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DESCRIPTION OF SGOT AND SGPT LEVELS IN HEPATITIS B PATIENTS AT KARSA HUSADA HOSPITAL BATU MALANG

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ABSTRACT

Background: Hepatitis B is a liver infection caused by the hepatitis B virus tha lead to hepatocellular damage. Liver enzyme tests, namely Serum Glutamic Oxaloa Transaminase (SGOT) and Serum Glutamic Pyruvic Transaminase (SGPT), are us important indicators in assessing the degree of liver damage. **Objective:** This aimed to describe the levels of SGOT and SGPT in hepatitis B patients at Karsa Hu Hospital, Batu Malang, during the period of January–December 2024. **Methods** research employed a quantitative descriptive method using secondary data medical records of 39 patients. Data analysis was conducted using univariat bivariate approaches. **Results:** The results showed that elevated SGOT levels found in 35 patients (89.7%), while normal levels were observed in 4 patients (10 Elevated SGPT levels were observed in 27 patients (69.2%), while 12 patients (30 had normal levels. Based on sex, elevated SGOT levels were more prevalent in (23 patients, 95.8%) compared to females (12 patients, 80.0%), while elevated levels were also dominant in males (20 patients, 83.3%) compared to femal patients, 46.7%). Based on age groups, the highest elevated SGOT levels were fou adults (22 patients, 91.7%), followed by adolescents (7 patients, 87.5%) and elde patients, 85.7%). Correlation test results showed a coefficient value of r = 0.380 v = 0.017 ($p < 0.05$). **Conclusion:** These findings indicate that the majority of hepat patients experienced elevated SGOT and SGPT levels, with predominance among males, and there was a significant correlation between the two liver enzymes.

Introduction

Hepatitis B is an infectious liver disease caused by the hepatitis B virus. This infection can occur in two forms: acute, which lasts a short time and has a high level of severity, and chronic, which lasts for a longer period of time. Chronic infection can increase the risk of death due to liver cirrhosis and liver cancer (WHO, 2023). The main transmission of Hepatitis B virus infection occurs through parenteral and vertical routes. Parental transmission can occur through needle sticks, sexual intercourse, blood transfusions, while vertical transmission refers to an infected mother to her child during pregnancy (Kepmenkes RI, 2019). In patients infected with the Hepatitis B virus do not show specific symptoms, in fact, most sufferers do not show any symptoms. Hepatitis B prevention can be done by avoiding contact with the blood or fluids of Hepatitis B sufferers, recognizing the presence of the virus in the mother during pregnancy, and providing active or passive immunization to newborns (Siswanto, 2020). According to a 2019 report by the World Health Organization (WHO), the hepatitis B virus (HBV) was the cause of potentially fatal hepatitis B. There were 296 million cases of hepatitis B globally, with the highest prevalence rates (6.2 and 6.1%) found in the West Pacific and Africa, respectively. Chronic hepatitis B resulted in approximately 820,000 deaths (WHO, 2023).

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Data from the Indonesian Liver Research Association (PPHI) on the National Consensus on Hepatitis B Management in Indonesia indicates that the prevalence of hepatitis B in Indonesia reaches 4.0-20.3% (12). Hepatitis B is a major health problem in Indonesia. According to the 2023 Indonesian Health Survey (SKI), approximately 6.7 million people were infected with hepatitis B (Ministry of Health of the Republic of Indonesia, 2024). This data will remain a reference until 2025, when the Ministry of Health reaffirmed this estimate as the basis for the hepatitis elimination program. Control efforts are carried out through maternal screening, birth dose (HBO) Hepatitis B immunization, and expanded Hepatitis B immunization for healthcare workers. By July 2025, the Ministry of Health has affirmed its commitment to achieving a Hepatitis-Free Indonesia by 2030 through prevention, early detection, and therapy strategies (Ministry of Health, 2025).

Previous research conducted by Nisa Ariesta Putri (2017) at Dr. Harjono Ponorogo Regional Hospital in Hepatitis B patients showed variations in changes in SGOT and SGPT levels. Most samples (60.9%) showed insignificant increases or were within the normal range. Furthermore, a small proportion of samples experienced significant increases in SGOT (12.5%) or SGPT (4.7%) levels, while approximately 21.9% of samples experienced significant increases in both enzymes. These findings can be used as relevant supporting data in The purpose of this study is to analyze the correlation between SGOT and SGPT levels as clinical indicators of liver damage to support the evaluation and management of Hepatitis B patients. scientific research to determine increases in SGOT and SGPT enzyme activity in Hepatitis B patients. This study was conducted at Karsa Husada Hospital Batu because there are no recent data available regarding the levels of SGOT and SGPT in Hepatitis B patients at this hospital. Local data are essential for clinical evaluation and for planning appropriate patient management. The novelty of this study lies in presenting the most recent and specific data from Hepatitis B patients at Karsa Husada Hospital Batu in the 2024 period, which has not been previously reported. The findings are expected to serve as a local reference and a foundation for further studies related to therapy monitoring and clinical factors in Hepatitis B patients.

Methods

This type of research used a cross-sectional design with a descriptive quantitative approach,conducted retrospectively using secondary data (medical record data of hepatitis B patients at Karsa Husada Hospital Batu Malang for the period January-December 2024, including gender and age). The research instrument used in this study was secondary data or existing (medical record data). The data collection technique uses a data collection format presented in tabular form which includes the identity or name of the patient, gender, date of birth, medical record number, age, positive hepatitis B diagnosis and the results of SGOT & SGPT level examinations. The data collection method involved a study of file recordings from the medical records unit or hospital laboratory. Data was not obtained from respondents, but rather from the medical records of hepatitis B patients who underwent SGOT and SGPT tests at Karsa Husada Hospital, Batu, Malang, from January to December 2024. The analysis included:

Numerical descriptive statistics (minimum, maximum, mean, and standard deviation) were performed using Microsoft Excel using built-in formulas to assess the general characteristics of SGOT and SGPT levels.

Frequency distributions were used to categorize SGOT and SGPT levels into normal and elevated categories.

Crosstabs were used to illustrate the distribution of SGOT and SGPT levels by gender and age.

Correlation tests were used to compare SGOT and SGPT test results. Pearson correlation analysis revealed a significant positive correlation between SGOT and SGPT levels ($r = 0.380$, $p = 0.017$).

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Results

Table 5.1 Average Results of SGOT and SGPT Levels in Hepatitis B Patients at Karsa Husada Hospital, Malang, in 2024

Parameter	*N*	*Mean* (U/L)	*SD* (U/L)	*Min* (U/L)	*Max* (U/L)
SGOT	39	174.95	178.02	13.0	692.5
SGPT	39	125.95	160.91	15.0	679.9
Normal Value SGOT : < 37 U/L SGPT : < 41 U/L					
Table 5.1 Description *Mean* : Average Value *N* : Number of Patients *SD* : Standard Deviation *Min* : Minimum Value *Max* : Maximum Value					

Source: Secondary data from 2025 research

Table 5.1 above shows the calculation of the average results obtained from the SGOT levels of 39 patients with a mean value of 174.95 U/L from the SGOT levels with a standard deviation of 178.02. From 39 patients, the SGPT levels with a mean of 125.95 U/L with a standard deviation of 160.91 U/L. The highest SGOT value reached 692.5 U/L and SGPT reached 679.9 U/L, while the minimum values were 13.0 U/L and 15.0 U/L, respectively.

Graph of the Number of Hepatitis B Patients in January – December 2024 at Karsa Husada Hospital, Batu, Malang. The following is a graph of the number of Hepatitis B patients per month at Karsa Husada Batu Hospital in 2024.

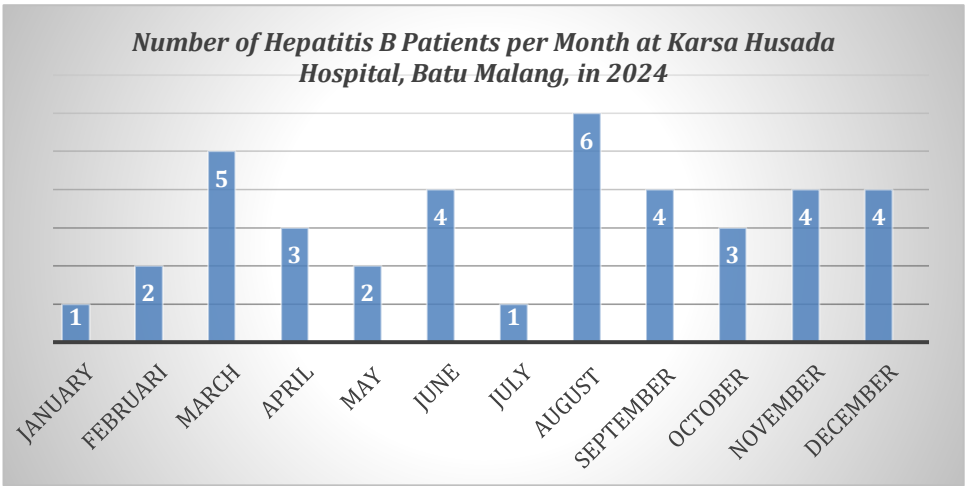

Figure 5.1 Graph of the Number of Hepatitis B Patients at Karsa Husada Hospital, Batu, Malang, 2024 Period

Based on Figure 5.2, the number of hepatitis B patients at Karsa Husada Hospital, Batu, Malang, in 2024, showed monthly fluctuations. The lowest number of patients was

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recorded in January and July (1 patient each), while the highest number occurred in August (6 patients).
Furthermore, the number of patients tended to remain stable at around 3-4 patients in April, June, September, October, November, and December. March showed a relatively high number (5 patients), which indicated an initial period of increasing cases.

Table 5.2 Frequency distribution of SGOT and SGPT levels in patients with hepatitis B at Karsa Husada Hospital, Batu, Malang in 2024

No	Category Level	SGOT level		SGPT level	
		N	%	N	%
1.	Normal	4	10.3 %	12	30.8%
2.	High	35	89.7%	27	69.2%
	Total	**39**	**100**	**39**	**100**

Source: secondary data from 2025 research

Based on Table 5.2 Frequency Distribution above of SGOT and SGPT Levels in Hepatitis B patients at Karsa Husada Hospital, Batu, Malang in 2024, it is known that SGOT levels: A total of 35 patients (89.7%) had high SGOT levels and only 4 patients (10.3%) had normal levels. While SGPT A total of 27 patients (69.2%) had high SGPT levels and 12 patients (30.8%) had normal levels. shows the frequency distribution of liver enzyme levels (SGOT and SGPT) in 39 patients with Hepatitis B at Karsa Husada Hospital, Batu, Malang, in 2024. The results showed that most patients experienced elevated liver enzyme levels with increased SGOT levels observed in 35 patiens (89.7%) and increased SGPT levels in 27 patiens (69.2%).

Table 5.3 Cross-tabulation of SGOT and SGPT Levels in Hepatitis B Patients at Karsa Husada Hospital, Batu, Malang, in 2024 by Gender

Gender	Level SGO			Level SGPT		
	Normal	High	Avarage	Normal	High	Average
Male	1 (4.2%)	23 (95.8%	24	4 (16.7 %	20 (83.3%)	24
Famale	3 (20.0%	12 (80.0	15	8(53.3%	7(46.7%	15
Total	4 (10.3%	35 (89.7%	39 (100%	12 (30.8%	27 (69.2%	39 (100%

Source: secondary data from 2025 research

Based on Table 5.3 cross-tabulation above of SGOT and SGPT levels in Hepatitis B patients at Karsa Husada Batu Hospital, it was found that in the SGOT examination, most patients showed high results, namely 23 (95.8%) in men and 12 (80.0%) in women. Only a small number had normal SGOT levels, 1 (4.2%) in men and 3 (20.0%) in women. Meanwhile, in the SGPT examination, most patients also showed high results, namely 20 (83.3%) in men and 7 (46.7%) in women. Normal SGPT levels were 4 (16.7%) in men and 8 (53.3%) in women.

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Table 5.4 Cross Tabulation of SGOT and SGPT Levels in Hepatitis B Patients at Karsa Husada Hospital, Batu, Malang, in 2024 Based on Age

Age	SGOT level			SGPT level		
	Normal	High	Average	Normal	High	Average
Young (18-4 years)	1(12.5%	7 (87.5%	8	4 (50.0%	4 (50.0%	8
Adult (41-6 years)	2 (8.3%	22(91.7%	24	5(20.8)	19(79.2%	24
Senior (>6 years)	1(14.4%	6 (85.7%	7	3 (42.9)	4 (57.1%	7
Total	4(10.3%	35(89.7%	39(100%	12(30.8%	27(69.2%	39(100%

Source: secondary data from 2025 research

Based on Table 5.4 regarding the cross-tabulation of SGOT and SGPT levels in patients with Hepatitis B at Karsa Husada Hospital Batu Malang in 2024 based on age, the results of SGOT levels were obtained. At a young age, there was 1 patient (12.5%) with normal SGOT levels and 7 patients (87.5%) with high SGOT levels. In adulthood, there were 2 patients (8.3%) with normal SGOT levels and 22 patients (91.7%) with high SGOT levels, while in old age, there was 1 patient (14.4%) with normal SGOT levels and 6 patients (85.7%) with high SGOT levels. Overall, of the 39 patients, 4 patients (10.3%) had normal SGOT levels and 35 patients (89.7%) had high SGOT levels. Meanwhile, in SGPT levels at a young age, there were 4 patients (50.0%) with normal SGPT levels and 4 patients (50.0%) with high SGPT levels. In adulthood, there were 5 patients (20.8%) with normal SGPT levels and 19 patients (79.2%) with high SGPT levels. Meanwhile, in the elderly, there were 3 patients (42.8%) with normal SGPT levels and 4 patients (57.1%) with high SGPT levels. Overall, of the 39 patients, 12 patients (30.8%) had normal SGPT levels and 27 patients (69.2%) had high SGPT levels.

In this study, statistical analysis was limited to descriptive statistics (frequency distribution and cross-tabulation) and correlation analysis. Tests of normality or homogeneity were not performed because the main purpose of the research was to describe the distribution of SGOT and SGPT levels and to assess their correlation.

Table 5.5 Pearson Correlation Test between SGOT and SGPT Levels in Hepatitis B Patients at Karsa Husada Hospital, Batu, Malang in 2024

variable	Pearson Corelation	sig. (p-valu	description
SGOT – SGF	0,380	0,017	There is a moderate and significant positiv correlation (p<0,05)
N	39	39	

Source: secondary data from 2025 research

Based on Table 5.6, the Pearson correlation test in Hepatitis B patients at Karsa Husada Hospital, Batu, Malang, showed a correlation coefficient of r = 0.380 with a significance value of p = 0.017 (p < 0.05) and a sample size of 39 respondents. This result indicates a statistically significant positive correlation between SGOT and SGPT levels, meaning that higher SGOT levels were associated with higher SGPT levels.

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Discussion

Based on Table 5.1, this study involved 39 patients with Hepatitis B who underwent SGOT and SGPT liver enzyme level examinations at Karsa Husada Hospital, Malang in 2024. SGOT Level The average (mean) SGOT level in patients was 174.95 U/L, which far exceeded the normal limit of SGOT (<37 U/L). The standard deviation (SD) was 178.02 U/L which indicated a very high variation or spread of data between patients, showing a significant difference in liver condition. The minimum value (Min) obtained was 13.0 U/L, which as still within the normal range, while the maximum value (Max) reached 692.5 U/L, which was considered very high and indicated severe liver damage in some patients. SGPT Level The average SGPT level was 125.95 U/L,which was also far above the normal value of SGPT (<41 U/L). The standard deviation was 160.91 U/L, which indicated significant variation between patients. The minimum value recorded was 15.0 U/L, which was close to the normal limit, while the maximum value reached 679.9 U/L,which indicated the presence of patients with very severe liver damage. (Khairani et al., 2022). These results indicated a significant difference between SGOT and SGPT levels in patients with hepatitis B compared to the population without hepatitis B, in line with previous research (Reza & Rachmawati, 2017).

High average SGOT and SGPT levels in Hepatitis B patients indicated significant liver cell (hepatocellular) damage. Higher SGOT levels than SGPT served as an indicator of chronic liver damage. Wide variations in values reflected different levels of disease severity between patients, which might have been influenced by disease stage, duration of infection, and the presence of other complications such as cirrhosis or multiple infections. An SGOT/SGPT ratio greater than 1 also indicated the need for close monitoring, as this condition had the potential to lead to permanent liver damage if it was not properly managed. Therefore, in addition to SGOT and SGPT examinations, monitoring other parameters such as bilirubin, albumin, and liver ultrasound was recommended to assess disease progression. (Maulidia et al., 2022). Regular monitoring of SGOT and SGPT levels was important to determine the development of liver conditions and the effectiveness of therapy given to Hepatitis B patients (Geni & Yahya, 2022).

Most Hepatitis B patients at Karsa Husada Hospital in Malang showed significantly elevated SGOT and SGPT levels above normal, with an SGOT/SGPT ratio of 1.39 that indicated possible chronic liver damage. These results emphasized the importance of early detection, regular monitoring, and appropriate therapy to prevent liver function deterioration (Rakhman & Mustika, 2023). It was also important to consider the use of hepatoprotectors that could help improve SGOT and SGPT levels in hepatitis B patients, as had been demonstrated in previous studies (Nugraha, 2022).

Based on Graph 5.1, the number of Hepatitis B patients recorded at Karsa Husada Hospital, Batu, Malang, throughout 2024 showed a month-to-month increase, with a total of 39 patients. The highest number of cases occurred in August, with 6 patients. This spike in that month was likely due to increased public awareness of health check-ups after the long holiday, or seasonal factors that influencing the spread or exacerbation of symptoms. March also showed a high number of patients, with 5 patients. This increase could have been attributed to increased public mobility at the beginning of the year or routine check-ups after the New Year. The lowest number of patients was recorded in January and July, with only 1 patient each. This might have been due to the lack of visits to health facilities at the beginning of the year because of the long holiday, and in July, when people tended to be busy with school holidays or religious holidays. After a low number in january, the number of of patients increased in February (2 patients) and reached its first peak in March (5 patients). A decrease occurred in April (3 patients) and May (2 patients), before rising again in June (4 patients). The second peak occurred in August (6 patients), followed by a decline in September (4 patients), and a plateau in October (3 patients)

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and November-December (4 patients each). These findings indicated that the spread or emergence of Hepatitis B cases was uneven across months. Influencing factors might have included community lifestyles, health screening behavior, seasonal factors, and large activities or events that increased the risk of transmission. The presence of two peaks (March and August) might have indicated the right time to increase screening activities or health education for the public. (Athalye et al., 2023)

Table 5.2 showed the frequency distribution of liver enzyme levels (SGOT and SGPT) in 39 patients with Hepatitis B at Karsa Husada Hospital, Batu, Malang, in 2024. The results showed that most patients experienced elevated liver enzyme levels. Distribution of SGOT Levels Four patients (10.3%) had SGOT levels within the normal range (<37 U/L). Thirty-five patients (89.7%) had elevated SGOT levels, far exceeding the normal range. The high percentage of patients with elevated SGOT levels indicated that most of them experienced significant liver cell damage due to hepatitis B virus infection. SGOT was a transaminase enzyme released into the bloodstream when hepatocytes were damaged. Elevated levels of this enzyme were often associated with inflammation or liver cell necrosis and could even be an indicator of disease progression toward chronic liver damage (Setiawan et al., 2022).

Meanwhile, the distribution of SGPT levels showed that 12 patients (30.8%) had normal SGPT levels (<41 U/L), while 27 patients (69.2%) had elevated SGPT levels. SGPT was more specific for liver damage than SGOT because this enzyme was present in higher concentrations in hepatocytes. The significant elevation of SGPT in most patients confirmed hepatocellular damage caused by Hepatitis B virus replication (Handayani & Wulandari, 2021).

Eighty-nine percent of patients showed elevated SGOT levels, while 69.2% also had elevated SGPT levels. This finding was consistent with a 2021 study at Dr. H. Abdul Moeloek Regional Hospital, Lampung, where SGOT levels were elevated in 53.7% and SGPT in 48.4% of patients. This indicated that liver enzyme profiles in hepatitis B patients generally tended to be elevated. (Al Waali et al., 2023).

The results of this study aligned with those of Pratama et al. (2022) , which reported that the majority of hepatitis B patients experienced elevated SGOT and SGPT levels above normal. This condition indicates an inflammatory response due to viral infection that triggered hepatocyte necrosis. Another study by Yulianti (2020) also found that 70-90% of hepatitis B patients experienced elevated liver enzyme levels, particularly SGPT, due to chronic liver tissue damage.

Therefore, the high distribution of SGOT and SGPT levels in the patients in this study indicated that hepatitis B infection was closely associated with significant hepatocellular damage. Regular monitoring of liver enzyme levels is crucial to assess disease progression and the effectiveness of therapy.

Comparison of SGOT and SGPT: The percentage of patients with elevated SGOT levels (89.7%) was significantly higher than that of patients with elevated SGPT levels (69.2%). This difference aligned with the SGOT/SGPT ratio in Table 5.2, which showed a value of 1.39 (>1). The high prevalence of liver enzyme levels above normal indicated significant liver damage in Hepatitis B patients at Karsa Husada Hospital. The presence of patients with normal values indicated a possible inactive phase of the disease or a good response to treatment, but monitoring was still necessary because Hepatitis B is chronic and can reactivate. (Khaerani et al., 2022.

These results indicated that higher SGOT and SGPT levels could be important indicators in diagnosing and monitoring a patient's liver condition, especially in cases of hepatitis. A study at Medika Stannia Hospital found that 62.5% of patients with Hepatitis B had SGOT levels outside the normal range, while 75% had abnormal SGPT levels (Ria, 2020). Consistent with this, Yanto

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(2024) reported that in Lampung 57.14% of patients showed abnormal SGOT activity and 51.02% showed abnormal SGPT activity.

Based on Table 5.3, the results of cross-tabulation of SGOT and SGPT levels by gender in Hepatitis B patients at Karsa Husada Hospital, Batu, Malang in 2024 showed that the majority of patients, both men and women, experienced increased SGOT levels. In the male group, most patients (23) (95.8%) had high SGOT levels, while only 1 (4.2%) had normal SGOT levels. Meanwhile, in the female group, most (12) (80.0%) had high SGOT levels and 3 (20.0%) had normal SGOT levels. Overall, 35 patients (89.7%) experienced high SGOT levels and only 4 (10.3%) had normal SGOT levels. This showed that the majority of patients, both men and women, experienced increased SGOT levels. Increased SGOT levels in Hepatitis B patients indicated hepatocellular damage or inflammation of liver cells where enzymes are released into the bloodstream when liver cells were damaged or injured. (Nugrahini, 2022).

The results of this study aligned with those conducted by Trisnaningtyas (2021). In their study, information obtained from 91 samples showed that the majority of hepatitis B patients were men (67.3%), while only 32.9% were women. This study was predominantly male. This was associated with risk factors, where men were more susceptible to elevated liver enzymes due to unhealthy lifestyles such as drug use, alcohol consumption, and unhealthy or unsanitary habits, which exacerbated liver damage. Therefore, it could be concluded that gender played a role in influencing the clinical profile of hepatitis B patients, with men tending to have higher SGOT levels than women.

Meanwhile, SGPT levels were found elevated in most patients. In the male group, 20 (83.3%) patients had elevated SGPT levels, while only 4 (16.7%) had normal levels in the female group, the percentage of patients with elevated SGPT levels was lower 7 (46.7%), while 8 (53.3%) had normal SGPT levels. Overall, the majority of patients—27 (69.2%)—had elevated SGPT levels, while 12 (30.8%) had normal levels. Elevated SGPT levels indicated hepatocellular damage due to inflammation or liver cell necrosis. The SGPT enzyme (Serum glutame pyruvate transaminase/ALT) was more liver-specific than SGOT, therefore, elevated SGOT levels were often used as a primary indicator of liver dysfunction. The results of this study aligned with those of Mulyati (2019), who stated that SGOT and SGPT levels tended to increase in men due to smoking and alcohol consumption, which could increase SGOT and SGPT levels in the body.

Furthermore, the results of this study aligned with the findings Geni & Yahya (2018) at Dr. Sardijto General Hospital in Yogyakarta, which demonstrated that more men were diagnosed with hepatitis B than women. This is because transmission could occur through activities that were more commonly performed by men, such as injuries sustained at work and alcohol consumption. It could also be caused by differences in lifestyle behaviors between men and women. For example, most men's lifestyles were less healthy than women's. Therefore, gender and lifestyle factors significantly contributed to high liver enzyme levels in Hepatitis B patients. Additional influencing factors, such as the role of male hormones, could also be considered. Androgen hormones in men tended to affect liver metabolism and could contribute to higher liver enzyme levels. Because the results of this study showed higher SGOT levels in men compared to women, hormonal influence might have played a role in increasing susceptibility to hepatocellular damage in male patients.

SGPT was a more specific enzyme for liver damage than SGOT. Therefore, high SGPT levels in most patients indicated significant hepatocellular damage due to hepatitis B virus infection. The findings of this study indicated that gender influenced the distribution of liver enzyme levels, with men experiencing more elevated SGOT and SGPT levels than women. This difference was thought to be influenced by lifestyle factors, such as alcohol consumption, smoking, unhealthy diet, and physical activity that pose risks to liver function. This was likely influenced

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by hormonal factors, particularly estrogen, which had a protective effect against liver cell damage (Nugraha et al., 2019).

The high rate of SGOT and SGPT elevations in Hepatitis B patients indicated that the disease had caused extensive liver damage. Therefore, routine liver enzyme testing is important for monitoring disease progression and evaluating therapy success. This study emphasized the need to educate patients, especially men, about maintaining liver health through a healthy lifestyle, avoiding alcohol consumption, quitting smoking, and increasing adherence to treatment. This is important for maintaining liver health through a healthy lifestyle and adherence to treatment.

Based on Table 5.4, a cross-tabulation of SGOT and SGPT levels in Hepatitis B patients at Karsa Husada Hospital, Batu, Malang, in 2024, it was found that in the younger age group, the majority of patients (7 patients) (87.5%) experienced elevated SGOT levels, while only 1 patiens (12.5%) had normal SGOT levels. This indicated that most young patients experienced liver damage or inflammation that began at a young age due to hepatitis B infection. Meanwhile, the distribution of SGPT levels was more even, with 4 patients (50.0%) having normal SGPT levels and 4 patients (50.0%) having elevated SGPT levels. This condition indicates that although some patients in the younger age group already experience liver dysfunction, the level of damage was not as severe as in the older age group, but still required vigilance.

In the Adult Age Group (41-60 years), the study results showed the highest percentage of elevated SGOT levels in 22 patients (91.7%) compared to other age groups. Only 2 patients (8.3%) had normal SGOT levels. This percentage is the highest compared to other age groups, indicating that adult patients aged 41-60 years were the most likely to experience elevated SGOT levels due to their productive years with a higher risk of exposure.

Adulthood was a phase with high work and social activity, resulted in greater exposure to hepatitis B risk factors, whether through blood transfusions, invasive medical procedures, the use of unsterile needles, or risky sexual behavior, compared to younger or older adults. Elevated liver enzyme levels in this age group reflected the cumulative impact of these risk factors during teirs productive years. SGOT and SGPT levels in adults could also be influenced by unhealthy lifestyles, such as alcohol consumption, smoking, lack of exercise, and a high-fat diet. Previous research has showed that adult patients with hepatitis B tended to experience more severe liver damage than younger age groups due to accumulated exposure to risk factors and disease progression (Setiawan et al., 2020). This indicated that adults were the most vulnerable population to Hepatitis B complications, such as cirrhosis or hepatocellular carcinoma. Therefore, routine liver enzyme monitoring was highly recommended in this age group (Preeti & Sawalka, 2023).

These results aligned with research by Trisnanigtyas (2021), which found that the highest prevalence was in adults aged 46-55 years (32.97%), suggesting a decline in the immune system with age. These results also aligned with research by Puspita & Kamilah (2020), which found that the highest prevalence was in adults aged 45-64 years (20.83%), an age group where liver function began to decline, making them susceptible to liver dysfunction. The immune system was already weakened, making the virus more susceptible to infection. In addition, there was a decrease in the number and function of hepatocytes in the adult population, which had a significant impact on the liver's ability to perform normal metabolism. Changes in liver enzyme activity in adults increased the risk of more severe liver cell damage in Hepatitis B patients. This decline in hepatocyte function, combined with exposure to risk factors such as unhealthy lifestyles and chronic infection, caused a more significant increase in SGOT and SGPT levels compared to younger age groups. This condition emphasized the need for routine monitoring of liver function and liver enzymes in the adult population to prevent further complications, such as cirrhosis or hepatocellular carcinoma.

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In chronic Hepatitis B patients, liver damage occured gradually. Many patients were infected at a young age, but symptoms or significant liver damage did not appear until adulthood, resulting in a sharp increase in SGOT levels. SGOT an enzyme found in the liver and other tissues such as heart muscle and skeletal muscle. Reflected more extensive liver damage. In adulthood, in addition to liver damage caused by hepatitis, additional factors such as an unhealthy lifestyle (alcohol, a high-fat diet, obesity) can exacerbated liver cell damage, leading to increased SGOT levels and a strong inflammatory response.

During In the active phase of Hepatitis B disease in adults, the immune system can mounted a stronger inflammatory response, causing numerous liver cells to be damaged and releasing SGOT into the bloodstream. There was no decline in total metabolic function. (Seto, 2019) It was important to understand that maintaining a healthy lifestyle could help reduced the risk of further liver damage in patients with chronic hepatitis B.

Therefore, it could be concluded that adults were the age group most likely to suffer from Hepatitis B, with more significant liver damage. Influencing factors included decreased natural immunity, changes in organ function, and accumulated exposure to risk factors Prevention efforts included vaccination, avoiding high-risk behaviors such as unprotected sexual intercourse or sharing needles, and maintaining a healthy lifestyle. Health education involved providing information about Hepatitis B transmission, liver health, and the importance of adherence to treatment. Laboratory monitoring consisted of routine liver function tests, including SGOT, SGPT, bilirubin, and albumin levels, as well as periodic liver ultrasound examinations to detect early liver damage. These measures were expected to increase awareness of Hepatitis B and help reduce long-term complications in patients.Therefore, adults needed to be the primary target for prevention efforts, health education, and regular laboratory monitoring to reduce long-term complications such as cirrhosis and hepatocellular carcinoma.

In contrast to older adults (>60 years) where some body functions began to slow down (including liver metabolism), adults still had an active metabolism so the release of SGOT due to liver cell damage could be greater. SGPT Levels A total of 5 patients (20.8%) had normal SGPT levels, while 19 patients (79.2%) experienced high SGPT levels. This indicated that liver damage in the adult group affected both liver enzymes, SGOT and SGPT.

The results of the study in Table 5.5 showed a significant positive correlation between SGPT and SGOT levels, with a correlation coefficient of r = 0.380 and a p value of 0.017. This meant that higher SGPT levels tended to lead to higher SGOT levels, although the correlation strength was in the weak to moderate category. SGPT (ALT) was more specific to the liver because the majority of this enzyme was produced by hepatocytes, while SGOT (AST) was also found in other organs such as muscle and heart, so its increase did not only reflect liver damage. However, in hepatocellular conditions, particularly hepatitis, these two enzymes usually increase simultaneously due to the inflammatory process and damage to the liver cell membrane, which caused the enzymes to be released into the bloodstream.

These findings aligned with a recent study in chronic hepatitis B patients, which reported that both SGOT and SGPT significantly correlated with liver stiffness, with r=0.483 ($p<0.01$) for SGOT and r=0.439 (p=0.002) for SGPT, respectively (Parmono et al., 2024). These results strengthened the evidence that elevated transaminases reflected both structural and functional liver changes. Therefore, the correlation found in this study supports the theory that The laboratory methods used for measuring SGOT and SGPT were obtained from secondary data recorded in patients' medical records. According to the hospital laboratory reports, the enzyme levels were measured using the IFCC kinetic method. Because the study used secondary data, the researchers did not perform the laboratory analyses directly but relied on the documented

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results provided by the hospital. SGOT and SGPT could be used together as important indicators for assessing hepatocellular damage, particularly in patients with hepatitis B.

Furthermore, another study in the context of Non-Alcoholic Fatty Liver Disease (NAFLD) found that the SGPT/SGOT ratio in patients with fatty liver averaged 1.34 and was statistically significant as an early biochemical marker of NAFLD (TM Karthikeya et al., 2024). This suggested that this ratio could be used as an early detection marker for non-alcoholic metabolic liver damage.

Thus, the correlation found in this study supported the theory that SGPT and SGOT could be used together as important indicators in assessing hepatocellular damage and as a reference in the clinical monitoring of patients with liver disorders, including hepatitis B and NAFLD. This association also provided a basis for recommending the use of the SGPT/SGOT ratio as a cost-effective, non-invasive screening tool that was easy to implement in clinical practice and epidemiological research.

Conclusion

Most Hepatitis B patients at Karsa Husada Hospital, Batu, Malang, had elevated SGOT and SGPT levels. Male patients had higher SGOT and SGPT levels compared to female patients, and the adult age group (41–60 years) showed the highest SGOT and SGPT levels compared to younger and older age groups. There was a significant positive correlation between SGOT and SGPT levels in Hepatitis B patients ($r = 0.380$, $p = 0.017$).

Suggestion

The results of this study are expected to serve as a reference for hospitals and medical personnel in monitoring liver function in Hepatitis B patients, particularly men and vulnerable adult age groups, to detect early liver damage. Patients should receive education about the dangers of elevated liver enzymes, the importance of adhering to medication, and maintaining a healthy lifestyle, including avoiding alcohol and cigarette consumption, following a balanced diet, and undergoing regular liver function tests. For future researchers, it is recommended to include comparison groups with different medical histories and lifestyle risk factors, as well as detailed clinical histories such as alcohol use and hepatotoxic drug consumption. Studies with larger sample sizes and analytical designs are advised to allow for broader generalization of results and to obtain a more comprehensive understanding of liver enzyme patterns in Hepatitis B patients.

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