

Analysis of Factors Causing Cardiovascular Disorders in Adults Suffering from Hepatitis B and C within the Krobokan Community Health Center Area

Resa Nirmala Jona * | Rusmiyati | Siti Juwariyah

Department of Nursing, STIKES Telogorejo Semarang, Indonesia

*Corresponding Author: resa@stikestelogorejo.ac.id

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ABSTRACT

Hepatitis is an inflammatory disease of the liver caused by toxins or poisons originating from chemicals, drugs, or infectious agents such as viruses. Hepatitis can be suffered by all groups, from children to adults. Previous research has proven that hepatitis C infection also contributes to the development of metabolic disorders which play an important role as risk factors for cardiovascular disease and hypertension. The aim of this research is to determine the factors that cause cardiovascular disorders in adult hepatitis B and C sufferers. This research is a type of descriptive research with a cross sectional design. The research respondents were 36 people (aged 20-60 years) using simple random sampling technique. The research results showed that the majority of respondents were 51-60 years old (44.5%), had at least elementary school education (52.8%), male gender (55.6%) and hepatitis B type (86.1%). The results of the analysis of factors causing cardiovascular disorders in hepatitis B and C sufferers were lifestyle, history of DM and high cholesterol with $P < 0.05$. In further research, efforts can be made to increase knowledge of hepatitis B and C sufferers so that cardiovascular disorders such as hypertension, CAD and even heart failure do not occur.

Introduction

Hepatitis is a condition characterized by inflammation of the liver due to toxins or poisons that arise from chemicals, medications, or infectious agents like viruses. This illness can affect individuals of all ages, from children to adults. The World Health Organization estimates that over 2 billion people globally have been infected with the hepatitis B virus, with 378 million or 4.8% being chronic carriers, leading to an annual mortality rate of 620,000. Each year, more than 4.5 million new cases of hepatitis B virus infection are reported, and one in four of these cases progresses to liver disease, liver cirrhosis, and primary hepatocellular carcinoma (Kementrian Kesehatan, 2014; Ott et al., 2012).

As of May 2022, there have been a total of 14 reported hepatitis cases. Dr. Mohammad Syahril, Sp.P, MPH, who serves as a spokesperson for the Indonesian Ministry of Health, indicated that there is one probable case of non-reactive hepatitis A, B, C, and E tests, with other pathogens testing negative. Among the 13 cases pending classification, there is one case from North Sumatra, one from West Sumatra, seven from DKI Jakarta, one from Jambi, and three from East Java. The most affected age group is children under 5 years old, accounting for seven cases, while those aged 6 to 10 years old have two cases, and there are five cases in the 11-16 age range. Out of the 14 suspected acute hepatitis cases, six individuals have succumbed, four are currently receiving treatment, and four have been discharged (Kementerian Kesehatan Republik Indonesia, 2018). In Semarang, the total number of hepatitis B cases reported in 2022 is expected to be 354 (Dinkes Kota Semarang, 2021).



Hepatitis B and C infections are among the leading contributors to chronic liver disease, cirrhosis, and liver cancer globally, significantly impacting people's quality of life and lifespan. The risks tied to these infections arise from several factors: the widespread transmission of substantial quantities of the virus within the community; the presence of long-term symptoms or the possibility of an asymptomatic disease progression; extrahepatic manifestations of the virus; its low rates of detection; and the absence of a vaccine (Rajewski et al., 2022). In recent years, studies have demonstrated that hepatitis C infection contributes to the onset of metabolic disorders, which are significant risk factors for cardiovascular disease and hypertension. The substantial impact of HCV on the emergence of obesity, insulin resistance, diabetes, lipid abnormalities, and liver steatosis has led some researchers to refer to the metabolic issues that arise during infection as 'viral and metabolic syndrome,' while liver steatosis itself has been described as an organ-specific form of metabolic syndrome (Petta, 2017; Rajewski et al., 2022).

The rise in heart and vascular diseases in patients with chronic hepatitis C virus has led to the identification of HCV as a novel risk factor for cardiovascular disease, highlighting its role as an extrahepatic manifestation of hepatitis C infection. The metabolic disorders linked to HCV resemble those seen in what is referred to as metabolic syndrome, which includes obesity, hypertension, diabetes, abnormal blood glucose levels, glucose intolerance, elevated triglyceride levels, and reduced HDL cholesterol levels in the blood; this syndrome is currently regarded as the primary cause of the increased risk for cardiovascular disease (Wu et al., 2019).

This study has not been conducted by earlier researchers. This investigation represents the initial effort to pinpoint the elements that lead to cardiovascular issues in individuals suffering from hepatitis, enabling future research to develop preventive or therapeutic strategies (promotive, preventive, and curative measures). Consequently, the objective of this research is to evaluate the factors contributing to cardiovascular problems in adults diagnosed with hepatitis B and C.

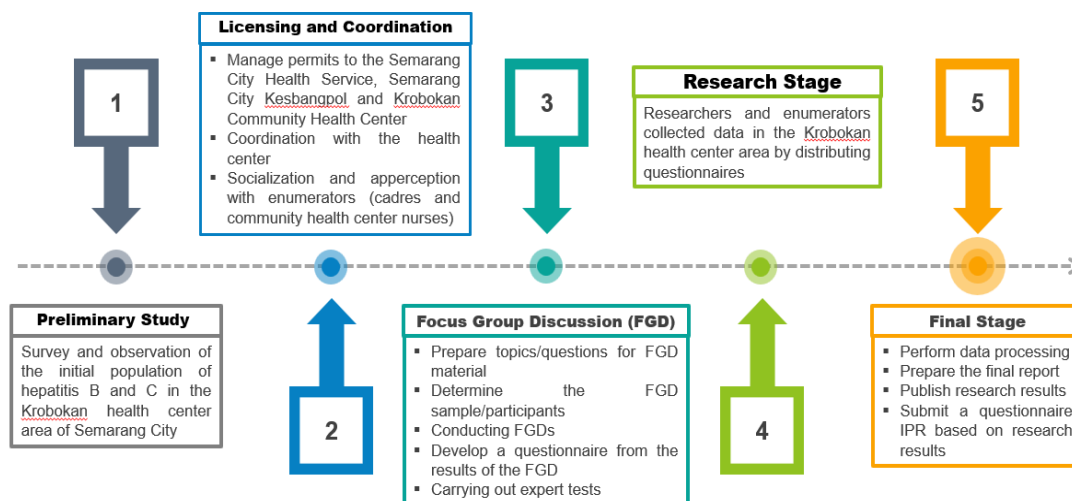
Methods

This study is a form of descriptive research featuring a cross-sectional design, which investigates the correlation between risk factors and their outcomes by engaging, observing, or gathering data at a single point in time (Nursalam, 2021). This method is employed to assess the connection between the independent variable (causal factors) and the dependent variable (cardiovascular diseases).

The participants in this study were all adults suffering from hepatitis B and C (aged 20 to 60 years) who attended the Krobokan Community Health Center in Semarang City. The research employed a simple random sampling technique with specific inclusion criteria, which required participants to have hepatitis B or C, be aged between 20 and 60 years, and have no difficulties in communication, reading, and writing. This research use chi_square test. This research was conducted from October to December 2024 in the Krobokan Semarang Community Health Center area, following the outlined research procedure:



RESEARCH FLOW



Picture 1. Research Flow

Results

The results of this study include data on the characteristics of respondents and analysis of factors causing cardiovascular disorders in hepatitis B and C sufferers.

1. Respondent characteristics

Table 1 Respondent characteristics
(n=36)

No	Variable	f	%
1.	Age		
	- 20 – 30 years old	3	8,3
	- 31 – 40 years old	8	22,2
	- 41 – 50 years old	9	25
2.	Last education		
	- elementary school	19	52,8
	- Junior high school	3	8,3
	- Senior High School	12	33,3
3.	Gender		
	- Man	20	55,6
	- Woman	16	44,4
4.	Type of Hepatitis		
	- Hepatitis B	31	86,1
	- Hepatitis C	5	13,9

Table 1 above explains that the majority of respondents were 51-60 years old (44.5%), had at least elementary school education (52.8%), male gender (55.6%) and hepatitis B type (86.1%).

2. Analysis of factors causing cardiovascular disorders in hepatitis B and C sufferers



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Table 2
Analysis of factors causing cardiovascular disorders in hepatitis B and C sufferers
(n=36)

	Obesity	History of DM	Lifestyle	History of High Cholesterol
Chi-Square	7.118 ^b	32.118 ^a	7.118 ^b	50.941 ^a
df	1	3	1	3
Asymp. Sig.	.544	.000	.008	.000

Table 2 above explains that the factors that can cause cardiovascular disorders in hepatitis B and C patients are history of DM, lifestyle and history of high cholesterol.

Discussion

1. Respondent characteristics

According to the age distribution of participants, most were within the 51-60 years age group. This aligns with Jeffrey's findings, which indicated that the largest population of people suffering from hepatitis was over the age of 40 (Safren et al., 2014). The findings from the Basic Health Research indicate that the highest prevalence of hepatitis is observed in the age categories of 45-54 and 65-74 years (Kementrian Kesehatan, 2014).

According to the educational backgrounds of the participants, the highest number of individuals in the intervention group had only completed elementary school. This aligns with findings from research by Corral F., which indicated that the incidence of hepatitis per 100,000 men was 88.3% among those with no education, 52.6% among those with primary schooling, 28.8% among men with secondary education, and 14.9% among university-educated men. Hepatitis in men with primary education is most prevalent in the age range of 55-59 years (Corral et al., 2001).

According to gender traits, most of the respondents were male. This aligns with the findings of Tambunan's study, which indicated that there were significantly more male respondents than female, with a ratio of 2.3:1 (Tambunan et al., 2015). Gender or sex refers to a characteristic that identifies an individual as male or female, which indicates that anatomical and physiological differences in humans lead to variations in behavioral patterns and activities between males and females. When it comes to health behaviors, women generally show greater concern for their health and are more likely to seek treatment compared to men. According to Hawk (2005), gender is a significant factor that affects an individual's health behaviors, including dietary management. Women tend to utilize health services more frequently than men and are more active in participating in health check-ups. (Kusumawati, 2014).

The most prevalent type of hepatitis among respondents is hepatitis B. The WHO estimates that over 2 billion individuals worldwide have been infected with the hepatitis B virus, with approximately 378 million, or 4.8%, living with chronic infections, resulting in an annual death toll of 620,000. Each year, there are over 4.5 million newly reported cases of hepatitis B virus infections, and one in four of these cases advances to liver cirrhosis and primary hepatocellular carcinoma (Wu et al., 2019).

2. Analysis of factors causing cardiovascular disorders in hepatitis B and C sufferers



The findings of this analysis indicate that three variables show a p value of less than 0.05, allowing us to conclude that a history of diabetes mellitus, lifestyle factors, and a past of high cholesterol can lead to cardiovascular issues in individuals suffering from hepatitis B and C. This aligns with earlier studies that link the mentioned metabolic disorders to HCV, akin to what is seen in metabolic syndrome, which includes obesity, hypertension, diabetes, abnormal blood glucose levels, glucose intolerance, elevated triglyceride levels, and reduced HDL cholesterol levels in the blood. These conditions are now regarded as significant contributors to the heightened risk of cardiovascular disease (Wu et al., 2019).

Recent studies have demonstrated that hepatitis C infection contributes to the onset of metabolic disorders, which are significant risk factors for cardiovascular disease and hypertension. The considerable impact of HCV on obesity, insulin resistance, diabetes development, lipid abnormalities, and liver steatosis has led some researchers to refer to these metabolic disturbances during infection as viral and metabolic syndrome, with liver steatosis being characterized as an organ-specific variant of metabolic syndrome (Rajewski et al., 2022)

Conclusion

The findings of this study indicated that most participants were aged between 51 and 60 years (44.5%), had a minimum of an elementary school education (52.8%), identified as male (55.6%), and were diagnosed with hepatitis B (86.1%). The analysis highlighted the factors contributing to cardiovascular issues among individuals with hepatitis B and C, including lifestyle choices, histories of diabetes mellitus, and elevated cholesterol levels. Future research should focus on enhancing the understanding of hepatitis B and C patients to prevent the onset of cardiovascular complications such as hypertension, coronary artery disease, and even heart failure.

Ethics approval and consent to participate

This study was approved by the Ethics Committee (078a/X/KE/STIKES/2024) from STIKES Telogorejo Semarang, Indonesia. Data collection for this research has received approval from all research respondents through an informed consent which has been signed by the respondent. The author states that they have no potential conflict of interest in connection with the investigation, authorship, and/or publication of this article.

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