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Original Research

Effectiveness of Video-Based Cardiac Health Training on Health Behavior in Acute Coronary Syndrome Patients

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ABSTRACT

Background: *Hospital readmissions among patients with Acute Coronary Syndrome (ACS) are frequently linked to unhealthy lifestyle behaviors such as poor diet, physical inactivity, smoking, and medication nonadherence. These modifiable risk factors significantly contribute to recurrent events and adverse outcomes, highlighting the need for effective secondary prevention strategies. Video-based health education offers a consistent and scalable approach to support behavioral change. This study aimed to evaluate the effectiveness of a video-based cardiac health education program in improving healthy behaviors among ACS patients.*

Methods: *A quasi-experimental, non-equivalent control group design was employed involving 57 ACS patients without severe complications. Participants were recruited via consecutive sampling and assigned to either the intervention group (n = 27) or control group (n = 30). The Modified Cardiac Health Behavior Scale (MCHBS) was used to assess healthy behaviors at baseline and after the intervention. The intervention comprised a video-based cardiac health education program with a 21-day follow-up period. Data were analyzed using paired sample t-tests for within-group comparisons and independent t-tests for between-group differences.*

Results: *Baseline healthy behavior scores did not differ significantly between groups ($p>0.05$). Post-intervention, both groups showed significant improvement; however, the intervention group demonstrated a significantly greater increase ($M\pm SD = 24.85\pm5.45$) compared to the control group ($M\pm SD = 10.67\pm6.57$), with a mean difference of 14.18 ($p<0.001$) and a large effect size (Hedges' $g = 2.337$).*

Conclusion: *Video-based cardiac health education effectively promotes healthier behaviors in ACS patients and holds promise as a scalable intervention to enhance secondary prevention and reduce hospital readmissions.*

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INTRODUCTION

Coronary Heart Disease (CHD), also referred to as Coronary Artery Disease (CAD), is a functional disorder of the heart caused by the narrowing or blockage of coronary arteries, and it remains the leading cause of mortality worldwide (Khan et al., 2020). In 2017, the global prevalence of CHD reached 126.5 million cases, increasing to 197.2 million by 2019 (Safiri et al., 2022). In Indonesia, CAD is the second leading cause of death after stroke, with a prevalence that rose from 0.5% in 2013 to 1.5% in 2018 (Kemenkes RI, 2018). In Central Java, the reported prevalence is 1.6%.

One of the critical manifestations of CAD is Acute Coronary Syndrome (ACS), a potentially life-threatening condition that significantly increases the risk of mortality and recurrent hospitalizations (Sholih, 2021). Afridayani et al., (2020); Noviyah et al., (2020); Sugiharto et al., (2023) From November 30 to December 13, 2015, 11 of 23 patients with acute myocardial infarction (AMI) were readmitted to the ICVCU at Dr. Moewardi General Hospital Click or tap here to enter text. Patients recovering from ACS remain vulnerable to relapse and rehospitalization, primarily due to modifiable risk factors such as poor dietary habits (high in fat and sodium), physical inactivity, smoking, stress, hypertension, diabetes mellitus, dyslipidemia, obesity, and poor medication adherence (Rahmawati et al., 2020; Steen et al., 2022). Addressing these risk factors through behavior change is essential to reduce recurrence and improve long-term outcomes.

Although numerous studies have shown that adopting healthier behaviors can reduce the risk of myocardial infarction (Rao et al., 2025), implementing lasting behavioral changes is challenging. Lifestyle habits are often deeply rooted, requiring time and consistent effort to change. Literature suggests that forming new habits typically requires at least 21 days (Maltz, 1969), and patients frequently need continuous support throughout this process (Kavradim & Ozer, 2020). However, healthcare professionals, particularly nurses, often encounter time constraints and high workloads that limit their capacity to provide individualized education (Ahmadi et al., 2022). These challenges highlight the need for effective, scalable, and resource-efficient educational interventions.

Video-based health education offers a scalable and effective solution. Prior studies have shown it can improve treatment adherence (Apriyani et al., 2021), enhance self-care practices, support the adoption of healthier behaviors (Gupta et al., 2020), improve quality of life (Dehkordi et al., 2021), boost self-efficacy and self-esteem (Ahmadi et al., 2022), and reduce anxiety and negative emotions (Torabizadeh et al., 2021). Moreover, video-based education provides a practical and scalable solution to deliver consistent health messages, addressing time constraints often faced by healthcare professionals and enabling patients to revisit the information at their own pace.

A preliminary investigation conducted by the researcher at Dr. Moewardi General Hospital revealed that the majority of patients with Acute Coronary Syndrome (ACS) exhibited unhealthy behaviors. (Apriyani et al., 2021; Gupta et al., 2020; Huriani, 2022)(Ahmadi et al., 2022; Kavradim & Ozer, 2020)Consequently, further research is essential to assess the effectiveness of video-based cardiac health training in promoting cardiac health behavior among ACS patients at the same institution.

MATERIALS AND METHOD

Research Design

This study employed a quantitative approach with a quasi-experimental design

using a non-equivalent control group. Participants were divided into an intervention group and a control group. Pre- and post-intervention assessments were conducted in both groups to measure changes in cardiac health behavior among patients with Acute Coronary Syndrome (ACS).

Population and Sample

The target population consisted of ACS patients hospitalized at Dr. Moewardi Regional Public Hospital, Surakarta. Inclusion criteria included: (1) patients aged 18 years or older, (2) a diagnosis of ACS with or without comorbid conditions such as diabetes mellitus or hypertension, (3) ability to communicate in Bahasa Indonesia, and (4) willingness to provide informed consent. Patients with cognitive impairments or in critical condition were excluded. Participants were recruited through consecutive sampling, wherein all eligible patients during the data collection period were approached until the required sample size was reached.

The minimum sample size was calculated based on a formula for comparing two independent means, with a significance level (α) of 0.05, 80% power (1–β), and an effect size derived from previous study (Huriani, 2022). A total of 60 patients were recruited, with 30 participants assigned to each group. Due to three dropouts from the intervention group, the final sample consisted of 57 participants (27 in the intervention group and 30 in the control group), yielding a 95% response rate.

Instrument

The primary instrument used in this study was the Modified Cardiac Health Behavior Scale (MCHBS), a structured questionnaire designed to assess health behavior related to cardiac care. The MCHBS consists of 25 items covering six dimensions: dietary behavior, physical activity, stress management, smoking behavior, medication adherence, and blood pressure monitoring. Each item is rated using a 4-point Likert scale, with higher scores indicating better cardiac health behavior. The instrument was previously validated and demonstrated high internal consistency, with a Cronbach's alpha coefficient of 0.92, indicating excellent reliability.

Content validity was ensured through expert judgment by professionals in cardiovascular nursing and health behavior research. The video content was developed based on established guidelines for secondary cardiac prevention and reviewed by a panel of cardiovascular nursing and media experts for content validity. It included information on the definition of ACS**,** risk factors**,** dietary recommendations, physical activity, stress management, smoking cessation, medication adherence, blood pressure control, and early warning signs—emphasizing the importance of calling emergency services (ambulance 119) when necessary.

Research Procedure

The study was conducted over a period of four weeks in March 2024 at Dr. Moewardi Regional Public Hospital, Surakarta. After obtaining ethical approval and informed consent, participants who met the inclusion criteria were assigned to either the intervention or control group using a non-randomized approach. At the beginning of the study (Week 0), both groups completed a pre-test questionnaire using the Modified Cardiac Health Behavior Scale (MCHBS), which took approximately 15–20 minutes to complete.

The intervention group received health education through a structured program consisting of two sessions. The first session included a face-to-face verbal explanation followed by the viewing of a 10-minute educational video on cardiac health behavior. After the session, participants were encouraged to ask questions to clarify any unclear content. The second session was conducted one week later as reinforcement, where key messages from the video were summarized and emphasized again. To enhance adherence, the intervention group received weekly follow-ups for three consecutive weeks (Weeks 1–3) via WhatsApp messages.

These messages served as reminders and motivational prompts to reinforce the behavior change messages from the video. In contrast, the control group received standard care, which consisted of routine verbal health education provided by hospital staff without video or follow-up. At the end of Week 4, both groups were asked to complete the same questionnaire as a post-test. The collected data were then used to assess the effect of the video-based cardiac health education on patients' health behaviors. This structured and replicable procedure allows future researchers to apply the same model in similar settings.

Data Analysis

Data analysis was conducted using univariate, bivariate, and multivariate techniques. Descriptive statistics were used to analyze participant characteristics. Inferential statistics included paired t-tests to assess within-group changes and independent t-tests to compare between-group outcomes. Multiple linear regression was also performed to examine the effect of the intervention while controlling for external variables. Prior to data analysis, a normality test was conducted using the Shapiro-Wilk test at a 0.05 level of significance, and the results indicated that the data were normally distributed.

Ethical Clearance

This study received ethical approval from the Medical and Health Research Ethics Committee of the Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada (FKKMK UGM), with the reference number: KE/FK/0407/EC/2024.

RESULTS

Descriptive data were collected to provide an overview of respondent characteristics at Dr. Moewardi Regional Public Hospital in 2024 (n = 57), As shown in Table 1.

Table 1. Baseline of cardiac health behavior based on demographic data at Dr. Moewardi Hospital in March-May 2024 (n=57)

Characteristics	Group			
	Treatment		Control	
	f	%	f	%
Age				
Late Adult (36-45 y.o)	1	3,7	1	3,3
Early Elderly (46-55 y.o)	6	22,2	3	10,0
Late Elderly (56-65 y.o)	13	48,1	14	46,7
Elderly (>65 y.o)	7	25,9	12	40,0
Gender				

Characteristics	Group			
	Treatment		Control	
	f	%	f	%
Male	14	51,9	15	50
Female	13	48,1	15	50
Education				
Primary education	5	18,5	7	23,3
Secondary education	12	44,4	15	50,0
Higher education	10	37,0	8	26,7
Socio-economic				
Low socio-economic	8	29,6	13	43,3
High socio-economic	19	70,4	17	56,7
Smoking status				
Active smoker	14	51,9	13	43,3
Passive smoker (living with a smoker)	10	37,0	11	36,7
Neither active nor passive smoker	3	11,1	6	20,0
History of disease				
None	4	14,8	5	16,7
Hypertension	10	37,0	9	30,0
DM	9	33,3	12	40,0
Hypertension & DM/stroke	2	7,4	3	10,0
Other	2	7,4	1	3,3
Source of Information				
Health worker				
Yes	7	25,9	7	23,3
No	20	74,1	23	76,7
Internet/information media				
Yes	17	63,0	15	50,0
No	10	37,0	15	50,0
Family/friends/neighbours				
Yes	12	44,4	16	53,3
No	15	55,6	14	46,7
BMI				
Underweight (<18.5)	1	3,7	4	13,3
Normal Weight (18.5-22.9)	11	40,7	10	33,3
Overweight (23-24.9)	8	29,6	8	26,7
Obesity I (25-29.9)	7	25,9	8	26,7

Note: [a] Levene test; [b] Chi Square; [c] Kendall's tau-b; p>0.05 (homogeneous); f=frequency; SD=standard deviation

Most participants in both the intervention and control groups were classified as late elderly (48,1% and 46,7%), with a nearly equal gender distribution (51,9% and 50%). Most had junior high school education (44,4% and 50%), high socioeconomic status (70,4% and 56,7%), were active smokers (51,9% and 43,3%), and had diabetes mellitus (33,3% and 40%). The main information source was internet/media (63% and 50%), and most had normal BMI (40,7% and 33,3%). A homogeneity test on pre-test health behavior scores showed a p-value of 0,108 (p > 0,05), indicating no significant

baseline difference between the groups. Further analysis showed variation in baseline health behavior by demographic characteristics, as shown in Table 2.

Table 2. Baseline of cardiac health behavior based on demographic data at Dr. Moewardi Hospital in March-May 2024 (n=57)

Characteristics	Cardiac Health Behavior			
	Poor		Good	
	n	%	n	%
Age				
Late Adult (36-45 y.o)	2	3,5	0	0
Early Elderly (46-55 y.o)	7	12,3	2	3,5
Late Elderly (56-65 y.o)	19	33,3	8	14,0
Elderly (>65 y.o)	10	17,5	9	15,8
Gender				
Male	24	63,2	5	26,3
Female	14	36,8	14	73,7
Education				
Primary education	6	10,5	6	10,5
Secondary education	20	35,1	7	12,3
Higher education	12	21,1	6	10,5
Socio-economic				
Low socio-economic	12	21,1	9	15,8
High socio-economic	26	45,6	10	17,5
Smoking status				
Active smoker				
Passive smoker (living with a	22	38,6	5	8,8
smoker)	12	21,1	9	15,8
Neither active nor passive	4	7,0	5	8,8
smoker				
History of disease				
None	7	12,3	2	3,5
Hypertension	12	21,1	7	12,3
DM	18	31,6	3	5,3
Hypertension& DM/stroke	1	1,8	4	7,0
Other	0	0	3	5,3
Source of Information				
Health worker				
Yes	9	15,8	5	8,8
No	29	50,9	14	24,6
Internet/information media				
Yes	22	38,6	10	17,5
No	16	28,1	9	15,8
Family/friends/neighbours				
Yes	16	28,1	12	21,1
No	22	38,6	7	12,3
BMI				
Underweight (<18.5)	2	3,5	3	5,3
Normal Weight (18.5-22.9)	15	26,3	6	10,5

Characteristics	Cardiac Health Behavior			
	Poor		Good	
	n	%	n	%
Overweight (23-24.9)	12	21,1	4	7,0
Obesity I (25-29.9)	9	15,8	6	10,5

Source : (primary data, 2024)

Table 2 presents the baseline characteristics of cardiac health behavior based on demographic data from patients at Dr. Moewardi General Hospital in 2024. The findings indicate that the majority of respondents exhibiting poor cardiac health behavior were in the late elderly age group, accounting for 19 individuals (33.3%). In terms of gender, poor cardiac health behavior was more frequently reported among male participants (n = 24, 63.2%). Regarding educational attainment, most respondents with poor cardiac health behavior had completed secondary education (n = 20, 35.1%).

Based on socioeconomic status, a higher proportion of poor cardiac health behavior was observed among respondents with high socioeconomic backgrounds (n = 26, 45.6%). Furthermore, the data revealed that a considerable number of participants with poor cardiac health behavior were active smokers (n = 22, 38.6%). Additionally, 18 respondents (31.6%) had a history of diabetes mellitus. Another notable finding is that 22 participants (38.6%) who reported poor cardiac health behavior relied primarily on the internet or digital media as their main source of health information.

In terms of Body Mass Index (BMI), 15 respondents (26.3%) with poor cardiac health behavior had normal body weight. While this demographic analysis was not the principal objective of the study, it is included as supplementary data to inform future research and contextualize the observed behaviors.

Differences in Cardiac Health Behavior Scores Before and After Cardiac Health Training Using Video in the Intervention and Control Groups

The comparison between the pretest (before) and posttest (after) results for each group is presented in Table 4.

Table 4. Cardiac Health Behavior Scores of Acute Coronary Syndrome Patients Before and After Cardiac Health Training at Dr. Moewardi General Hospital, 2024 (n=57)

Group	Cardiac Health Behavior		Δ	*p*
	Mean±SD Before	Mean±SD After		
Treatment (n=27)	48,07±6,91	79,37±4,04	+31,29	<0,001*
Control (n=30)	47,43±6,75	63,80±5,29	+16,36	<0,001*

Note: paired sample t-test; *p<0.05 (there is an effect); SD=standard deviation; Δ=mean difference

Based on Table 4, the mean difference in cardiac health behavior scores before and after the intervention in the intervention group was statistically significant ($p < 0.001$). Therefore, it can be concluded that there was a significant difference between the pretest and posttest scores in the intervention group ($p < 0.05$). Likewise, the control group also demonstrated a statistically significant difference between the pretest and posttest scores ($p < 0.001$), indicating that significant changes occurred in both groups.

The Effect of Cardiac Health Training on Cardiac Health Behavior
The analysis of the behavioral score differences is presented in Table 5.

Table 5. The Effect of Cardiac Health Training on Cardiac Health Behavior among Acute Coronary Syndrome Patients at Dr. Moewardi General Hospital, 2024 (n = 57)

Group	Mean±SD	Δ	*p*	ES	95% CI	
					Lower	*Upper*
Treatment (n=27)	31,29±4,04	14,93	*<0,001	**3,149	10,96	17,41
Control (n=30)	16,36±5,29					

Note:* *independent sample t-test*; ** *hedges'g*; p<0,05 (there is an effect); SD=standard deviation; Δ=mean difference, ES=effect size

As shown in Table 5, the difference in mean cardiac health behavior scores was greater in the intervention group than in the control group. The post-intervention mean difference between the two groups was +14.18. This finding indicates a stronger improvement in cardiac health behavior among those who received the intervention compared to those who did not.

The results of the Independent Sample T-Test showed statistical significance ($p < 0.001$), confirming the effect of video-based cardiac health training on post-intervention behavior scores. Additionally, the Hedges' g value of 2.337 suggests a large effect size, indicating that the clinical impact of the cardiac health education intervention was substantial. Based on these findings, it can be concluded that video-based cardiac health training effectively improved the cardiac health behavior of patients with Acute Coronary Syndrome (ACS) at Dr. Moewardi General Hospital.

DISCUSSION

Differences in cardiac health behavior scores before and after video-based cardiac health training in the intervention and control groups

Based on Table 4, the statistical analysis for each group showed a significant difference in cardiac health behavior scores before and after the cardiac health training. This was true both for the intervention group (which received video-based cardiac health training and follow-up) and the control group (which received standard care). According to the researchers' analysis, this may have occurred because all patients with acute coronary syndrome, regardless of group assignment, received standard hospital care, including cardiac health education by healthcare professionals prior to discharge. Consequently, improvements in cardiac health behavior may also have occurred in the control group.

The greater mean difference in the intervention group suggests that video-based cardiac training was more effective on the average cardiac health behavior scores compared to standard care alone. This is supported by previous research demonstrating that health education interventions can significantly influence patients with acute coronary syndrome to adopt healthier behaviors as a form of secondary prevention. These include improved medication adherence and engagement in supportive behaviors such as healthy diet and regular physical activity, thereby reducing the risk of recurrent events (Abu et al., 2020; Kondo et al., 2023; Yang et al., 2021).

Furthermore, factors such as resilience, perceived self-control, and patient activation also play crucial roles in behavior change following acute coronary events. Wray et al., (2024) patients who possess stronger resilience resources tend to be more

capable of adopting healthier behavior after experiencing acute coronary syndrome. Moreover, patients who are actively involved in making decisions about their care are more likely to report positive care experiences and are more inclined to adhere to recommended behavior modifications.

Therefore, cardiac health education delivered to ACS patients may serve as a key strategy in facilitating behavior transformation through enhanced knowledge, understanding of the importance of medication adherence, and psychological support to help patients manage the behavioral transition. Such measures can contribute to reducing the risk of recurrence following acute coronary syndrome.

The effect of cardiac health training on cardiac health behavior

As presented in Table 5, the results confirm that cardiac health training had a significant effect on improving the cardiac health behavior of patients with Acute Coronary Syndrome (ACS) at Dr. Moewardi General Hospital. This finding is supported by Huriani, (2022) who demonstrated that the Education for Myocardial Infarction Literacy (EMIL) Model improved patients' knowledge, attitudes, and cardiac health behavior in individuals with STEMI. Similarly, Xia et al., (2021) found that nursing interventions promoting heart-healthy behavior effectively facilitated behavioral change in patients with coronary heart disease.

Bae et al., (2021) also reported that mHealth-based lifestyle and risk factor modification interventions significantly influenced health parameters such as LDL cholesterol, systolic blood pressure, and Body Mass Index (BMI) in patients with coronary artery disease. These findings suggest that technology-based approaches, including video education, can be effective in modifying health-related behaviors and outcomes among ACS patients. Another study by Kubica & Bączkowska, (2020) found that individualized motivation and health education regarding disease pathophysiology, goal setting, and improved medication adherence contributed to lifestyle change and enhanced clinical outcomes in post-myocardial infarction patients.

Health education may enhance cardiac health behavior among ACS patients through multiple mechanisms. These include increased knowledge of the disease, greater awareness of the importance of lifestyle modification, and the development of positive health-related perceptions that serve as motivational drivers for behavioral change. Shi et al., (2023) emphasized that accurate understanding of the disease and healthy lifestyle practices are essential for patients to adopt heart-protective behaviors, such as smoking cessation, regular exercise, and balanced nutrition, while maintaining adherence to prescribed treatments. In line with this Utama, (2023) showed that video-based counseling interventions enhanced patient knowledge and promoted healthier behavior changes. Apriyani et al., (2021) further demonstrated that educational videos improved medication adherence and self-care practices following Percutaneous Coronary Intervention (PCI), leading to reduced hospital readmission rates.

Moreover, health education can act as a motivating force for patients to pursue positive behavioral changes. Nurses, serving as health educators, can enhance patients' perceptions of their illness, which in turn positively influences their motivation to make behavior changes (Anggraeni et al., 2020). Cruz-Cobo et al., (2023) found that video-based health applications that provide audio-visual content on cardiac health behavior, along with personalized messages and gamification features, were effective in motivating patients with coronary heart disease.

The motivation derived from such interventions can encourage patients to engage more actively in positive behavior change. Additionally, video-based health education can help patients better comprehend and internalize the material presented. The use of visually engaging formats and clearly delivered messages enables patients to more effectively understand and adopt the recommended cardiac health behaviors. In conclusion, based on the current findings and supporting evidence, video-based health education holds great potential for influencing behavioral change among patients with acute coronary syndrome by improving their knowledge, motivation, attitudes, and capacity to adopt healthier behaviors.

CONCLUSION

Video-based cardiac health training has demonstrated a positive impact on promoting cardiac health behavior among patients with acute coronary syndrome (ACS). These findings underscore the potential value of integrating video-based education into routine cardiac care programs. However, future studies are encouraged to address the current limitations by employing randomized sampling methods, monitoring video engagement metrics, and optimizing video design to ensure accessibility, efficiency, and engagement for the target population.

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