

The Relationship between Serum Hepatitis B Virus DNA Level and Liver Fibrosis Status among Patients with Chronic HBV Infection in Chumphon: Findings from the National Surveillance Program

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ABSTRACT

Objective: To determine the prevalence and screening coverage of hepatitis B virus (HBV) infection, examine the relationship between HBV DNA level and liver fibrosis, and assess antiviral treatment among patients with chronic HBV infection in Chumphon Province.

Materials and Methods: This descriptive cross-sectional study included individuals born before 1992 and high-risk groups screened between October 2024 and June 2025 across all 11 districts of Chumphon Province. Data included HBV serology, HBV DNA level, liver fibrosis assessed by the aspartate aminotransferase-to-platelet ratio index (APRI) and ultrasonography, and antiviral treatment.

Results: Among 23,040 individuals screened (99.9% of the target), 462 were newly HBsAg-positive, yielding a prevalence of 2.0%, comparable with the national prevalence of 1.7%. Of these, 408 continued follow-up; median age was 54 years, and females predominated. HBV DNA $\geq 2,000$ IU/mL was present in 48.3%. Higher viral load was significantly associated with greater fibrosis: APRI >0.5 occurred in 62.7% versus 37.3%, and APRI >1.0 in 94.3% versus 5.7% ($p < 0.001$). Overall, 36.3% had significant fibrosis and 10.1% had cirrhosis, predominantly in the high-viral-load group. Among 149 patients who underwent ultrasonography, cirrhosis and hepatocellular carcinoma were detected in 11.5% and 1.3%, respectively, exclusively in the high-viral-load group. Tenofovir alafenamide was prescribed to 37.2% overall and 72.6% of patients with high viral loads.

Conclusion: Higher HBV DNA levels were associated with greater liver fibrosis, cirrhosis, and hepatocellular carcinoma. These findings support proactive HBV screening and improved access to antiviral therapy. Combining HBV DNA measurement, APRI, and liver ultrasonography may facilitate risk stratification and early detection of advanced liver disease, supporting efforts toward viral hepatitis elimination.

Keywords: Hepatitis B virus; HBV DNA viral load; APRI; Cirrhosis; Hepatocellular carcinoma; Chumphon Province

Received 20 November 2025 | Revised 22 March 2026 | Accepted 1 April 2026

J Med Assoc Thai 2026;109(10):835-44

<https://doi.org/10.35755/jmedassocthai.2026.10.03965>

Hepatitis B virus (HBV) is a major cause of cirrhosis and liver cancer in populations worldwide. When infection occurs in infants, up to 90% of patients develop chronic HBV infection⁽¹⁾. Approximately 15% to 40% of patients with chronic hepatitis will progress to cirrhosis, and about 2% to 5% of patients with cirrhosis will develop liver cancer⁽²⁾. Patients with higher viral loads face a higher risk. Treatment with

antiviral drugs can suppress viral replication, helping to reduce the risk of disease progression to cirrhosis and liver cancer. According to the latest report by the World Health Organization (WHO) in 2021⁽³⁾, in 2019, there were approximately 820,000 deaths from hepatitis B worldwide, with 296 million people infected globally, but only 22% received treatment. Populations in Asia and Southeast Asia still have very high infection rates, second only to the African continent^(4,5). The WHO has set a goal to eliminate hepatitis B by 2030⁽⁶⁾. Its main target is the administration of the hepatitis B vaccine

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How to cite this article:

Prapruetkit J. The Relationship between Serum Hepatitis B Virus DNA Level and Liver Fibrosis Status among Patients with Chronic HBV Infection in Chumphon: Findings from the National Surveillance Program. J Med Assoc Thai 2026;109:835-44.

What is already known about this topic?

The overall prevalence of HBV infection in Thailand has declined to 1.7% after newborn vaccine initiation. Patients with high viral load are associated with the development of liver fibrosis, cirrhosis, and liver cancer.

What does this study add?

The prevalence of HBV infection in Chumphon Province is 2.0%, comparable to the current overall national prevalence. Patients with high viral load $\geq 2,000$ IU/mL are significantly associated with liver fibrosis (62.7%), cirrhosis (11.5%), and liver cancer (1.3%).

to at least 90% of infants. WHO has also aimed to eliminate mother-to-child transmission by reducing the infection rate among children under 5 years of age to below 0.1%⁽⁷⁾.

The situation of hepatitis B in Thailand shows a prevalence of about 5% to 7%⁽⁸⁾ in the population born before 1992, the year Thailand initiated a policy of vaccinating all newborns against hepatitis B as part of the country's Expanded Program on Immunization. This has led to a significant decrease in the prevalence of the disease. A recent study in 2025 demonstrated a marked decline in HBV infection among individuals born after 1992. No infections were detected among individuals younger than 20 years. The prevalence among those aged 21 to 30 years was approximately 0.3%, while in individuals older than 60 years it was 4.3%. Overall, the national prevalence of chronic HBV infection in Thailand has decreased to 1.7%⁽⁹⁾. However, the problem of infected individuals born before 1992 remains. In 2017, Thailand had approximately 2.2 million chronic HBV infections nationwide⁽¹⁰⁾. In the past, mother-to-child transmission was a major risk factor for the spread, but currently, the highest-risk populations are people who inject drugs (8.5%), followed by people with HIV (8.07%), and men who have sex with men (8.0%)⁽¹¹⁾. In 2019, the reported morbidity rate of hepatitis B was highest in Northern Thailand (15.8 per 100,000 population), followed by the Northeast (10.32), Central (8.73), and the South has the lowest rate (7.93)⁽¹²⁾.

Chumphon Province has implemented the Ministry of Public Health's strategic plan for the prevention and solution of viral hepatitis B.E. 2560 to 2564 (2017 to 2021) to screen for hepatitis B and C patients throughout the province and bring eligible patients into the treatment process as much as possible. Currently, data on the prevalence and distribution of hepatitis B patients in Chumphon Province are limited. Information regarding the relationship between HBV DNA viral load and liver fibrosis in the southern region is also scarce. Therefore, the present study aims to investigate the prevalence, screening rate, the relationship between HBV DNA viral load and liver fibrosis status, and the rate of antiviral drug administration among chronic hepatitis B patients in Chumphon Province.

MATERIALS AND METHODS

This study is a descriptive cross-sectional study. The study was conducted from October 2024 to June 2025, based on a multi-center design divided by district among hospitals under the Chumphon Provincial

Public Health Office, comprising 11 hospitals: Thasae Hospital, Pathio Hospital, Mab Amarit Hospital, Sawi Hospital, Langsuan Hospital, Paknam Chumphon Hospital, Paknam Langsuan Hospital, Thung Tako Hospital, Lamae Hospital, Phato Hospital, and Chumphon Khet Udomsakdi Hospital, serving as the main coordinating center. The present study was approved by the Ethics Committee of Chumphon Khet Udomsakdi Hospital (CPH-EC-114/2568).

Study Population and Data Collection

The sample group consists of the population born before 1992 and individuals with one or more risk factors for hepatitis B. These include a history of intravenous drug use, being HIV-positive, having received blood or blood components, or having undergone organ transplantation before 1992, a history of hemodialysis, having unprotected sex, having a family member with hepatitis B or C, having tattoos, piercings, acupuncture, or sharing sharp objects with others. Participants voluntarily underwent screening for hepatitis B using a rapid test. Patients previously diagnosed with and currently being treated for hepatitis B were excluded. The researchers collected data from patient medical records and data forms from the Communicable Disease Control Unit of the Chumphon Provincial Public Health Office and Chumphon Khet Udomsakdi Hospital. The data included age, sex, district of residence, HBsAg result, HBV DNA viral load (IU/mL), liver fibrosis value (aspartate aminotransferase-to-platelet ratio index, APRI), liver ultrasound results, and receipt of antiviral drugs. The APRI was used to assess liver fibrosis, calculated according to standard formulas and categorized based on WHO criteria as follows: APRI <0.5, no significant fibrosis; APRI 0.5 to 1.0, significant fibrosis; and APRI ≥1.0, advanced fibrosis or cirrhosis. Liver ultrasound results were obtained from radiologists' reports, summarized as normal, fatty liver, cirrhosis, and liver nodules.

Statistical Analyses

Data were analyzed using descriptive statistics, including prevalence, frequency, percentage, median, and interquartile range (IQR). Fisher's exact test or chi-squared test and the Mann-Whitney U test were used to compare differences between groups. A p-value less than 0.05 was considered statistically significant.

RESULTS

According to data from the Chumphon Provincial Statistical Office, in 2025, there were 315,761 people

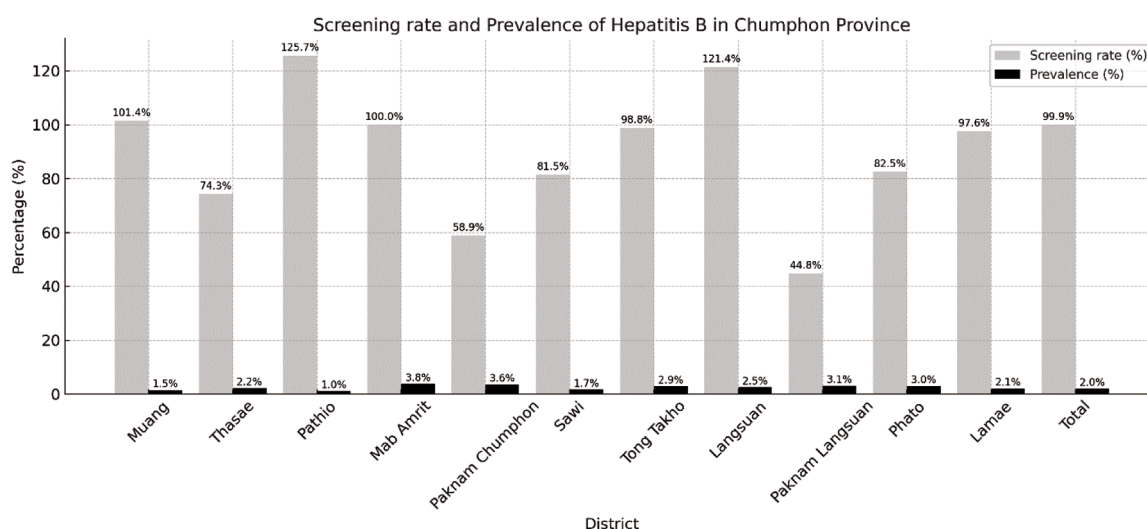


Figure 1. Screening rate and prevalence of hepatitis B virus infection in Chumphon Province.

born before 1992. Chumphon Province set a target to screen 23,065 people in the first year, representing 7.3% of the population born before 1992. The screening target was determined by the Department of Disease Control, Ministry of Public Health, Thailand. The screening was conducted between October 1, 2024, and June 30, 2025. A total of 23,040 individuals were screened, resulting in a provincial screening rate of 99.9%. The districts with the highest screening rates were Pathio (125.7%), Langsuan (121.4%), Mueang (101.4%), and Mab Amarit (100%), respectively. Meanwhile, the districts with screening rates far below the target were Paknam Langsuan (44.8%), followed by Paknam Chumphon (58.9%) and Thasae (74.3%). The screening results found 462 new cases of hepatitis B infection (HBsAg+), representing a prevalence of 2.0% in Chumphon Province. The districts with the highest prevalence were Mab Amarit (3.8%), Paknam Chumphon (3.6%), and Paknam Langsuan (3.1%), respectively. In contrast, Pathio District had the lowest prevalence (1.0%), followed by Mueang District (1.5%). The prevalence of hepatitis B infection varied by district, but the difference was not statistically significant ($p > 0.05$), as shown in Table 1 and Figure 1.

Hepatitis B DNA Viral Load Study Results

Out of 462 new hepatitis B patients, only 408 (88.4%) attended follow-up at the hospital, but 54 patients (11.6%) did not show up or refused further treatment. The baseline characteristics of the 408 hepatitis B patients are shown in Table 2. The study found that the patients' median age was 54 years

Table 1. Screening rate and prevalence of hepatitis B virus infection in Chumphon Province

District	Target (n)	Screened (n)	Screening rate (%)	HBsAg+ (n)	Prevalence (%)
Muang	7,748	7,857	101.4	118	1.5
Thasae	3,960	2,941	74.3	65	2.2
Pathio	1,290	1,621	125.7	17	1.0
Mab Amrit	660	660	100	25	3.8
Paknam Chumphon	660	389	58.9	14	3.6
Sawi	3,420	2,788	81.5	47	1.7
Tong Takho	1,110	1,097	98.8	32	2.9
Langsuan	2,490	3,024	121.4	76	2.5
Paknam Langsuan	1,020	457	44.8	14	3.1
Phato	1,140	941	82.5	28	3.0
Lamae	1,290	1,259	97.6	26	2.1
Total	23,065	23,040	99.9	462	2.0

(IQR 46 to 61), the most common age group being 51 to 60 years (35%), followed by 41 to 50 years and 61 to 70 years (22% each). There were more females than males (60.7% and 39.2%, respectively). Most patients resided in Mueang District (24.5%), followed by Langsuan (16.2%) and Thasae (13.2%). When all patients were divided into two groups based on viral load, the group with low viral load ($< 2,000$ IU/mL) consisted of 211 people (51.7%), and the group with high viral load ($\geq 2,000$ IU/mL) had 197 people (48.3%). The baseline characteristics of both groups are shown in Table 2. Both groups had a similar median age (54 and 53 years). When patients were divided into 5 age groups—34 to 40 years (60 people), 41 to 50 years (90 people), 51 to 60 years

Table 2. Clinical characteristics of the 408 hepatitis B patients by HBV DNA viral load

Characteristics	Total (n=408)	HBV DNA VL <2,000 (n=211)	HBV DNA VL ≥2,000 (n=197)	p-value
Age (years); median (IQR)	54 (44 to 60)	54 (46 to 61)	53 (53 to 63)	0.35
Age group (years); n (%)				
34 to 40	60 (14.7)	27 (45)	33 (55)	
41 to 50	90 (22)	48 (53.3)	42 (46.7)	
51 to 60	143 (35)	71 (49.6)	72 (50.4)	
61 to 70	90 (22)	48 (53.3)	42 (46.7)	
>70	25 (6.3)	17 (68)	8 (32)	
Male; n (%)	160 (39.2)	73 (34.6)	87 (44.20)	0.06
District; n (%)				0.18
Muang	100 (24.5)	58 (58)	42 (42)	
Thasae	54 (13.2)	25 (46.3)	29 (53.7)	
Pathio	11 (2.69)	3 (27.2)	8 (72.8)	
Mab Amrit	20 (4.9)	10 (50)	10 (50)	
Sawi	46 (11.3)	19 (41.3)	27 (58.7)	
Langsuan	66 (16.2)	31 (47)	35 (53)	
Paknam Chumphon	14 (3.4)	9 (64.3)	5 (35.7)	
Paknam Langsuan	14 (3.4)	10 (71.4)	4 (28.6)	
Lamae	26 (6.4)	11 (42.3)	15 (57.7)	
Phato	28 (6.9)	19 (67.9)	9 (32.1)	
Tong Takho	29 (7.1)	16 (55.2)	13 (44.8)	
HBV DNA VL (IU/mL); median (IQR)	1,095 (230 to 9,202)	286 (94.5 to 710)	27,300 (4,270 to 592,450)	<0.001
Treatment with TAF; n (%)	152 (37.2)	9 (4.3)	143 (72.6)	<0.001

HBV=hepatitis B virus; VL=viral load; TAF=tenofovir alafenamide; IQR=interquartile range

(148 people), 61 to 70 years (90 people), and over 70 years (25 people)—the age distribution between the two groups was similar. Although the patients over 70 years old had a higher proportion with low viral load compared to other age groups (68%), there was no statistically significant difference in age groups between the two patient groups ($p=0.35$). Regarding the district of residence across all 11 districts, the district with the highest proportion of high viral load (HBV DNA VL $\geq 2,000$) was Pathio (72.8%), followed by Sawi (58.7%) and Lamae (57.7%). The districts with the lowest proportion of high viral load patients were Paknam Langsuan (28.6%), Phato (32.1%), and Paknam Chumphon (35.7%). The high proportion observed in Phato (72.8%) may be influenced by the small sample size (11 people) and should be interpreted with caution. Overall, the rate of patients with high viral load $\geq 2,000$ IU/mL in Chumphon Province was 48.3%. Statistical analysis showed no significant difference in the distribution of patients by district ($p=0.18$) (Figure 2). The median viral load for all patients was 1,095 IU/mL. The low viral load group had a median of 286 IU/mL compared to 27,300 IU/mL in the high viral load group, a statistically significant difference ($p<0.001$) (Figure 3).

Liver Fibrosis Study Results

Of the 408 hepatitis B patients, 347 (85%) had their liver fibrosis calculated using the APRI, and only 149 (36.5%) underwent a liver ultrasound. The results of the APRI and liver ultrasound are shown in Table 3 and Figure 4. Among the 347 hepatitis B patients, 36.3% had moderate liver fibrosis (APRI 0.5 to 1.0, significant fibrosis), and 35 patients (10.1%) had advanced liver fibrosis or cirrhosis (APRI ≥ 1.0). When comparing the overall fibrosis scores between the two groups, the high viral load group had a higher median fibrosis score than the low viral load group (0.5 and 0.2, respectively), with a statistically significant difference ($p<0.001$). When patients were grouped by fibrosis severity using WHO cutoffs, low-level fibrosis (APRI <0.5) was more common in the low viral load group (61.8% vs. 38.2%). Moderate fibrosis (APRI 0.5 to 1.0, significant fibrosis) was more common in the high viral load group (62.7% vs. 37.3%). Advanced fibrosis or cirrhosis (APRI ≥ 1.0) was found much more frequently in the high viral load group (94.3%) compared to the low viral load group (5.7%). All these differences were statistically significant ($p<0.001$). Liver ultrasound results in 149 patients (36.5%) showed that a normal liver status

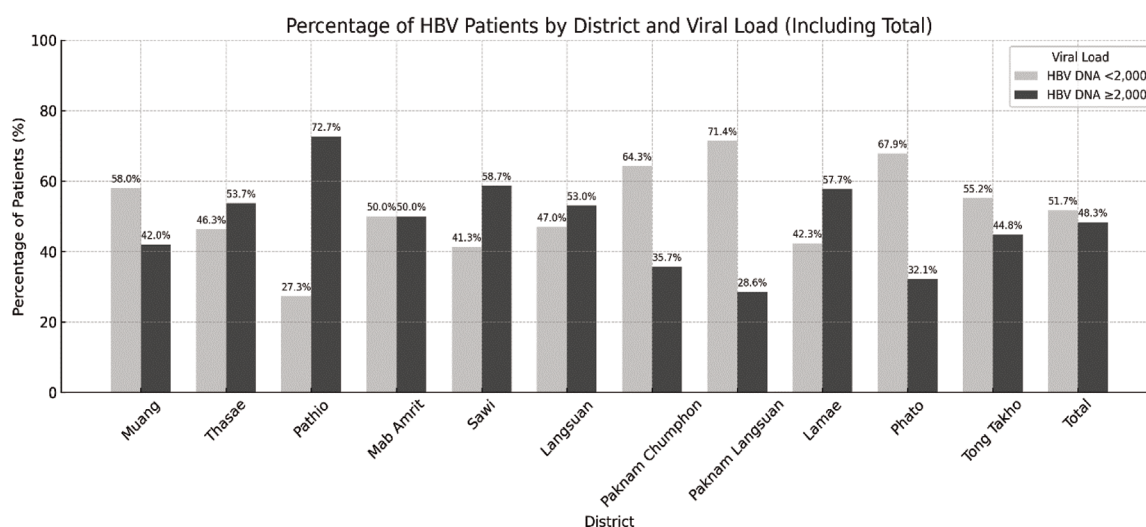


Figure 2. Distribution of HBV patients by district and HBV DNA viral load.

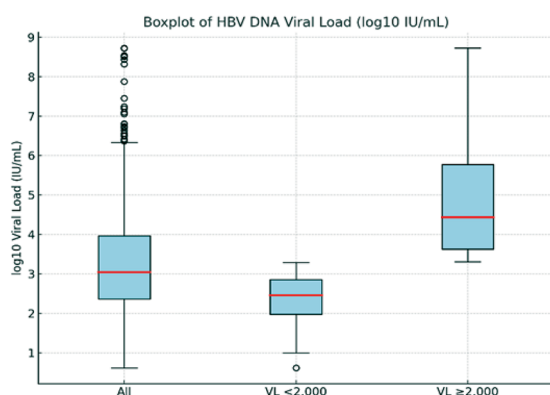


Figure 3. Distribution of HBV DNA viral load among two groups of patients in log₁₀ IU/mL.

was similar in both groups (VL <2,000: 56 patients and VL ≥2,000: 52 patients) ($p=0.38$), which was not a significant difference. Fatty liver was detected more often in the low viral load group than the high viral load group (68.2% and 31.8%, respectively), but was not statistically significant ($p=0.085$). Cirrhosis was found in 17 patients (11.4%), all of whom had a high viral load, which was statistically significant ($p<0.001$). Liver ultrasound revealed liver nodules in 2 patients (1.3%), exclusively in the high viral load group, which was also statistically significant ($p<0.001$). Both of these patients later underwent further investigation by a 3-phase liver computed tomography (CT) scan and were diagnosed with hepatocellular carcinoma (HCC). Neither of them had any symptoms at the time of screening. They were detected with HCC solely through the proactive liver ultrasound.

Patient Treatment Results with Antiviral Drugs

Of the 408 patients, 152 (37.2%) were treated with the antiviral drug tenofovir alafenamide (TAF), which is the primary medication for the treatment of hepatitis B. The proportion of patients receiving the drug was 72.6% in the high viral load group ($\geq 2,000$ IU/mL), whereas only 4.3% of those in the low viral load group. This difference was statistically significant ($p<0.001$) (Figure 5). Among the 197 patients in the high viral load group, 54 (27.4%) did not receive antiviral drugs. The reasons were: 11 patients (5.6%) were under 35 years old and did not meet the criteria for treatment based on liver fibrosis; 33 patients (16.7%) refused medication and requested to follow up. These patients were younger than 40 years old, had a viral load <6,000 IU/mL, and 10 patients (5.0%) were lost to follow-up. In the low viral load group (<2,000 IU/mL), 9 patients received antiviral treatment because they were found to have cirrhosis by liver ultrasound or an APRI score ≥ 1.0 , which indicated immediate antiviral treatment, even with a low viral load.

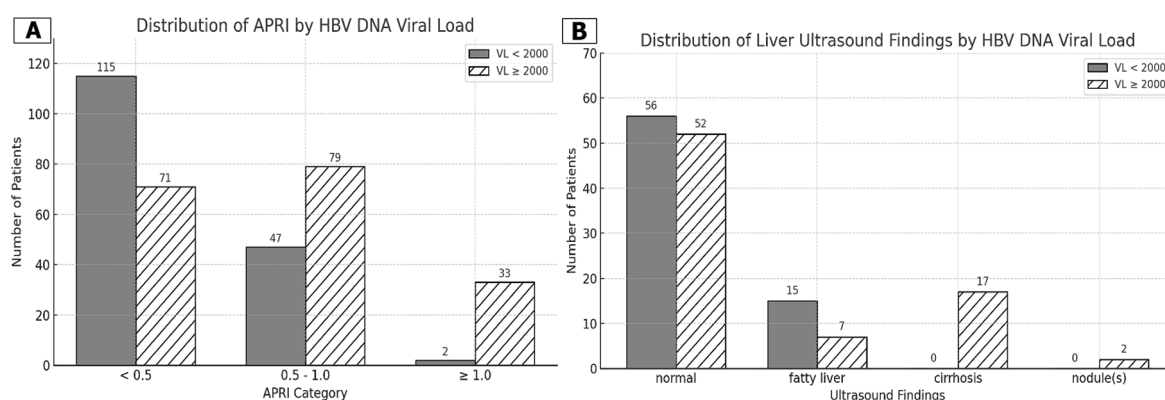
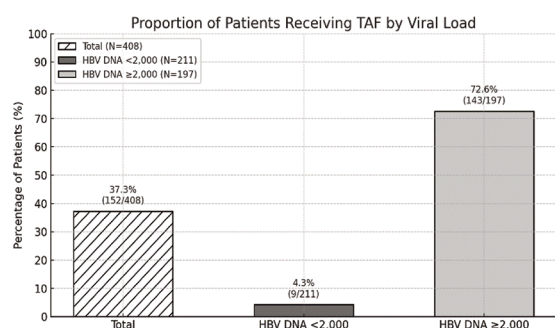
DISCUSSION

The present study investigated the prevalence, screening rate, the relationship between HBV viral load and liver fibrosis, and the rate of antiviral drug administration among chronic hepatitis B patients in Chumphon Province. It was conducted as part of the nationwide screening project for hepatitis B and C for the fiscal year 2025. Although previous research has studied the prevalence of hepatitis B in Thailand and the southern region, such a study had not been conducted in Chumphon. Data on the relationship between HBV

Table 3. Results of liver fibrosis (APRI) and liver ultrasound by HBV DNA viral load

	Total	HBV DNA VL <2,000	HBV DNA VL ≥2,000	p-value
APRI; median (IQR)	0.3 (0.2 to 0.5)	0.2 (0.2 to 0.3)	0.5 (0.4 to 0.7)	<0.001
APRI score category; n (%)	347	164	183	
<0.5	186 (53.6)	115 (61.8)	71 (38.2)	<0.001
0.5 to 1.0	126 (36.3)	47 (37.3)	79 (62.7)	<0.001
≥1.0	35 (10.1)	2 (5.7)	33 (94.3)	<0.001
Ultrasonographic finding; n (%)	149	73	76	
Normal	108 (72.5)	56 (52.0)	52 (48.0)	0.38
Fatty liver	22 (14.7)	15 (68.2)	7 (31.8)	0.085
Cirrhosis	17 (11.5)	0 (0.0)	17 (100)	<0.001
Nodule(s)	2 (1.3)	0 (0.0)	2 (100)	<0.001

HBV=hepatitis B virus; VL=viral load; IQR=interquartile range


Figure 4. Distribution of liver fibrosis (APRI) (A) and liver ultrasound by HBV DNA viral load (B).

Figure 5. Proportion of patients receiving antiviral drugs (TAF) by HBV DNA viral load.

viral load and liver fibrosis in the south are limited. This is the first research to comprehensively collect data on screening rates, prevalence, viral load distribution, liver fibrosis status, and access to treatment for hepatitis B patients in Chumphon Province.

The screening target was determined by the Department of Disease Control, which set a nationwide target of 3 million individuals born before 1992 for the

first year (2025). Chumphon Province was assigned a target to screen 23,065 individuals, and we achieved a provincial screening rate of 99.9%. Although this represents 7.3% of the eligible population, it reflects a phased implementation strategy, with targets planned to increase annually to achieve full coverage of 100% by 2030. In this study, we found that several districts, particularly smaller ones, had screening rates below the target, possibly due to personnel limitations. Provincial supervisors must provide guidance and offer assistance to ensure that screening in the coming years is more effective. The screening found HBsAg+ 462 individuals, corresponding to a provincial prevalence of 2.0%. However, only 408 patients (88.4%) continue the treatment process in the hospitals, while the other 11.6% refused treatment or were lost to follow-up. This is an important problem and a critical gap for healthcare services in Thailand. This emphasizes the need for proactive patient education, addresses concerns about the disease, and improves treatment in routine clinical practice. According to the most recent nationwide study, the overall prevalence of

HBV infection in Thailand has declined to 1.7%⁽⁹⁾. In contrast, individuals born before 1992 continue to exhibit a higher prevalence of 4.3%. Therefore, the prevalence of 2.0% among the pre-1992 birth cohort in Chumphon Province is relatively low compared with individuals of the same age group and is comparable to the current overall national prevalence.

Of the 408 patients, the proportion of the high viral load group ($\geq 2,000$ IU/mL) was close to the low viral load group (48.3% vs. 51.7%), indicating an even distribution of viral levels within the population. The study found that the high viral load group had significantly more fibrosis (APRI 0.5 to 1.0) and cirrhosis (APRI ≥ 1.0) than the low viral load group (62.7% vs. 37.3% and 94.3% vs. 5.7%, respectively). Liver ultrasound revealed cirrhosis exclusively in the high viral load group 11.5% and HCC (1.3%). This evidence confirms that a high HBV DNA viral load is directly associated with liver fibrosis, cirrhosis, and HCC. These findings are consistent with a large-scale study from Taiwan⁽¹³⁾, which followed over 3,600 hepatitis B patients and found that those with a high viral load ($\geq 10,000$ copies/mL or 2,000 IU/mL) had a significantly increased risk of liver cancer, independent of age, sex, alanine transaminase (ALT) levels, HBeAg status, and cirrhosis. Therefore, HBV DNA viral load is the most important predictor of HCC in chronic hepatitis B patients. However, the low rate of ultrasound examinations (36.5%) due to the shortage of radiologists in Chumphon Province may lead to underdiagnosis of cirrhosis and HCC in this study. Additionally, the liver ultrasound showed that fatty liver was more common in the low viral load group (68.2% vs. 31.8%, $p=0.085$), although not statistically significant. This is a highly relevant clinical observation given the rise of metabolic dysfunction-associated steatotic liver disease (MASLD). Further analysis of body mass index (BMI) and metabolic syndrome is warranted, and patients with elevated BMI should be considered for intensive weight reduction and metabolic control to reduce the risk of HCC. This is supported by a previous study⁽¹⁴⁾ demonstrating that metabolic liver disease significantly increases the risk of HCC in chronic hepatitis B patients, even with low viral load.

The use of non-invasive scores such as APRI for assessing liver fibrosis without the need for liver biopsy provides substantial clinical benefits. In addition to its diagnostic accuracy, APRI is simple to calculate and widely accessible in all levels of healthcare settings. APRI was initially developed for the assessment of hepatic fibrosis in chronic hepatitis C virus (HCV)

patients and demonstrated high diagnostic accuracy⁽¹⁵⁾. It was later refined and applied to patients with chronic hepatitis B (CHB) and other chronic liver diseases^(16,17). The updated WHO 2024 Guidelines⁽⁶⁾ recommend the use of APRI for the screening and staging of liver fibrosis in HBV-infected individuals. The guideline adopts two diagnostic cut-off values: APRI <0.5 and ≥ 1.0 . An APRI score ≥ 0.5 indicates significant fibrosis (Metavir $\geq F2$), whereas an APRI score ≥ 1.0 is considered cirrhosis (F4). This revision replaces the previous threshold of APRI >2.0 , which has very low sensitivity for diagnosing cirrhosis in both HBV and HCV patients^(18,19) despite its very high specificity. A recent systematic review and meta-analysis informing the WHO 2024 guidelines reported that applying a threshold of APRI >0.8 to 1.2 improves sensitivity to 59.4% while maintaining high specificity of 73.9%⁽²⁰⁾. The combined use of HBV DNA viral load and APRI has therefore been widely adopted as a treatment-guiding strategy for chronic hepatitis B worldwide^(6,21-23). This approach serves as a crucial tool for the timely initiation of antiviral therapy, helping to slow hepatic disease progression and reduce the future risk of hepatocellular carcinoma.

TAF is a nucleos(t)ide analogue (NA) used as a primary drug for treating hepatitis B. A review of studies in Asian patients⁽²⁴⁾ showed that NA therapy can reduce the risk of liver cancer up to 80% in non-cirrhotic patients and 30% in patients who already have cirrhosis. Therefore, promptly starting NA antiviral therapy in hepatitis B patients is highly beneficial, significantly reducing the risk of liver cancer, especially in those without cirrhosis. This study found that 152 patients received TAF, accounting for 72.6% of patients eligible for treatment (VL $\geq 2,000$ IU/mL), or 37.2% of all patients. In contrast, only 4.3% of the low viral load group received antiviral drugs. This result aligns with international guidelines⁽²¹⁻²³⁾ and the Thai Guidelines for Screening and Treatment of Hepatitis B and C for General Practitioners, B.E. 2567 (2024)⁽²⁵⁾. These guidelines recommend starting antiviral therapy in patients with a viral load $\geq 2,000$ IU/mL who are also over 35 years old, or have evidence of hepatitis (elevated ALT), or have moderate or higher liver fibrosis (APRI >0.5). It was also found that 21.8% of patients were not ready to start antiviral therapy; all were under 40 years old with a relatively low HBV DNA VL ($<6,000$ IU/mL). Data from several studies confirm that patients under 40 have a high chance of their viral load decreasing spontaneously to a low viremia or inactive carrier state⁽²⁾. Therefore, this group may not need to start antiviral drugs immediately,

but requires continuous monitoring of viral load and liver fibrosis. We found that HBsAg+ 54 patients (11.6%) refused to enter treatment, indicating a lack of awareness of the disease's importance and a lack of concern for their health. Proactive community-level education and follow-up are essential to encourage patients to accept treatment in hospitals.

The WHO has established a strategic plan to eliminate viral hepatitis by 2030⁽⁶⁾ (the 2030 Agenda for Sustainable Development) and released "Guidelines for the prevention, diagnosis, care and treatment for people with chronic hepatitis B infection" in March 2024, aiming to increase the treatment rate for hepatitis B patients from the previous 8 to 15% to at least 50%. Meanwhile, Thailand has announced the "Thailand National Strategies to Eliminate Viral Hepatitis 2022 to 2030"⁽¹²⁾ and established the "Guidelines for Screening and Treatment of Hepatitis B and C for General Practitioners, B.E. 2567 (2024)"⁽²⁵⁾ to broaden the treatment criteria and simplify the process. A comparison of the WHO and Thai guidelines reveals some differences. For instance, in the group with HBV DNA $\geq 2,000$ IU/mL, the WHO still uses the previous criteria from EASL 2017 and AASLD 2018, recommending treatment only when ALT is elevated. In contrast, Thailand has expanded the criteria for this group, recommending antiviral drugs for anyone over 35 years old, or with moderate fibrosis (F2) or higher, or with HBV-related extrahepatic manifestations, even if ALT is normal. Research has found that patients who do not meet the AASLD 2018 treatment criteria and do not receive antiviral therapy have about a 2.38 times higher risk of developing cirrhosis and liver cancer compared to the group that receives treatment⁽²⁶⁾. These data support Thailand's treatment, which allows for more patient care than the WHO's. For patients with cirrhosis, they only need to have detectable virus in their blood to receive antiviral drugs. The WHO has added treatment criteria for HBV patients with persistently elevated ALT, moderate fibrosis (F2) or higher, cirrhosis, a family history of liver cancer, co-infection with other viruses (HIV, HDV, HCV), or comorbidities like diabetes and fatty liver disease; these patients can start antiviral therapy without an HBV DNA VL test or consideration of ALT levels. This approach is suitable for resource-limited countries where HBV DNA VL testing is not universally available. In Thailand, HBV DNA VL testing is still required, except for patients receiving immunosuppressive drugs who can start antiviral therapy immediately. It is clear that both new treatment guidelines have been adjusted to make treatment easier and more widely accessible, based

on the context of each country's public health system. It is expected that in the long term, the incidence of liver cancer in Thailand and worldwide will decrease significantly.

LIMITATION

As data were collected from multiple community hospitals, some data forms were incomplete, and not all patients (85%) were assessed for liver fibrosis (APRI). Improving the completeness of data entry and adding an automatic FIB-4/APRI calculation system to medical records would enhance the quality of screening. A lack of radiologists resulted in a very low rate of liver ultrasound, at only 36.5% of all patients, leading to an underestimation of cirrhosis and liver cancer. Increasing the number of radiologists and ultrasound service points, such as by opening special clinics, adding service units at private medical facilities, or using mobile Transient Elastography (FibroScan), would help identify more patients who meet treatment criteria and detect liver cancer earlier.

CONCLUSION

The overall picture of hepatitis B infection in the population of Chumphon Province is similar to the national average (2.0% vs. 1.7%). Patients with high viral load are significantly associated with the development of liver fibrosis, cirrhosis, and liver cancer. The use of HBV DNA viral load with a cutoff of $\geq 2,000$ IU/mL, in conjunction with APRI and ultrasound to guide treatment decisions, is an appropriate approach that aligns with international standards. Therefore, continuous proactive screening should be carried out, with a connected system to ensure that all diagnosed patients are fully evaluated for treatment. This will help reduce the long-term burden of cirrhosis and liver cancer in the population of Chumphon Province.

Acknowledgement

The author gratefully acknowledge the Chumphon Provincial Public Health Office 11 District Hospital in Chumphon, Outpatient Department, Division of Medical Records, and Chumphon Khet Udomsakdi Hospital for their collaboration and data support.

Author Contributions

JP, MD, Gastroenterologist (Senior Professional Level), Chumphon Khet Udomsakdi Hospital, was responsible for conceptualization, study design, data acquisition, formal analysis, interpretation of data, manuscript drafting, critical revision, supervision,

and project administration. The author reviewed and approved the final version of the manuscript.

Clinical Trial Registration

This study is not a clinical trial; therefore, registration is not required.

Conflicts of Interest

The author declares no conflict of interest.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request. Due to privacy and ethical restrictions, the data are not publicly available.

Ethics Approval and Consent to Participate

The study was approved by the Ethics Committee of Chumphon Khet Udomsakdi Hospital (protocol number CPH-EC-114/2568). The requirement for informed consent was waived as the data were retrospectively collected and were anonymous.

Funding Disclosure

This study received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Use of Artificial Intelligence

Artificial intelligence tools (GPT-5.3, OpenAI) were used to assist in language editing and improving the clarity of the manuscript. All content was reviewed and verified by the author.

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