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## **Examining the relationship between health literacy and quality of life in patients with coronary heart disease: a quantitative study at a cardiology clinic**

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**Informed consent:** written informed consent was obtained for anonymized patient information to be published in this article.

## **Abstract**

Coronary Heart Disease (CHD) is the leading cause of death worldwide and is rising, annually. Improved health outcomes require early treatment and self-monitoring, which need health literacy. This study examined how health literacy affects CHD patients' Quality of Life (QoL) at the Hospital's Cardiology Clinic. This quantitative, descriptive correlation study was cross-sectional. The sample was 164 respondents, sampled consecutively. Patients must be willing to participate, diagnosed with CHD, and attend cardiology outpatient follow-up appointments. Health literacy was measured with the HLS-EU-SQ10 and QoL with the Seattle Angina Questionnaire. This study used chi-square to analyze the relationship between two ordinal scale variables in a contingency table. The average age was 58.07 years, according to research. Of the respondents, 59 (36.0%) had graduated high school. Health literacy was assessed in three QoL domains: physical limitation ( $P=0.024$ ), angina frequency ( $P=0.570$ ), and QoL ( $P=0.338$ ). Service agencies should be able to use pamphlets to improve health literacy and provide rehabilitation to acute coronary syndrome patients to improve QoL.

## **Introduction**

Along with the development of the modern world, non-communicable diseases are also increasing. This can be seen in the increase in non-communicable disease deaths due to cardiovascular disease which reached 17.9 million in 2016.<sup>1</sup> Heart disease is a general term for all diseases involving the heart, cases of heart disease in the world were 550 million people.<sup>2</sup> Coronary heart disease (CHD) occurs due to blockage due to the accumulation of fat in the walls of blood vessels which causes stiffness of blood vessels and abnormal blood flow thereby blocking blood flow to the heart.<sup>3-5</sup> The incidence of CHD in Indonesia was estimated to be 15 out of 1,000 or 1.5% of the population in Indonesia who have CHD.<sup>6</sup> CHD in Indonesia has resulted in the death of approximately 510,840 people.<sup>6</sup> The number of CHD patients at the Heart Polyclinic of Arifin Achmad Hospital, Riau Province from January to December 2020 was 1708 cases.

Health literacy is the extent to which individuals can access, and process basic health service information by participating in health-related decisions.<sup>7-9</sup> Based on research results, functional cardiovascular disease health literacy found that 55.4% of patients understood health information, 53.9% of patients did not understand health information, and 50.5% of patients had information enough to manage health.<sup>10</sup> The following are some examples of information about behaviors related to CHD: smoking, physical activity, eating habits, response to cardiac symptoms, and medication adherence. Some examples of outcomes related to patients with CHD include morbidity (*e.g.*, rehospitalization), mortality, and quality of life (QoL).<sup>11-13</sup>

QoL is an assessment of one's position in life, in the context of cultural and environmental values, in relation to individual goals, expectations, norms, and social aspects. It provides a broad and effective understanding of a person's physical health status, psychological state and beliefs, social relationships, and relationships with the environment.<sup>14-17</sup> Based on the results of the previous research, the QoL of coronary heart patients was found good at 52.9% and bad at 47.1%.<sup>18</sup> The QoL of coronary heart patients (25.86%) had a good QoL, and 43 people (74.14%) had a poor QoL.<sup>19</sup>

Low levels of health literacy correlated with heightened levels of anxiety and depression ( $P < 0.0001$ ) and lower assessments of health-related QoL (HeartQoL scores  $P = 0.03$ ).<sup>20</sup> Statistically significant differences were found in gender, age, smoking history, marital status, education level, household income, and QoL among various health literacy groups. Low levels of education and household income were predictors of poor health literacy.<sup>21</sup> One way to improve good QoL is by providing information in the form of education. This study aimed to look at the relationship between health literacy and QoL in heart patients.

## **Materials and Methods**

### ***Study design***

The type of research used a quantitative with a descriptive correlational design, utilizing a cross-sectional approach. Cross-sectional refers to data collected multiple times at unequal intervals.<sup>22</sup>

### ***Population, sample, and sampling***

The study population consisted of 1708 patients, from which a sample of 164 respondents was selected using consecutive sampling. The criteria for inclusion were patients willing to participate, those suffering from CHD, and control patients at the heart polyclinic.

### ***Variables and instruments***

The variables in this study are health literacy and QoL. The instruments used in this study are the Health Literacy Study-European Short Questionnaire-10-Indonesia (HLS-EU-SQ10-IDN), which is the short version of the HLS-EU-47Q questionnaire, and the QoL instrument, which is the Seattle Angina Questionnaire-7 (SAQ-7). The validity value of the health literacy questionnaire was standardized with a validity value of 0.89, and the QoL questionnaire with a validity value of 0.64. In the reliability test of the HLS-EU-SQ10-DN questionnaire, the reliability result was 0.9. Health literacy index values are then categorized as follows: 0-25 = inadequate; >25-33 = problematic; >33-42 = sufficient; >42-50 = excellent. The SAQ-7 consists of 7 questions designed to assess the health status of patients with coronary artery disease (CAD). Responses are coded from worst to best status,

with scores ranging from 1 to 6 for physical limitation, angina stability, and angina frequency; 1 to 5/6 for treatment satisfaction; and 1 to 5 for QoL. Each domain score is scaled from 0 to 100, with 0 indicating the worst and 100 the best possible status. The SAQ is validated, reproducible, and sensitive to clinical changes. Additionally, patients' SAQ scores are independently predictive of future mortality, hospitalization, and resource utilization.<sup>23</sup> The results of the validity test showed that the questionnaire was valid with a result of 0.80 for physical limitations, 0.78 for angina frequency, 0.81 for the QoL, and 0.86 for the summary score.<sup>23</sup>

### ***Data analysis***

The data obtained were analyzed using univariate analysis with the central tendency and frequency distribution, then analyzed by bivariate analysis using the chi-square test. The chi-square test evaluates whether there is a difference between the observed frequencies in the contingency table and the frequencies we would expect if the two variables were independent. This research passed the ethics test of the Health Research Ethics Commission at Hang Tuah University Pekanbaru with the number: 237/KEPK/STIKes-HTP/IV/2022.

### **Results**

According to Table 1, it was found that 164 respondents studied were on average 58.07 years old.

Table 2 showed the majority of respondents were male which was 117 respondents (71.3%). The majority were married as many as 160 respondents (97.6%). Besides that, many respondents had high school/vocational education levels as many as 59 respondents (36.0%). Many respondents were retirees which was 38 respondents (20.1%). There 67.1% of health literacy was in the problematic category. Then, the results of the QoL obtained 49.4% with physical limitations which were still classified as good, 38.4% frequency of angina every day or week, and 52.5% QoL was excellent.

The results of the data analysis in Table 3 showed health literacy appears to be significantly associated with physical limitation ( $P=0.024$ ), suggesting that individuals with different levels of health literacy experience varying degrees of physical limitation related to CAD. However, there is no significant association between health literacy and angina frequency ( $P=0.570$ ) or QoL ( $P=0.338$ ). This implies that while health literacy may influence physical limitations, it does not have a significant impact on the frequency of angina symptoms or overall QoL among individuals with CAD.

### **Discussion**

The findings of this study reveal a significant association between health literacy and physical limitation among individuals with CAD. Specifically, the analysis demonstrates that individuals with

different levels of health literacy exhibit varying degrees of physical limitation related to their condition. This underscores the importance of health literacy in managing and coping with the physical challenges posed by CAD. These results align with previous research that has highlighted low health literacy are more likely to engage in unhealthy behaviors, such as smoking, insufficient physical activity, and being overweight. Additionally, these individuals tend to report lower levels of physical and mental health, with large clinically significant effect sizes of 0.56 and 0.78 respectively, even after adjusting for confounding factors.<sup>24</sup> Furthermore, there exists a negative association between health literacy and QoL among patients with acute coronary syndrome (ACS).

Enhanced health literacy among individuals in their eighties, particularly concerning social support for health and the capability to access reliable health information, correlates with better physical and mental well-being following percutaneous coronary intervention.<sup>25</sup> Health literacy is moderately correlated with QoL, but this finding needs to be supported by more evidence.<sup>26</sup> Health literacy is higher compared to the German national survey based on the same outcome measure.<sup>27</sup> Individuals with higher levels of health literacy are often better equipped to understand and adhere to treatment regimens, engage in preventive behaviors, and navigate the healthcare system effectively, all of which can contribute to improved physical functioning and reduced limitations in daily activities.

Contrary to expectations, the study did not find a significant association between health literacy and angina frequency or QoL. This suggests that while health literacy influences physical limitations, it does not have a direct impact on the frequency of angina symptoms or overall QoL among individuals with CAD. Other factors, such as disease severity, comorbidities, and social support, may play a more prominent role in determining these outcomes.<sup>28</sup>

No relationship was found between health literacy and QoL (physical and mental components).<sup>29</sup> Low health literacy in patients with ACS is consistently associated with poor QoL. After controlling for demographic and clinical factors in patients with ACS, the physical QoL domain remained a significant result of self-care behavior and health literacy. According to the literature, self-care practices and health literacy should be taken into account when predicting patients with ACS QoL. However, there is no previous evidence about the best process of the relationship between the three variables.<sup>30</sup>

Health literacy is a determinant of health in cardiovascular disease.<sup>31</sup> Low health literacy is associated with the development of cardiovascular disease after adjustment for age and sex.<sup>32</sup> Patients with CVD who have low health literacy have higher mortality, higher rates of readmission to the hospital, and lower QoL.<sup>33</sup> Low health literacy is common in people with cardiovascular disease.<sup>34</sup> This condition can occur due to adherence to treatment, and awareness of ACS patients to reduce and

maintain activities carried out. Thus, they do not trigger symptoms. The lack of medication during an attack, in addition to the two factors mentioned above, may cause angina to occur more frequently, which will alter how stable angina is. To keep patients motivated to comply with therapy and foster positive family support, nurses can offer emotional support. A very low frequency of angina was reported by almost all respondents.

This research is consistent with a study that found that elderly hypertensive patients have both positive and negative perceptions.<sup>35</sup> The more serious and severe the patient's perception, the greater the need for preventive measures.<sup>36</sup> Patients change their behavior according to the severity of their disease leading to a positive perception of the disease. Hence, according to one of the reasons for positive perceptions as explained by the theory, a good perception will increase a positive subject such as health in healing disease.<sup>36</sup>

## **Conclusions**

The findings of this study highlight the nuanced relationship between health literacy and various health outcomes among individuals with CAD. While a significant association was observed between health literacy and physical limitation, indicating that individuals with different levels of health literacy experience varying degrees of physical limitation, no significant associations were found with angina frequency or QoL. These results suggest that while health literacy may play a role in shaping the extent of physical limitations experienced by individuals with CAD, it may not directly influence the frequency of angina symptoms or overall QoL. Other factors, such as disease severity, comorbidities, and access to healthcare resources, may contribute more substantially to these outcomes.

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**Table 1. Respondent's central tendency by age.**

Variable	N	Mean	SD	Minimum/maximum	Range
Age	164	58.07	11.983	24-82	58

SD, standard deviation.

**Table 2. Respondents' frequency distribution characteristics, health literacy, and quality of life of patients.**

Variable	N	%
Sex		
Male	117	71.3
Female	47	28.7
Marriage status		
Married	160	97.6
Single	4	2.4

Educational level		
Uneducated	7	4.3
Primary school	31	18.9
Junior high school	23	14.0
Senior high school	59	36.0
University	41	30.4
Occupation		
Retired	38	23.2
Housemaid	37	22.6
Teacher/lecturer	5	3.0
Civil servant	13	7.9
Unemployment	33	20.1
Farmer	11	6.7
Entrepreneur	14	8.5
Private staff	5	3.0
Police	5	3.0
Labor	3	1.8
Health literacy		
Inadequate	30	18.3
Problematic	110	67.1
Sufficiency	24	14.6
Physical limitation		
Excellent	17	10.4
Good	81	49.4
Poor to fair	66	40.2
Angina frequency		
Daily to weekly	63	38.4
Monthly	52	31.7
None	49	29.9
Quality of life		
Excellent	86	52.5
Good	46	28.0
Poor to fair	32	19.5
Total	164	100

**Table 3. Relationship between health literacy and quality of life of physical activity.**

Variable	Health literacy			P-value
	Inadequate	Problematic	Sufficient	
Physical limitation				0.024
Excellent	3	7	7	
Good	14	57	10	
Poor to fair	13	46	7	

Angina frequency				0.570
Daily to weekly	15	40	8	
Monthly	9	36	7	
None	6	34	9	
Quality of life				0.338
Excellent	15	55	16	
Good	8	31	7	
Poor to fair	7	24	1	
Total	30	110	24	