesia (Sari et al., 2019). In contrast, the number of patients in the 15–24 and 25–34 age groups was relatively lower. The low incidence of hepatitis B in this age group is thought to be related to the successful implementation of the hepatitis B immunization program starting from infancy, which significantly contributed to the decline in hepatitis B infection rates in young people (Ministry of Health of the Republic of Indonesia, 2018).

These results align with previous research by Sari et al. (2019) and Nugroho & Handayani (2021), which reported that the majority of chronic hepatitis B patients in Indonesia are aged over 50. This confirms that age plays an important role in the incidence and progression of hepatitis B, particularly in relation to the duration of infection and decreased immunity.

Treatment profile

The study results showed that of the 99 patients, the majority received antiviral therapy, with tenofovir being the most commonly used drug, in 79 patients (78.78%). Furthermore, entecavir was used by 18 patients (17.17%), while 2 patients (2.02%) did not receive antiviral therapy. This indicates that the majority of chronic hepatitis B patients in the study received antiviral treatment as medically indicated. The predominant use of tenofovir may be attributed to its ability to effectively suppress hepatitis B virus replication and its favorable safety profile for long-term use. Tenofovir belongs to the nucleos(t)ide analog group, which is recommended as first-line therapy due to its low resistance barrier. Previous research reported that tenofovir use in chronic hepatitis B patients significantly reduced HBV DNA levels and improved liver function (Putri et al., 2020).

Entecavir is also widely used as an alternative antiviral therapy. This drug is highly effective in suppressing viral replication and is generally well tolerated by patients. Research conducted by Sari and Handayani (2019) showed that entecavir therapy provided a good virological response, especially in patients who had never received prior antiviral treatment.

The choice between tenofovir and entecavir is usually tailored to the patient's clinical condition, such as kidney function and the presence of comorbidities. A small percentage of patients did not receive antiviral therapy. This could be due to several factors, including the patient being in the inactive phase, having low HBV DNA levels, or not yet meeting the criteria for antiviral therapy. National guidelines state that not all chronic hepatitis B patients require immediate antiviral therapy and that some may require regular monitoring (Ministry of Health of the Republic of Indonesia, 2017). In addition to antiviral therapy, many patients also received hepatoprotective therapy as supportive therapy. Based on research data, Curcuma Force was the most frequently used hepatoprotective agent, in 64 patients (64.64%). Meanwhile, vitamin E was used by 5 patients (5.05%) and UDCA by 2 patients (2.02%). Hepatoprotective therapy aims to help maintain and improve liver function due to chronic inflammation. Curcuma contains curcumin, which has anti-inflammatory and antioxidant activities. Several studies have reported that curcuma can help lower liver enzyme levels and improve the clinical condition of patients with impaired liver function (Rahmawati et al., 2018). This may explain the high use of Curcuma Force as supportive therapy in patients in this study. The relatively low use of UDCA is likely related to its more specific clinical indications, particularly in patients with bile flow disorders or cholestasis. UDCA is known to increase bile flow and provide protective effects on liver cells (Pratama et al., 2021).

Meanwhile, vitamin E is used as an antioxidant to help reduce oxidative stress, although its role is adjunctive and not primary therapy. Nineteen patients (19.19%) did not receive hepatoprotective therapy. This may be due to the patients' relatively stable clinical condition or the focus of treatment being more directed toward antiviral therapy. Overall, the results of this study

indicate that the pattern of use of antiviral and hepatoprotective therapy has been adjusted to the patient's clinical condition and applicable management practices.

In addition to antiviral and hepatoprotective therapy, some patients also received supportive therapy: 32 patients (32.32%) received vitamin B complex, 11 patients (11.11%) received vitamin D, 1 patient (1.01%) received vitamin K, 12 patients (12.12%) received iron tablets, 6 patients received calcium, and 37 patients (37.37%) did not receive supportive therapy. Vitamin B complex was the most commonly used form of additional therapy in this study. Vitamin B complex administration is used to support energy metabolism, nervous system function, and red blood cell formation, which are often affected in patients with chronic liver disease. Metabolic problems and peripheral neuropathy are common complaints faced by patients with chronic hepatitis B, especially those with long-term disease and undergoing multidrug therapy (Sari and Handayani, 2021). Research conducted in Indonesia shows that vitamin B complex supplementation can help restore neuropathy and improve the quality of life in patients with chronic diseases, including liver disease (Putra et al., 2020).

Vitamin D was administered to 11.11% of patients as adjunct therapy. Vitamin D deficiency is common in patients with chronic liver disease due to impaired liver metabolism and lack of sunlight exposure. Vitamin D is known to play a role in regulating the immune system and calcium balance. Several local studies have reported that low vitamin D levels are associated with liver disease severity, although they do not directly affect hepatitis B virus replication (Rahmawati et al., 2022). Therefore, vitamin D supplementation is given to support patients' metabolic and immune systems.

Vitamin K is only used in a small number of patients. Vitamin K administration is related to its function in the blood clotting process. In chronic liver disease, the synthesis of blood clotting factors can be disrupted, increasing the risk of bleeding. Vitamin K can help improve clotting problems, especially in patients with cholestasis or impaired fat absorption (Sihombing and Lestari, 2019). The low use of vitamin K in this study suggests that not all patients experience clotting problems that require supplementation.

Fe tablets were used by 12.12% of patients as adjunct therapy to treat anemia. Anemia is common in hepatitis B patients due to chronic inflammation, nutritional deficiencies, or gastrointestinal bleeding. Previous research at a referral hospital in Indonesia showed that iron supplementation can increase hemoglobin levels in patients with chronic liver disease with iron deficiency anemia (Wulandari et al., 2020). However, iron administration requires caution and supervision, as excess iron can worsen liver damage.

Calcium ($CaCO_3$/Caco) was administered to 6.06% of patients. Calcium supplementation aims to prevent bone metabolism disorders that can occur in patients with chronic liver disease, especially those with vitamin D deficiency or long-term medication use. Bone density problems are reported to be more common in patients with chronic liver disease compared to the general population (Yuliana et al., 2021).

Overall, supportive therapy for hepatitis B patients in this study served as an adjunct therapy aimed at improving the patient's general condition, nutritional status, and quality of life. The relationship between supportive therapy and hepatitis B was indirect, namely through the management of complications and other conditions arising from chronic liver disease, rather than as therapy to inhibit viral replication (Andriani et al., 2020).

The high use of hepatoprotective agents and supportive therapy indicates that healthcare professionals are focusing not only on virological parameters but also on the functional and metabolic aspects of patients. Impaired liver function, oxidative stress, vitamin deficiencies, and anemia are common problems associated with chronic hepatitis B and can worsen the patient's condition if left untreated. Therefore, providing additional therapies such as Curcuma, vitamins, minerals, and other supplements is crucial to aid the healing process and prevent clinical deterioration.

Overall, the results of this study demonstrate that chronic hepatitis B management has been implemented in a rational and patient-centered manner. These findings are expected to serve as a basis for evaluating and improving clinical services, as well as serve as a reference for future research

International Journal Of Health, Engineering And Technology (IJHET) E-ISSN 2829 - 8683
Volume 4, Number 6, March 2026, Page. 2700 - 2709
Email : editorijhess@gmail.com

assessing the relationship between therapy patterns and long-term clinical outcomes in chronic hepatitis B patients.

Other drug therapies

Medication use in hepatitis B patients is not limited to antiviral therapy but also includes various other medications used to manage comorbidities and clinical complications associated with the disease. This indicates that hepatitis B patients generally require comprehensive management that does not solely focus on controlling viral replication.

Amlodipine was the most commonly used antihypertensive drug (32.32%), followed by candesartan (18.18%) and propranolol (16.00%). The high use of antihypertensives indicates that hypertension is a common comorbidity in hepatitis B patients. In addition to being a comorbidity, hypertension can also be associated with hemodynamic changes in chronic liver disease. Propranolol use is indirectly related to hepatitis B because this drug is often prescribed to patients with portal hypertension complications, particularly as prophylaxis for variceal bleeding. Some patients (9.09%) did not receive antihypertensive therapy due to the lack of clinical indications.

Among diuretics, spironolactone was the most commonly used drug (31.31%), while furosemide was used in 12.12% of patients. These diuretics are primarily used to treat complications of chronic liver disease such as ascites and fluid retention. However, more than half of patients (56.56%) did not receive diuretic therapy, indicating that not all hepatitis B patients experience complications requiring these medications.

Gastrointestinal medication use was quite high, with omeprazole (34.34%) and lansoprazole (29.29%) being the most frequently prescribed medications. Sucralfate and domperidone were also used according to patient clinical complaints. The high use of gastrointestinal medications reflects the presence of gastrointestinal complaints or the need for gastric protection, particularly in patients undergoing long-term therapy and polypharmacy. The administration of this class of medications is not directly related to hepatitis B virus infection but rather to the clinical condition and concomitant therapies used. A total of 33.33% of patients did not receive gastrointestinal medications due to a lack of clinical indications.

Among antidiabetic and dyslipidemia medications, metformin was the most commonly used drug (15.15%), followed by atorvastatin (12.12%) and simvastatin (6.06%). This suggests that some hepatitis B patients also experience metabolic disorders such as diabetes mellitus and dyslipidemia. However, the majority of patients (60.60%) did not receive therapy in this class because they lacked clinical indications for metabolic disorders. Meanwhile, among neuropathy and pain medications, gabapentin was the most frequently used drug (10.10%), followed by celecoxib (8.08%), amitriptyline, and pregabalin. The use of these medications was associated with chronic pain or neuropathy in a small proportion of patients. The majority of patients (74.74%) did not receive therapy for neuropathy and pain because they did not experience these complaints. Overall, the use of non-antiviral medications in hepatitis B patients is indirectly related to hepatitis B disease, namely through comorbidities and clinical complications accompanying chronic hepatitis B infection. Therefore, the management of hepatitis B patients needs to be carried out comprehensively by considering the patient's clinical condition, not only focusing on antiviral therapy, but also on the management of comorbidities and existing complications.

Characteristics of liver cirrhosis patients based on diagnosis

Research has shown that comorbidities found in hepatitis B patients include portal hypertension, esophageal varices, and ascites. Portal hypertension was the most common comorbidity, occurring in nine patients (9.09%). This condition indicates that some hepatitis B patients already experience hemodynamic disturbances due to chronic liver structural damage.

Portal hypertension occurs due to increased portal blood flow resistance caused by liver structural changes such as fibrosis and cirrhosis. Normal portal venous pressure ranges from 5–10 mmHg, while portal hypertension is defined as a persistent increase in portal venous pressure of ≥12–

15 mmHg. This increased pressure is a common complication of chronic liver disease, including chronic hepatitis B (Kusumobroto, 2004).

Ascites was found in two patients (2.02%). Ascites is an abnormal accumulation of fluid in the peritoneal cavity resulting from decreased liver function. When liver function declines, salt and water retention and a decrease in plasma oncotic pressure occur, allowing fluid to easily shift into the abdominal cavity. This condition causes abdominal enlargement, discomfort, and weight gain in patients (Stiphany et al., 2011).

The results of this study align with research conducted by Stiphany et al. (2011) on inpatients at Dr. R.D. Pirngadi Regional Hospital, Medan, which stated that ascites was the most common comorbidity associated with liver cirrhosis. This study explained that ascites occurs as a result of fluid accumulation in the abdominal cavity, influenced by decreased liver function and increased portal pressure.

Esophageal varices were found in four patients, representing a percentage of 4.04%. Esophageal varices are a late complication of portal hypertension. In liver cirrhosis, scar tissue obstructs portal blood flow, increasing pressure in the portal vein. As a result, blood flow is diverted to collateral veins, including veins in the distal esophagus, leading to venous dilation or esophageal varices (Stiphany et al., 2011).

Based on previous research, the comorbidities found in hepatitis B patients in this study were similar to complications often found in liver cirrhosis, albeit at a lower rate. This is likely due to differences in patient characteristics, disease stage, and limitations in recording diagnoses in medical records.

Distribution Based on Hepatitis B Therapy Administration

Data analysis revealed that of the 99 hepatitis B patients studied, 60 (60.61%) had received hepatitis B therapy, while 39 (39.39%) had not received antiviral therapy.

These results indicate that the majority of patients in this study had received treatment appropriate to their clinical condition, although some patients had not yet received specific hepatitis B therapy. Not all chronic hepatitis B patients have an indication for antiviral therapy. Hepatitis B treatment is administered based on several clinical and laboratory parameters, such as HBV DNA levels, alanine aminotransferase (ALT) values, HBeAg status, and the degree of liver damage. Patients in the inactive phase of the disease or with low viral replication are usually not immediately given antiviral therapy but are instead monitored regularly. This is one factor why some patients in this study did not receive hepatitis B therapy (Ministry of Health of the Republic of Indonesia, 2019).

Furthermore, the decision to administer therapy is also influenced by the stage of the disease and the presence of complications. Patients with high disease activity or at risk of severe conditions such as fibrosis and cirrhosis are more likely to receive long-term antiviral therapy. In contrast, in patients with stable liver function and no signs of active inflammation, routine monitoring is usually the preferred option (PPHI, 2017). The findings in this study align with previous research in Indonesia, which showed that not all chronic hepatitis B patients received antiviral therapy. Research by Sari et al. (2020) stated that approximately half of chronic hepatitis B patients received therapy, while others only underwent routine monitoring. This indicates that hepatitis B therapy practices in Indonesia are in accordance with national guidelines and individual patient conditions. Patients receiving hepatitis B therapy in this study demonstrated the application of treatment principles that consider medical indications and the risk of disease severity. Therefore, the decision to administer therapy is not given equally to all patients, but rather based on a comprehensive medical evaluation.

Compliance with antiviral treatment

In terms of the appropriateness of the antiviral dosage and frequency at Moewardi Hospital compared with the National Consensus for Hepatitis B Management, tenofovir was given at 300 mg/day and entecavir at 0.5 mg/day.

The doses received by the patients were consistent with the literature. The therapies used in chronic hepatitis B patients in this study belonged to the nucleos(t)ide analog class, namely entecavir

and tenofovir disoproxil fumarate (TDF). Both drugs are recommended first-line antivirals in the management of chronic hepatitis B due to their potent viral suppression potential and low risk of resistance. Entecavir is recommended at a dose of 0.5 mg per day for chronic hepatitis B patients who have not received prior antiviral therapy. In this study, the entecavir dosage listed is in accordance with the recommended guidelines, which is 0.5 mg per day.

This indicates that the dosage and use of entecavir are in accordance with the therapeutic standards established by the Ministry of Health of the Republic of Indonesia. This compliance is crucial because proper dosing plays a role in optimally suppressing hepatitis B virus replication and preventing drug resistance. Tenofovir disoproxil fumarate (TDF) is also a first-line antiviral with a standard dose of 300 mg per day. The table shows that the TDF dose and frequency listed in the patient data are in accordance with the recommended guidelines, which is 300 mg per day. Tenofovir is highly effective in reducing HBV DNA levels and is safe for long-term use, making it often chosen as primary therapy, especially in patients with high disease activity or risk of disease progression.

Suitability of Dose and Frequency of Therapy

Based on the research results in Table 4.8, the single hepatoprotectors used in hepatitis B patients include Curcuma, Vitamin E, and Ursodeoxycholic Acid (UDCA). Of the 99 samples, 71 patients received hepatoprotective therapy, with Curcuma being the most commonly used drug (64 patients), followed by Vitamin E (5 patients), and UDCA (2 patients).

The high use of hepatoprotective agents indicates that liver support therapy remains an important part of the management of chronic hepatitis B patients. Based on the research results, all hepatoprotective agent use in hepatitis B patients in this study was in accordance with the guidelines and references used. Of the 71 patients who received hepatoprotective agents, all (100%) were categorized as appropriate (S), and no inappropriate use was found (TS = 0). Specifically, Curcuma was used in 64 patients at a dose of 3x20 mg per day, and all were in accordance with the recommended dosages listed in the DIH and clinical practice as liver support therapy. Vitamin E 100 IU was administered to five patients once daily, all of which were appropriately used. Meanwhile, UDCA was administered to two patients at a dose of 250 mg per day, in accordance with the standard recommended dose for certain liver disorders. Curcuma is a herbal hepatoprotective agent containing the active compound curcumin. Curcumin is known to have anti-inflammatory and antioxidant effects that play a role in reducing oxidative stress and protecting hepatocyte cells from further damage (Fauzan & Juniarti, 2022). Previous research has shown that administering Curcuma longa extract can reduce transaminase enzyme levels and improve liver histopathology in an experimental liver damage model (Sari et al., 2019). This supports the use of Curcuma as an adjunct therapy in hepatitis B patients to help maintain liver function, although it does not have antiviral properties. Vitamin E is used in a small number of patients as an antioxidant. Vitamin E plays a role in neutralizing free radicals and reducing lipid peroxidation, which can exacerbate liver cell damage due to chronic inflammation (Putri et al., 2020). Previous research has reported that vitamin E administration can improve liver function parameters such as AST and ALT in patients with certain chronic liver diseases, although its effects are supportive and indirect in inhibiting hepatitis B virus replication (Rahmawati & Nugroho, 2021). Long-term vitamin E use still requires monitoring, as high doses can potentially cause coagulation disorders (Putri et al., 2020).

UDCA is a hydrophilic bile acid that works by improving bile flow, reducing the accumulation of toxic bile acids, and providing cytoprotective effects on hepatocytes (Yuliana et al., 2018). Previous research has shown that UDCA can help improve liver function and reduce liver enzyme levels in patients with cholestatic disease and chronic liver disorders (Sihombing et al., 2019). In this study, UDCA use was relatively low, indicating that this drug was only given to patients with specific clinical indications, such as impaired bile flow or cholestasis.

Overall, the use of hepatoprotectors in hepatitis B patients is adjunctive therapy, aimed at helping improve and maintain liver function, not as primary therapy to eliminate the virus. The relationship between hepatoprotectors and hepatitis B is indirect, namely through efforts to reduce

liver cell damage caused by chronic inflammation and oxidative stress. Therefore, hepatoprotective therapy should be tailored to the patient's specific needs.

CONCLUSION

Based on the results of research conducted on 99 Hepatitis B patients regarding the Analysis of Complication Treatment Images in Hepatitis B Patients at the Outpatient Installation of Dr. Moewardi Surakarta Regional Hospital, it can be concluded that:

1. The treatment plan for hepatitis B patients with liver cirrhosis was comprehensive and tailored to their clinical condition. Most patients received antiviral therapy, with tenofovir and entecavir as first-line therapy, according to national guidelines. Both antiviral and hepatoprotective agents were administered in accordance with applicable recommendations..
2. Types of medication used in the management of complications of liver cirrhosis in hepatitis B patients in outpatient settings include antiviral therapy (tenofovir and entecavir), hepatoprotective agents (Curcuma, Vitamin E, and UDCA), and other medications for comorbidities and complications such as antihypertensives, diuretics, gastrointestinal medications, antidiabetics, and neuropathy therapy. Drug use focuses not only on controlling hepatitis B virus replication but also on managing hemodynamic complications, metabolic disorders, and other clinical complaints that accompany chronic liver disease.

REFERENCES

Andriyani, A., dan Yusuf, Y. (2021). Evaluasi Rasionalitas Penggunaan Antivirus pada Pasien Hepatitis B Kronik Rawat Inap di RSUD Dr. Soetomo. *Jurnal Farmasi Klinis Indonesia*, 10(2), 99-106.

Andriyani, N., dan Yusuf, H. (2021). Evaluasi efektivitas terapi hepatitis B kronis di rumah sakit pemerintah. Jurnal Farmasi Klinik Indonesia, 10(2), 145–152.

Andriani, Y., Pradiftha Sari, C., Setyaningrum, N., dan Ndaru, C. (2020). Evaluasi Pengobatan Pada Pasien Hepatitis B Rawat Jalan Di Rumah Sakit Yogyakarta. *Prosiding Seminar Nasional* Hasil Penelitian dan Pengabdian Masyarakat, 1(1), 65–75.

Andriani, Y., Yulia, R., dan Hartinah, D. (2020). Evaluasi Pengobatan pada Pasien Hepatitis B Rawat Jalan di Rumah Sakit Yogyakarta. Prosiding Seminar Nasional Hasil Penelitian dan Pengabdian Masyarakat.

Badan Pusat Statistik. (2022). Statistik penduduk menurut kelompok umur. Badan Pusat Statistik Republik Indonesia.

Dewi, P. P., Widiana, I. G. R., dan Wiryanthini, A. A. D. (2024). Gangguan Fungsi Hati: Patogenesis dan Tatalaksana. *Jurnal Penyakit Dalam.*

Fitriani, K. E., dan Yulianti, T. (2022). Evaluasi Terapi Antiviral Pada Pasien Hepatitis B Kronis Di Instalasi Rawat Inap Rsud Dr. Moewardi Surakarta Periode Juni Tahun 2018-Juni Tahun 2019. *Usadha Journal of Pharmacy*, 1(1), 123–137.

Fitriani, R., dan Yulianti, D. (2022). Hubungan kepatuhan pasien terhadap keberhasilan terapi hepatitis B kronis. Jurnal Farmasi Sains dan Praktik, 9(1), 12–19.

Hidayat, A., Pratama, F., dan Wibisono, R. (2020). Efektivitas terapi analog nukleos(t)ida pada pasien hepatitis B kronis. Media Farmasi Indonesia, 17(3), 120–127.

Kementerian Kesehatan Republik Indonesia. (2011). *Pedoman Penggunaan Obat Rasional (POR)*. Jakarta: Kementerian Kesehatan Republik Indonesia

Kementerian Kesehatan Republik Indonesia. (2019). *Pedoman Nasional Pelayanan Kedokteran Tata Laksana Hepatitis B.* Jakarta: Kementerian Kesehatan Republik Indonesia.

Kementerian Kesehatan RI. (2022). *Petunjuk Teknis Tatalaksana Klinis Hepatitis B dan C.* Jakarta: Kementerian Kesehatan Republik Indonesia.

Lestari, G. D., dan Kafesa, A. (2024). Kajian Penanganan Hepatitis B Berdasarkan Perilaku dan Pemeriksaan Molekuler. *Mahayati Health Student Journal (MAHESA),* 4(2), 123-130.

Lestari, I., Diah, P., dan Hartono, M. (2023). Panduan klinis nasional penatalaksanaan hepatitis B kronis. Jurnal Farmasi dan Kesehatan Indonesia, 12(2), 102–110.

Lestari, R., Suwito, P., dan Sulaiman, A. (2023). Analog Nukleosida/Nukleotida sebagai Terapi Hepatitis B Kronis: Studi Kohort 3 Tahun. *Jurnal Penyakit Dalam Indonesia,* 10(1), 1-9.

Nugroho, A., dan Handayani, R. (2021). Faktor usia dan imunitas terhadap progresivitas hepatitis B kronik. Jurnal Penyakit Dalam Indonesia, 8(2), 85–92.

Pratama, H., dan Dewi, S. (2020). Edukasi gaya hidup sehat pada pasien hepatitis B kronis. Jurnal Promosi Kesehatan Indonesia, 18(3), 199–206.

PUSTAKA. J*urnal Kesehatan Tuanku Tambusai,* 5(2), 52-60. (Kajian pustaka yang merangkum terapi HBV di Indonesia)

Sari, D. P., Rahmawati, I., dan Lestari, Y. (2019). Karakteristik pasien hepatitis B kronik berdasarkan usia dan faktor risiko di rumah sakit rujukan. Jurnal Kesehatan Masyarakat, 14(3), 210–218.

Triana, R., Putri, A. D., dan Yuliana, S. (2023). Gambaran karakteristik penderita hepatitis B berdasarkan jenis kelamin pada pendonor darah di Unit Transfusi Darah PMI Kota Bengkulu. Jurnal Kesehatan Masyarakat Indonesia, 18(1), 45–52.

Trisnaningtyas, R. W., Sari, C. P., dan Setyaningrum, N. (2017). Evaluasi Terapi pada Pasien Hepatitis B di RSUP Dr. Sardjito Yogyakarta*. Jurnal Ilmiah Farmasi,* 13(1), 27-33.

Ventiani, N., Rosita, Y., dan Lestari, R. (2012). Prevalensi HBsAg pada pendonor darah di Palang Merah Indonesia Cabang Padang. Jurnal Kesehatan Andalas, 1(2), 65–70.

World Health Organization (WHO). (2014). Guidelines for the prevention, care and treatment of persons with chronic hepatitis B infection. Geneva: World Health Organization.

Wulandari, R., Nugroho, D., dan Putri, S. (2023). Profil pasien hepatitis B di RSUD tipe A: Analisis retrospektif. Jurnal Kedokteran Indonesia, 11(1), 22–29.