

The Influence of Diabetes and Dyslipidemia on Coronary Heart Disease Survival and Mortality at H. Adam Malik General Hospital, Medan

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ABSTRACT

Coronary heart disease (CHD) is one of the cardiovascular diseases and the main cause of death throughout the world. Based on WHO data, CHD is the first cause of death worldwide from 2000 to 2019. CHD is the second biggest cause of death in Indonesia (Age-standardised years of life lost (YLL) rate 2735 per 100,000 population). The average death rate due to CHD in North Sumatra exceeds the national average (Age-standardised years of life lost (YLL) rate of 3014 per 100,000 population). The aim of this study is to determine the effect of diabetes and dyslipidemia on survival and death in people with CHD. The study used a prospective cohort design with a sample size of 87 people. This research was conducted at the Haji Adam Malik Hospital in Medan from May to December 2023. The study population were all hospitalized patients of CHD at the H. Adam Malik Hospital Medan during the period research time. The research sample was a research population that met the inclusion and exclusion criteria. Data analysis used SPSS with Poisson and Cox regression tests. The results showed that dyslipidemia ($p=0.035$) and diabetes ($p=0.016$) had a significant effect on coronary heart disease mortality. Cox regression analysis showed that diabetes ($p=0.032$; HR 5,519; 95% CI=1.160–

26.260) has a significant effect on differences in survival from coronary heart disease. The public is expected to control diabetes and lipid levels to reduce deaths due to CHD.

Keywords: Coronary Heart Disease Survival, Dyslipidemia, Diabetes

INTRODUCTION

The third target on the Sustainable Development Goals (SDGs) agenda in the health sector which is expected to be achieved by 2030 is to reduce morbidity and mortality caused by non-communicable diseases (NCDs) (WHO, 2022). Coronary heart disease (CHD) is one of the cardiovascular diseases and the main cause of death throughout the world. Based on epidemiological studies taken from Global Burden of Disease data, it was found that the estimated incidence of coronary heart disease between 1990 and 2017 was 126 million people worldwide (1,655/100,000) with 9 million deaths due to CHD. It is estimated that the prevalence of CHD will increase by 1,845/100,000 in 2030 (Khan et al., 2020), CHD is the second largest cause of death in Indonesia (Age-standardised years of life lost (YLL) rate 2735 per 100,000 population). The average death rate due to CHD in North Sumatra exceeds the

national average (Age-standardised years of life lost (YLL) rate 3014 per 100,000 population) based on the Global Burden of Disease study (Mboi et al., 2022). A survival metaanalysis study in Japan conducted by Li et al. with 9 prospective cohort studies (median follow-up 12.7 years) found a pooled-C survival value of 0.83 for CHD. Diabetes mellitus and the ratio of total cholesterol to HDL are predictors of CHD (Li et al., 2021).

RESEARCH METHODS

This research is an observational analytical study with a prospective cohort method. A prospective cohort method is a type of observational study that follows a group of people over time to investigate the association between a factor of interest and their outcomes (Chan et al., 2020). This research was conducted at Haji Adam Malik General Hospital, Medan. The time this research was conducted was from May to December 2023.

The population of this study were all patients of coronary heart disease who were hospitalized at H. Adam Malik Hospital in Medan from May to December 2023. The sample for this study was a research population that met the inclusion criteria and exclusion.

Inclusion Criteria:

1. Sample age is over 18 years.
2. The main diagnosis of the sample is coronary heart disease (ICD 10 I21, I22, I25).
3. Complete data.

Exclusion criteria:

1. Samples with a primary or secondary diagnosis that is not heart disease.
 2. CHD patients with severe complications
- CHD survival is defined as the survival of CHD patients from admission to hospital discharge regardless of events. The event in the study was death. Sensor if the patient is lost to follow up.

Diabetes criteria are based on the patient's blood sugar level where the fasting blood sugar level is ≥ 126 mg/dL. Dyslipidemia is a

condition of increased blood fat levels in the form of total cholesterol, LDL, triglycerides and/or decreased HDL.

The research data is secondary data and was collected from medical record data at Haji Adam Malik Hospital Medan. Analysis using SPSS.

RESULT AND DISCUSSION

The total number of respondents in this study was 87 respondents consisting of 10 (11.5%) CHD sufferers with death status and 77 (88.5%) CHD sufferers with alive discharge status. The range of days in patient care is between one and fourteen days with an average of four days of care.

Table 1. Univariate Analysis

Respondent Characteristics	n= 87 (%)
Age	
31-40 years old	3 (3.4)
41-50 years old	24 (27.6)
51-60 years old	36 (41.4)
61-70 years old	22 (25.3)
71-80 years old	2 (2.3)
Gender	
Female	21 (24.1)
Male	66 (75.9)
Dyslipidemia	
No	43 (49.4)
Yes	44 (50.6)
Diabetes	
No	53 (60.9)
Yes	34 (39.1)

Bivariate analysis was carried out using a simple Poisson regression test and a Cox regression test with a significance level of 95 percent or significant if the p value < 0.05 . Based on the results of research using bivariate analysis using simple Poisson regression, the p value for diabetes was 0.016 ($p < 0.05$), which means that there is a significant influence of diabetes on the death of coronary heart disease sufferers at H. Adam Malik General Hospital, Medan. The p value for dyslipidemia is 0.035 ($p < 0.05$), which means that there is a significant influence of dyslipidemia on the death of coronary heart disease sufferers at H. Adam Malik General Hospital, Medan.

Table 2. Bivariate Analysis of the Effect of Dyslipidemia and Diabetes on Coronary Heart Disease Mortality (Poisson Regression)

Independent Variable	p	RR	95% CI
Age	0.692	1.010	0.961–1.062
Gender			
Female	0.748	1.272	0.292–5.524
Male			
Dyslipidemia			
Yes	0.035	8.771	1.164–66.667
No			
Diabetes			
Yes	0.016	6.250	1.408–27.778
No			

The Cox regression test was carried out to assess differences in median survival of coronary heart disease sufferers based on diabetes and dyslipidemia factors.

Table 3. Analysis of Survival of Diabetes and Dyslipidemia in Coronary Heart Disease Patients at H. Adam Malik General Hospital, Medan

Independent Variable	Median Survival Time	p	HR	95% CI
Age				
31-40 years old	11.00	0.991	0.996	0.478–2.073
41-50 years old	5.00			
51-60 years old	14.00			
61-70 years old	8.46			
71-80 years old	9.00			
Gender				
Female	9.00	0.691	0.727	0.151–3.054
Male	14.00			
Dyslipidemia				
No	12.00			
Yes	8.80	0.051	7.903	0.993–62.897
Diabetes				
No	14.00			
Yes	8.52	0.032	5.519	1.160–26.260

From the results, it was found that the median survival time decreased in CHD sufferers with diabetes or dyslipidemia. The p value for diabetes is 0.032 ($p < 0.05$), which means there is a significant difference in median survival based on the diabetes factor in people with coronary heart disease at H. Adam Malik General Hospital, Medan. The p value for dyslipidemia is 0.051 ($p > 0.05$), which means there is no significant difference in median survival based on the dyslipidemia factor in patients with coronary heart disease at H. Adam Malik General Hospital, Medan.

The results of bivariate analysis using the simple Cox regression test and the simple Poisson regression test in this study showed

that there was an influence of diabetes on the difference in median survival from coronary heart disease ($p = 0.032$ and HR 5.519) and death from coronary heart disease ($p = 0.016$). This means that in this study, survival times were found to be 5.519 times shorter in coronary heart disease sufferers who had a history of diabetes compared to coronary heart disease sufferers who did not have a history of diabetes. The results of this research are in line with the research of Farhadian et al. in Iran with 220 respondents who found a relationship between diabetes and coronary heart disease survival (Cox regression; $p = 0.003$ and HR 2.17). The research results are also supported by research by Kubiela,

Diakowska and Uchmanowicz in Poland with 120,974 samples over 3 years of analysis to assess the risk of death from coronary heart disease, which found a relationship between diabetes and death from coronary heart disease (poisson regression; $p=0.001$ and OR 1.358).

The results of bivariate analysis using the simple Cox regression test and simple Poisson regression test in this study showed that there was no influence of dyslipidemia on the difference in median survival from coronary heart disease ($p=0.051$), but there was an influence of dyslipidemia on mortality from coronary heart disease ($p=0.035$). The results of this research are in line with the research of Farhadian et al. in Iran with 220 respondents who found no relationship between dyslipidemia and coronary heart disease survival (Cox regression; $p=0.089$). However, the results are not in line with research by Xia et al. in China involving 2,803 respondents with a mean follow-up of 30 months which found a relationship between dyslipidemia and coronary heart disease survival (Cox regression; $p=0.001$). The research results are in line with research by Hedayatnia et al. in Iran involving 8,698 respondents who found the effect of dyslipidemia on coronary heart disease mortality ($p=0.001$). Another study conducted by Pol et al. Involving 14,884 respondents, results also found that there was an influence of dyslipidemia on coronary heart disease mortality ($p=0.001$). The Cox regression OR value in this study was 6.691 with a p value approaching 0.05. Differences in the characteristics of dyslipidemia in the form of increased LDL, total cholesterol, triglycerides and decreased HDL as well as differences in genotype can underlie the insignificant results in Cox regression compared to other studies.

CONCLUSION

In this study, it was found that there was an influence of diabetes and dyslipidemia on CHD survival and mortality at H. Adam Malik General Hospital, Medan. Future researchers can consider multicenter studies

with a longer observation duration and a larger sample to obtain a stronger causal relationship between risk factors and effects.

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