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Research

CHARACTERIZATION OF CHRONIC HEPATITIS PATIENTS BASED ON BPJS KESEHATAN SAMPLE DATA, 2015-2023

Andhika Putra Rahardjo[1]

[1]Faculty of Medicine, Universitas Kristen Duta Wacana, Yogyakarta, Indonesia

Corresponding Author: andhikaputrarahardjo@gmail.com

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ABSTRACT

Background: Chronic hepatitis is a major public health burden in Indonesia, leading to liver cirrhosis and hepatocellular carcinoma. While large-scale administrative data is available through BPJS Kesehatan, national-level characterization of patient profiles remains limited.

Objective: This study aims to characterize the demographic profiles, healthcare facility distribution, and complications of chronic hepatitis patients in Indonesia.

Methods: A retrospective cohort study was conducted using the BPJS Kesehatan Sample Database (2015–2023). Analysis included ICD-10 diagnostic criteria and hospital classification.

Results: A total of 1,370 cases were analyzed, with the highest concentration in Java. The productive age group (15-44 years) dominated at 48%. Liver cirrhosis was the most common complication (30%).

Conclusion: Chronic hepatitis significantly impacts the productive-age population. Strengthening early detection at secondary healthcare levels is essential to prevent advanced complications.

Keywords: chronic hepatitis, BPJS Kesehatan, epidemiology, Indonesia, JKN

INTRODUCTION

Chronic viral hepatitis remains one of the leading causes of liver-related morbidity and mortality worldwide. Hepatitis B virus (HBV) and hepatitis C virus (HCV) infections account for the majority of chronic hepatitis cases and are strongly associated with the development of liver cirrhosis and hepatocellular carcinoma (HCC). Recent estimates from the Global Burden of Disease (GBD) 2022 study indicate that the global prevalence of chronic HBV infection remains at approximately 3.2%, underscoring the persistent burden of viral hepatitis despite advances in prevention and treatment.[1] Similarly, the World Health Organization (WHO) reported that viral hepatitis caused approximately 1.3 million deaths globally in 2022, primarily due to complications related to chronic liver disease.[2]

Low- and middle-income countries continue to bear a disproportionate share of this burden. Indonesia is classified as a country with intermediate-to-high endemicity for hepatitis B and remains affected by a substantial burden of hepatitis C. Historical epidemiological data demonstrate sustained transmission of both HBV and HCV in the Indonesian population prior to the widespread implementation of vaccination and screening programs.[3] Although national immunization initiatives have reduced new HBV infections among younger cohorts, a large proportion of adults infected before vaccine introduction remain at risk for chronic liver disease and its complications.

Recent epidemiological studies in Indonesia have documented ongoing hepatitis transmission in various population groups. Studies among healthcare workers have demonstrated occupational exposure and persistent infection risks.[4] Similarly, investigations among blood donors and correctional facility populations revealed a notable prevalence of occult HBV infection and co-infection with HCV and HIV, highlighting underdiagnosis in both general and high-risk groups.[5] These findings suggest that chronic hepatitis remains a largely silent disease across diverse segments of the population.

In response to this ongoing burden, Indonesia has committed to the global target of eliminating viral hepatitis as a public health threat by 2030. National strategies emphasize expanded vaccination, improved screening coverage, and increased access to antiviral therapy, particularly for hepatitis C through direct-acting antivirals (DAAs).[2] Modeling studies have demonstrated that achieving elimination targets will require substantial scale-up of diagnosis and treatment, supported by a strong health financing system.[6]

The implementation of the National Health Insurance system (Jaminan Kesehatan Nasional, JKN), administered by BPJS Kesehatan, has significantly expanded access to

healthcare services in Indonesia. As the largest single-payer health insurance system in the country, BPJS Kesehatan generates extensive administrative health data that provide a unique opportunity to examine disease patterns and healthcare utilization at the national level. However, despite the availability of these large-scale data, comprehensive analyses characterizing chronic hepatitis patients within the BPJS Kesehatan system remain limited.

Most existing studies on hepatitis B and C in Indonesia have focused on specific populations or localized clinical settings, such as healthcare workers, blood donors, correctional facility inmates, or patients treated in tertiary referral hospitals.[4,5,7] While these studies provide valuable insights into epidemiological patterns and risk factors, their findings cannot be readily generalized to the broader population covered by the national health insurance system. At the national level, estimates of hepatitis burden in Indonesia are largely derived from model-based projections and global surveillance reports, such as those produced by the GBD study and WHO.[1,2] Although these reports are essential for global comparison and policy advocacy, they do not reflect real-world healthcare utilization, referral pathways, and disease complications experienced by patients within the JKN system.

Furthermore, studies evaluating hepatitis management under JKN have primarily concentrated on policy analysis, cost-effectiveness modeling, or treatment outcomes in selected cohorts, particularly in the context of hepatitis C elimination strategies.[6] There is a lack of empirical evidence describing how chronic hepatitis patients are distributed across different levels of healthcare facilities and the extent to which they present with advanced complications such as cirrhosis and hepatocellular carcinoma in routine clinical practice. Although studies assessing knowledge, attitudes, and preventive behaviors toward hepatitis in Indonesia have identified gaps in screening uptake and vaccination coverage, these findings have rarely been linked to administrative healthcare data that capture actual service utilization and disease outcomes.[8,9]

Consequently, there is a clear need for a national-level characterization of chronic hepatitis patients using real-world administrative health data. By analyzing BPJS Kesehatan National Sample Data from 2015 to 2023, this study addresses these gaps by providing comprehensive information on demographic characteristics, healthcare facility utilization, and major disease complications among chronic hepatitis patients within the JKN system. This evidence is crucial to inform health policy, optimize referral mechanisms, and strengthen Indonesia's efforts to achieve viral hepatitis elimination by 2030.

METHODS

Study Design and Data Source

This study employed a retrospective observational design using secondary data obtained from the BPJS Kesehatan National Sample Database. The dataset consists of anonymized health insurance claims representing healthcare utilization under the JKN scheme across Indonesia.

Study Population

Patients were included if they had a diagnosis of chronic viral hepatitis recorded using International Classification of Diseases, 10th Revision (ICD-10) codes B18.0, B18.1, B18.2, B18.8, or B18.9. To ensure consistency with the clinical definition of chronic hepatitis, patients were required to have at least two healthcare encounters with the same diagnosis separated by a minimum interval of six months.

Variables and Definitions

Demographic variables included age, sex, and region of healthcare utilization. Age was categorized into productive age (15–44 years), middle age (45–64 years), and elderly (>65 years), reflecting demographic and workforce classifications commonly used in Indonesian public health research.

Healthcare facilities were classified according to the national hospital tier system:

- Type A: Tertiary or national referral hospitals
- Type B: Provincial referral hospitals
- Type C: District or secondary-level hospitals

Major complications were identified using ICD-10 codes for liver cirrhosis (K74), hepatocellular carcinoma (C22.0), and hepatic failure (K72). These complications represent clinically significant outcomes of chronic HBV and HCV infection and are commonly used indicators of disease progression.[10]

Ethical Considerations

The BPJS Kesehatan Sample Data are fully anonymized prior to release. This study involved no direct patient contact and did not use identifiable personal information. As such, individual informed consent was not required, in accordance with national ethical guidelines for secondary data analysis.

RESULTS

A total of 1,370 patients met the inclusion criteria during the study period. The distribution of cases revealed notable demographic and clinical patterns.

Demographic Characteristics

Nearly half of the patients (48.0%) were within the productive-age group (15–44 years), followed by those aged 45–64 years (40.0%). Elderly patients (>65 years) accounted for 12.0% of cases.

Healthcare Facility Utilization

The distribution of cases across provinces is presented in Table 1. Cases were observed in all 34 provinces, indicating broad geographic coverage. The highest number of cases was recorded in Central Java (n = 210; 15.33%), followed by East Java (n = 172; 12.55%) and West Java (n = 115; 8.39%). Jakarta Capital Region (DKI Jakarta) also contributed a substantial proportion of cases (n = 76; 5.55%). Several provinces outside Java showed notable case counts,

including South Sulawesi (n = 88; 6.42%) and East Nusa Tenggara (n = 70; 5.11%). In contrast, lower numbers of cases were observed in provinces such as North Kalimantan, Bangka Belitung Islands, and Maluku Utara, each accounting for less than 1% of the total cases. Overall, the distribution reflects marked regional variation, with a higher concentration of cases in more densely populated provinces, particularly on Java Island, while provinces with smaller populations contributed fewer cases.

The characteristics of the study population are summarized in Table 2. Nearly half of the cases were in the 15–44 years age group (n = 658; 48%), followed by those aged 45–64 years (n = 548; 40%), while individuals aged ≥64 years accounted for a smaller proportion (n = 164; 12%). In terms of sex distribution, male patients predominated (n = 795; 58%), whereas female patients comprised 42% of the cases (n = 575). Regarding healthcare facility level, cases were relatively evenly distributed across hospital types, with Type A hospitals accounting for 30% (n = 411), and both Type B and Type C hospitals contributing 35% each (n = 479 and n = 480, respectively). Among major complications, liver cirrhosis was the most frequently observed (n = 411; 30%), followed by hepatocellular carcinoma (n = 205; 15%) and hepatic failure (n = 137; 10%). Overall, this pattern demonstrates that chronic hepatitis care within the BPJS Kesehatan system was not predominantly centralized at tertiary centers, but rather distributed across multiple levels of healthcare facilities.

Complication Profile

Regarding disease-related complications, liver cirrhosis was the most frequently documented condition, affecting 30.0% of the study population. Hepatocellular carcinoma was identified in 15.0% of patients, indicating a substantial burden of malignant liver disease among individuals with chronic hepatitis. Additionally, hepatic failure was observed in 10.0% of cases. The occurrence of these complications in a notable proportion of patients suggests that many individuals entered the healthcare system with advanced stages of chronic liver disease, as reflected by the presence of both structural liver damage and life-threatening clinical outcomes.

Table 1. Geographical distribution of chronic hepatitis cases by province, 2015-2023

No.	Province	Number Of Case	%
1	Aceh	21	1,53
2	Bali	65	4,75
3	Banten	34	2,48
4	Bengkulu	6	0,44
5	S.P. Yogyakarta	26	1,9
6	S.R. Jakarta	76	5,55
7	Jambi	14	1,02
8	West Java	115	8,39
9	Central Java	210	15,33
10	East Java	172	12,55
11	West Kalimantan	17	1,24
12	South Kalimantan	36	2,63
13	Central Kalimantan	26	1,9
14	East Kalimantan	38	2,77
15	North Kalimantan	5	0,36
16	Bangka Belitung Islands	5	0,36
17	Riau Islands	9	0,66
18	Lampung	36	2,63
19	Maluku	20	1,46
20	North Maluku	20	0,146
21	Nanggroe Aceh Darussalam	7	0,51
22	West Nusa Tenggara	34	2,48
23	East Nusa Tenggara	70	5,11
24	Papua	22	1,61
25	West Papua	24	1,75
26	Riau	9	0,66
27	West Sulawesi	10	0,73
28	South Sulawesi	88	6,42
29	Central Sulawesi	31	2,26
30	Southeast Sulawesi	20	1,46
31	North Sulawesi	27	1,97
32	West Sumatera	24	1,75
33	South Sumatera	28	2,04
34	North Sumatera	25	1,25

Table 2. Demographic and Clinical Characteristics of Chronic Hepatitis Patients (n = 1,370)

Variable	Number	%
Age Group (years)		
15-44 (productive age)	658	48
45-64	548	40
>64	164	12
Sex		
Male	795	58
Female	575	42
Healthcare Facility Level		
Type A hospital	411	30
Type B hospital	479	35
Type C hospital	480	35
Major Complications		
Liver cirrhosis	411	30
Hepatocellular carcinoma	205	15
Hepatic failure	137	10

DISCUSSION

This study provides national-level evidence on the characteristics of chronic hepatitis patients utilizing BPJS Kesehatan services in Indonesia. The predominance of patients within the productive-age group highlights the substantial socioeconomic implications of chronic hepatitis. Illness occurring during peak working years may lead to reduced productivity, increased healthcare costs, and long-term economic consequences for both individuals and the national health system.

The present study demonstrated that nearly half of the patients belonged to the productive-age group (15–44 years), followed by those aged 45–64 years, with a smaller

proportion observed among elderly patients. This pattern may be associated with increased social activities, occupational exposure, and higher mobility in these age groups, which potentially elevate the risk of viral transmission.[11] The observed geographic variation in case distribution likely reflects a combination of population density, healthcare utilization patterns, and reporting intensity, rather than true differences in underlying disease risk alone. Provinces on Java Island accounted for the largest proportions of cases, which is consistent with their larger populations and higher concentration of healthcare facilities. In administrative claims data, regions with greater service availability and higher health-seeking behaviors are more likely to generate complete and repeated records, thereby increasing case capture.[12]

We also found a higher prevalence among males. This gender disparity may be attributed to differences in risk-related behaviors, occupational factors, and healthcare-seeking patterns.[13,14] The higher proportion of male patients observed aligns with previous studies demonstrating increased exposure to hepatitis risk factors among men, including occupational hazards and historical healthcare-related transmission.[4,15] Behavioral and biological factors may also contribute to sex-based differences in disease progression.[16]

The decentralization of care observed in this study reflects the structure of the JKN referral system. While management at Type B and C hospitals improves geographic access to care, it also raises concerns regarding the availability of specialized diagnostics and antiviral therapies. Barriers to hepatitis B vaccination and treatment access have been documented in Indonesia, including logistical and system-level challenges.[9]

The high prevalence of cirrhosis and hepatocellular carcinoma suggests delayed diagnosis, consistent with the asymptomatic nature of chronic hepatitis. Studies examining knowledge, attitudes, and practices related to hepatitis prevention and screening in Indonesia indicate persistent gaps in public awareness, which may contribute to late presentation.[8] Evidence from modeling studies suggests that earlier diagnosis and expanded access to antiviral therapy particularly DAAs for hepatitis C could substantially reduce liver-related complications and mortality.[6] Strengthening integration between screening programs and primary care services within the JKN framework is therefore essential.

CONCLUSION

Chronic hepatitis continues to represent a significant public health burden in Indonesia, disproportionately affecting individuals of productive age and frequently presenting with advanced liver disease. Although the JKN system has expanded access to healthcare, substantial gaps remain in early detection and disease management. The observed geographic variation in case distribution highlights persistent regional disparities in healthcare utilization and service availability, with higher case capture in densely populated provinces and lower representation in less resourced regions. Strengthening screening programs, improving referral pathways, and enhancing hepatitis care capacity at secondary-level facilities are critical steps toward achieving national and global hepatitis elimination targets.

LIMITATIONS

This study is subject to several limitations related to the use of administrative claims data. First, the analysis was based on BPJS Kesehatan claims, which are primarily designed for reimbursement purposes rather than research, leading to limited clinical information, possible diagnostic inaccuracies, and inconsistencies in coding practices among healthcare providers. Data regarding disease severity, laboratory parameters, and treatment compliance were not available in this dataset. Second, case identification relied on documented diagnostic codes and records of healthcare utilization, which may reflect only diagnosed and treated cases rather than the actual prevalence in the general population. Consequently, individuals with restricted access to healthcare services or asymptomatic conditions may have been underrepresented. Third, although the dataset covered a wide geographic area, it consisted of a weighted sample of the national population, and some degree of residual sampling bias cannot be excluded. Therefore, these limitations should be taken into account when interpreting the results, particularly in relation to estimates of disease burden and patterns of clinical progression.

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