Hội Tim Mạch Học Việt Nam
Vietnam National Heart Association

Tạp chí
Tim Mạch Học Việt Nam

Journal of Vietnamese Cardiology

In this issue:

ISSN 1859 - 2848
Digital version
jvc.vnha.org.vn/

Issue 112E (November, 2024)

Hội Tim Mạch Học Việt Nam
Vietnam National Heart Association

Tạp chí

Tim Mạch Học Việt Nam

JOURNAL OF VIETNAMESE CARDIOLOGY

(Xuất bản định kỳ 3 tháng 1 lần)

(Published quarterly)

Issue 112E (November, 2024)

JOURNAL OF VIETNAMESE CARDIOLOGY

OFFICE OF VIETNAM NATIONAL HEART ASSOCIATION
C Building - Bach Mai Hospital - 78 Giai Phong Street - Dong Da District – Hanoi - Vietnam
Tel: +84.24.3868.8488 Fax: +84.24.3868.8488
Email: tapchi@vnha.org.vn Website: https://jvc.vnha.org.vn/

Publishing License No.: 472/GP-BTTTT issued on: 22-7-2021

TABLE OF CONTENT

Highlights from Guidelines and Consensus released at ESC Congress 2024

Nguyen Ngoc Quang ✉
Hanoi Medical University

▶ **Correspondence to**
A/Prof. Nguyen Ngoc Quang
Hanoi Medical University
Email: quangtm@gmail.com

▶ Received 19 October 2024
Accepted 21 November 2024
Published online 30 November 2024

To cite: Nguyen NQ. *J Vietnam Cardiol* 2024;112E:4-10

ABSTRACTS

The 2024 ESC guidelines and consensus reveal several significant trends in cardiovascular medicine. They emphasize a more individualized, patient-centered approach while maintaining evidence-based protocols, supported by new biological markers and imaging techniques. Risk factor management and prevention have gained prominence, with comprehensive strategies for managing comorbidities and lifestyle modifications. The guidelines demonstrate greater flexibility in treatment targets and risk stratification, incorporating new markers for more precise patient care. They reinforce the importance of multidisciplinary team approaches and provide detailed frameworks for coordinating care between healthcare providers. Implementation considerations have been expanded, focusing on integrating preventive measures and non-pharmacological interventions throughout the patient journey, with practical recommendations for real-world clinical practice.

Keywords: ESC 2024, guidelines, consensus.

The 2024 European Society of Cardiology Conference marked a significant milestone in cardiovascular medicine, bringing together an impressive 31,800 delegates, including 5,400 chairs and presenters across 1,337 scientific sessions. The conference's scope was unprecedented, featuring key updates in clinical guidelines, cutting-edge research presentations, and important debates on current cardiovascular practices. The structured format included special events, global community sessions, official joint sessions, and numerous platforms for scientific exchange, demonstrating the ESC's commitment to advancing cardiovascular medicine through international collaboration.

A notable highlight was the presentation of 40 new clinical trials across 12 dedicated sessions, covering diverse areas including hypertension management, heart failure treatments, and innovative interventional approaches. The trials reflected current trends in cardiovascular medicine, with significant focus on personalized medicine approaches, novel therapeutic agents, and the integration of artificial intelligence in clinical practice.

The conference featured 19 "Great Debates" sessions, addressing crucial controversies in contemporary cardiovascular medicine. These debates covered a wide spectrum of topics, including preventive cardiology (blood pressure thresholds, lipid management strategies), chronic coronary disease

management, cardiac shock management, valvular interventions, and the role of artificial intelligence in cardiology. These sessions highlighted the evolving nature of cardiovascular medicine and the importance of evidence-based decision-making in complex clinical scenarios.

Professional education was a key focus, with an extensive program including 86 clinical case sessions, 16 practical seminars, 13 workshops, and 95 symposia. The conference also emphasized the importance of continuous medical education through interactive formats, including "Bring your Questions" sessions and tutorial presentations. The inclusion of 274 industry-collaborative sessions and 208 tutorials demonstrated the strong partnership between academic medicine and industry in advancing cardiovascular care.

Looking at emerging trends, the conference highlighted several key directions in cardiovascular medicine: a stronger emphasis on preventive cardiology, increased integration of artificial intelligence and digital health technologies, advancement in personalized medicine approaches, and new strategies for managing complex cardiovascular conditions. The high number of late-breaking science sessions (26) and advances in science presentations (24) underscored the rapid pace of innovation in cardiovascular medicine. These developments, combined with the release of four new guidelines, provide a comprehensive framework for advancing cardiovascular care while maintaining focus on evidence-based, patient-centered approaches.

Four guidelines on management of blood pressure, atrial fibrillation, chronic coronary syndromes; peripheral arterial and aortic diseases and one consensus on obesity and cardiovascular disease were released and extensively discussed at ESC congress this year.

KEY POINTS FROM THE 2024 ESC GUIDELINES FOR BLOOD PRESSURE MANAGEMENT:

The 2024 European Society of Cardiology guidelines for blood pressure management establish a clear target systolic blood pressure (SBP) of 120-129 mm Hg for adults on medication. This target represents a significant shift in treatment goals, though the guidelines acknowledge certain exceptions, including patients over 85 years old, those with frailty, orthostatic symptoms, or limited life expectancy. For these groups, the recommendation is to achieve the lowest tolerable blood pressure approaching this target, recognizing the need for individualized care.

The guidelines introduce a new conceptual framework for understanding blood pressure risk, defining hypertension as SBP >140 mm Hg or diastolic BP >90 mm Hg, while also establishing a new category of "elevated BP" (SBP 120-139 mm Hg or DBP 70-89 mm Hg). This approach acknowledges that cardiovascular risk increases across a continuum rather than starting at a specific threshold. The guidelines emphasize the importance of out-of-office blood pressure measurements for diagnostic purposes, particularly to identify white-coat and masked hypertension, though office measurements remain acceptable when out-of-office readings are unavailable.

Treatment recommendations follow a risk-based approach, recognizing that patients with conditions such as diabetes, kidney disease, cardiovascular disease, target organ damage, and familial hypercholesterolemia require more intensive management. The guidelines recommend starting with lifestyle interventions for three months before initiating drug therapy if targets aren't met. For pregnant women, the guidelines specifically recommend considering low- to moderate-intensity exercise to reduce the risk of gestational hypertension and pre-eclampsia, in consultation with an obstetrician.

The guidelines place strong emphasis on patient empowerment and treatment adherence through self-measurement of blood pressure. Special consideration is given to specific populations, including the recommendation for screening for secondary hypertension in adults diagnosed before age 40, except in obese young adults where sleep

apnea screening should be prioritized. The guidelines also specifically address measurement techniques, noting that manual blood pressure readings should be used for patients with atrial fibrillation, as most automated devices aren't validated for these patients.

Implementation remains a critical focus of these guidelines, with specific sections dedicated to overcoming barriers to effective implementation. The document takes an inclusive approach, incorporating sex and gender considerations throughout, clearly distinguishing between biological sex and sociocultural gender roles. This comprehensive approach reflects a modern understanding of how these factors influence both the presentation and management of hypertension, while acknowledging that poor implementation has historically been the major weakness of clinical hypertension guidelines.

KEY POINTS FROM THE 2024 ESC GUIDELINES FOR MANAGEMENT OF ATRIAL FIBRILLATION:

The European Society of Cardiology's 2024 guidelines for atrial fibrillation (AF) management centers around the AF-CARE pathway, which provides a structured approach to treatment. This comprehensive framework addresses four key areas: (1) Comorbidity and risk factor management, (2) Avoiding stroke and thromboembolism, (3) Reducing symptoms through rate and rhythm control, and (4) Evaluating patients' progress regularly. This pathway emphasizes the importance of a systematic approach to AF management while ensuring all critical aspects of care are addressed.

A cornerstone of AF management is the comprehensive control of risk factors and comorbid conditions. The guidelines strongly emphasize the importance of managing conditions such as hypertension, heart failure, and diabetes mellitus. Lifestyle modifications play a crucial role, with specific recommendations including a structured exercise program of 150-300 minutes of moderate activity or 75-150 minutes of vigorous activity weekly. Weight reduction of at least 10% is recommended for overweight patients, and alcohol consumption should be limited to no more than three standard drinks per week. These interventions are designed not only to manage AF but also to prevent its progression and improve treatment outcomes.

Stroke prevention through appropriate anticoagulation remains a critical component of AF management. The guidelines recommend Direct Oral Anticoagulants (DOACs) as the preferred choice over vitamin K antagonists for eligible patients. Anticoagulation is strongly recommended for patients with a CHA2-VA score of 2 or higher and should be considered for those with a score of 1. Importantly, the guidelines caution against combining anticoagulants with antiplatelet therapy unless specifically indicated for acute vascular events. All patients undergoing ablation procedures must maintain anticoagulation for at least two months post-procedure, regardless of their baseline stroke risk.

For symptom management, the guidelines outline a comprehensive approach to both rate and rhythm control. Rate control can be achieved through beta-blockers, digoxin, or calcium channel blockers, depending on the patient's left ventricular ejection fraction. Rhythm control strategies, including cardioversion, antiarrhythmic drugs, and catheter ablation, should be considered within 12 months of diagnosis in suitable patients. Catheter ablation is recommended as a first-line treatment for paroxysmal AF and as a second-line option for persistent AF when antiarrhythmic drugs prove ineffective.

Finally, the guidelines emphasize the importance of ongoing monitoring and treatment adjustment through a collaborative approach. Treatment decisions should be made jointly between the healthcare team and the patient, with regular reassessment of risk factors and treatment effectiveness. Patient education plays a vital role, ensuring individuals understand their condition and the importance of adherence to both medication and lifestyle modifications. This approach requires a multidisciplinary team effort, with regular evaluation of treatment progress and adjustment of management strategies as needed to optimize outcomes for each patient.

KEY POINTS FROM THE 2024 ESC GUIDELINES FOR CHRONIC CORONARY SYNDROMES MANAGEMENT:

The 2024 European Society of Cardiology guidelines introduce a comprehensive approach to managing chronic coronary syndromes (CCS), which describes stable periods of coronary artery disease. The guidelines emphasize the importance of distinguishing between obstructive atherosclerotic coronary artery disease and conditions like coronary microvascular disease or vasospasm, as symptoms can overlap. This distinction is particularly crucial for properly treating patients with angina or ischemia with nonobstructive coronary arteries (ANOCA/INOCA).

The guidelines outline a four-step management process for suspected CCS. The first step involves general clinical evaluation, including symptom assessment, ruling out acute coronary syndrome, and basic testing like ECG and blood work. The second step encompasses further cardiac examination, particularly echocardiography, to evaluate left ventricular function and valve health. The third step focuses on diagnostic testing to confirm CCS and assess future event risk, while the fourth step involves implementing lifestyle modifications, risk factor management, and appropriate medical therapies.

Diagnostic testing recommendations have been refined, with a preference for noninvasive anatomic or functional imaging as first-line testing. Coronary computed tomography angiography (CCTA) is recommended to rule out obstructive coronary artery disease and detect nonobstructive disease, while functional imaging is preferred for correlating symptoms with myocardial ischemia and guiding revascularization decisions. The guidelines suggest that combining these approaches through selective second-line testing may improve patient selection for invasive coronary angiography (ICA).

Regarding treatment, the guidelines recommend a single antiplatelet agent (aspirin or clopidogrel) for long-term use in CCS patients with obstructive atherosclerotic disease, with dual antithrombotic therapy considered for high-thrombotic-risk patients who don't have high bleeding risk. Important new evidence indicates that myocardial revascularization doesn't improve survival compared to guideline-directed medical therapy alone in patients with normal left ventricular function and without significant left main or proximal left anterior descending lesions. However, for patients with complex multivessel disease, particularly those with diabetes, coronary artery bypass grafting shows better survival outcomes than percutaneous coronary intervention.

The guidelines strongly emphasize the importance of a comprehensive management approach that combines lifestyle modifications, risk factor management, and appropriate medication. Patient education and shared decision-making between healthcare professionals and patients are highlighted as crucial elements for successful long-term outcomes. This patient-centered approach ensures that therapeutic pathways are tailored to individual needs while maintaining focus on risk factor control and long-term management of the condition.

KEY POINTS FROM THE 2024 ESC GUIDELINES FOR PERIPHERAL ARTERIAL AND AORTIC DISEASES:

The 2024 European Society of Cardiology has released comprehensive updated guidelines that merge the previous 2017 peripheral arterial diseases (PAD) and 2014 aortic diseases guidelines into a single document. This consolidation reflects the interconnected nature of these conditions and provides streamlined recommendations for their management, incorporating significant updates in screening protocols, treatment targets, and intervention strategies.

The guidelines introduce expanded screening recommendations for abdominal aortic aneurysms (AAA), now including all men aged ≥75 years regardless of smoking status, and women aged ≥75 years who are active smokers or have hypertension. This represents a significant change from previous guidelines, which had more restricted criteria for women. Additionally, first-degree relatives aged ≥50 years of patients with AAA should undergo duplex

ultrasound screening, unless another clear cause for the index AAA can be identified - a recommendation that has been elevated to Class I.

Treatment targets for patients with PAD have been significantly revised, with more aggressive goals for both blood pressure and cholesterol management. The guidelines now recommend a systolic blood pressure target of 120-129 mm Hg for PAD patients with hypertension, compared to the previous target of <140/90 mm Hg. For patients with atherosclerotic PAD, the LDL-cholesterol reduction goal has been lowered to <55 mg/dL, with an additional requirement of >50% reduction from baseline. In cases of acute mesenteric ischemia due to superior mesenteric artery occlusion, endovascular revascularization is now preferred over open surgery.

The guidelines provide detailed recommendations for aortic interventions and follow-up protocols. For ascending aortic aneurysms, surgery is recommended at a maximal diameter of ≥55 mm, with valve-sparing aortic root replacement recommended in experienced centers. Post-intervention monitoring has been clearly defined, with specific timelines for both open and endovascular repairs. After open AAA repair, imaging is recommended within the first year and every five years thereafter, while endovascular repairs require CT at one month and annual duplex ultrasound follow-up.

Special attention is given to specific aortic conditions and their management. The guidelines now recommend thoracic endovascular aortic repair as a Class I intervention for complicated type B intramural hematoma, and similar strong recommendations exist for type A and complicated type B penetrating atherosclerotic ulcers. For patients with bicuspid aortic valves, the guidelines establish clear monitoring protocols using CT/MRI and echocardiography, with surgical intervention recommended at lower aortic diameters (≥45 mm) compared to standard cases. These comprehensive recommendations reflect the latest evidence in aortic disease management and aim to standardize care across different clinical scenarios.

KEY POINTS FROM THE ESC CLINICAL CONSENSUS STATEMENT ON OBESITY AND CARDIOVASCULAR DISEASE:

The European Society of Cardiology's consensus statement addresses the critical relationship between obesity and cardiovascular disease (CVD), noting that obesity rates have more than doubled globally in the past four decades, with approximately 67.5% of obesity-related excess mortality attributable to CVD. The statement defines obesity using WHO criteria, with BMI classifications ranging from normal (20 to <25 kg/m^2) to severe obesity (≥40 kg/m^2), while acknowledging that Asian populations may have lower country-specific cut-points. The obesity epidemic is influenced by multiple factors, including socioeconomic disparities, genetic predisposition, and environmental factors such as the increased availability of processed foods and sedentary lifestyles.

The statement emphasizes the importance of understanding metabolically unhealthy weight, particularly the role of visceral adipose tissue in cardiovascular risk. While BMI is commonly used, measures like waist circumference and waist-to-hip ratio may better reflect visceral adiposity and associated cardiovascular risk. The guidelines specifically recommend preventing further weight gain when waist circumference exceeds 94 cm in men and 88 cm in women. The relationship between obesity and other cardiovascular risk factors is significant, with approximately 80% of type 2 diabetes patients being overweight or obese, and clear associations between BMI and increased blood pressure, dyslipidemia, and obstructive sleep apnea.

Treatment strategies for obesity encompass multiple approaches, beginning with lifestyle interventions targeting diet and physical activity. Dietary interventions typically aim for a 500-750 kcal/day energy deficit, while emphasizing portion control and reduction of ultra-processed foods. The statement highlights the importance of psychological support and addressing obesity stigma, noting that patients are more likely to succeed when clinicians use supportive, nonjudgmental approaches.

Pharmacological options have expanded, with six approved medications in both Europe and the US, including newer agents like semaglutide and tirzepatide, which have shown promising results in reducing cardiovascular events.

Surgical treatments, including bariatric surgery, are recommended for individuals with BMI ≥40 kg/m^2 or ≥35 kg/m^2 with obesity-related comorbidities. While these procedures can lead to significant improvements in cardiovascular outcomes, including reductions in mortality and lower incidence of heart failure, myocardial infarction, and stroke, they also carry risks of long-term complications such as malabsorption and internal hernias. The statement addresses the complex relationship between obesity and various cardiovascular conditions, including the "obesity paradox" where moderately increased BMI may be associated with better prognosis in some cardiac conditions.

The consensus statement also specifically addresses obesity's impact on various cardiovascular conditions, including heart failure, atrial fibrillation, and venous thromboembolism. Weight loss is recommended for managing these conditions, though the approach must be carefully tailored to each patient's situation. The statement provides specific guidance for anticoagulation in obese patients, particularly those who have undergone bariatric surgery, recommending vitamin K antagonists over direct oral anticoagulants in certain cases and advising against edoxaban or dabigatran for patients with BMI ≥40 kg/m^2 or weight >120 kg.

EMERGING TRENDS FROM 2024 ESC GUIDELINES AND CONSENSUS STATEMENTS

The European Society of Cardiology's 2024 guidelines and consensus statements strongly emphasize a truly patient-centered approach to cardiovascular care, marking a significant evolution in treatment philosophy. While evidence-based protocols remain essential, the guidelines now place greater emphasis on individualizing treatment plans based on each patient's specific characteristics, preferences, and life circumstances. This enhanced patient-centered approach is supported by new biological markers and imaging techniques that enable more personalized diagnosis and treatment strategies. The integration of these new diagnostic tools allows for better characterization of individual patient risks and responses to therapy, leading to more precise and effective treatment plans. This individualized approach ensures that standardized care protocols serve as a foundation while allowing for flexibility in implementation to meet specific patient needs and circumstances.

Risk factor management and prevention have been elevated to new prominence across all guidelines, with a particular focus on comprehensive management of comorbidities in cardiovascular patients. The ESC emphasizes that addressing modifiable risk factors must begin at the initial patient encounter and continue throughout the treatment journey. Notably, there is increased attention to non-pharmacological interventions, with the guidelines providing detailed recommendations for lifestyle modifications, including dietary changes, regular physical activity, and weight management. This comprehensive approach to risk factor management reflects a deeper understanding of how cardiovascular disease development and progression are influenced by multiple interacting factors, requiring a more integrated approach to prevention and treatment.

The guidelines introduce new concepts in establishing evidence-based treatment targets and risk stratification. While maintaining specific numerical goals for key parameters such as blood pressure and cholesterol levels, the 2024 guidelines demonstrate greater flexibility in how these targets are applied, taking into account individual patient characteristics and comorbidities. New biological markers and imaging techniques are incorporated into risk assessment strategies, allowing for more precise patient stratification and treatment planning. This flexible approach to target-setting and monitoring reflects the growing understanding that optimal cardiovascular care requires regular reassessment and

adjustment based on individual patient responses and changing circumstances.

The multidisciplinary team approach has been further refined in the 2024 guidelines, with a stronger emphasis on integrated care that addresses both cardiovascular conditions and comorbidities simultaneously. The guidelines provide more detailed frameworks for coordinating care between various healthcare providers, including primary care physicians, specialists, nurses, and other healthcare professionals. Patient education and engagement are emphasized as essential components of successful treatment, with new approaches to shared decision-making that ensure patients are truly at the center of their care plans. The guidelines stress the importance of regular communication and coordination between team members to ensure comprehensive care delivery that addresses all aspects of patient health.

Implementation considerations have been significantly expanded in the 2024 guidelines, with a particular focus on integrating preventive measures and non-pharmacological interventions throughout the patient journey. The ESC acknowledges that translating guidelines into practice presents significant challenges and provides practical recommendations for implementing more holistic approaches to care. This includes strategies for incorporating preventive measures from the outset of treatment, integrating new monitoring technologies, and establishing clear pathways for ongoing risk assessment and treatment adjustment. The guidelines emphasize the importance of flexible implementation approaches that can adapt to individual patient needs while maintaining evidence-based standards of care. This enhanced focus on implementation reflects the ESC's commitment to ensuring that evidence-based recommendations translate effectively into real-world clinical practice while maintaining the flexibility needed for truly patient-centered care.

Finally, there is a marked emphasis on non-pharmacological interventions and preventive measures integrated throughout the treatment journey. The guidelines place greater importance on lifestyle modifications, dietary interventions, and physical activity as fundamental components of cardiovascular care, rather than merely adjunct therapies. This reflects a growing recognition that optimal cardiovascular outcomes require a holistic approach to health management, with prevention and non-drug interventions playing crucial roles alongside traditional medical treatments. This trend is further supported by detailed recommendations for implementing these interventions in clinical practice, making them more accessible and effective for both healthcare providers and patients.

REFERENCES

1. McEvoy JW, McCarthy CP, Bruno RM, et al. 2024 ESC Guidelines for the management of elevated blood pressure and hypertension. Eur Heart J. 2024;45(38):3912-4018. doi:10.1093/eurheartj/ehae178
2. Van Gelder IC, Rienstra M, Bunting KV, et al. 2024 ESC Guidelines for the management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS). Eur Heart J. 2024;45(36):3314-3414. doi:10.1093/eurheartj/ehae176
3. Vrints C, Andreotti F, Koskinas KC, et al. 2024 ESC Guidelines for the management of chronic coronary syndromes. Eur Heart J. 2024;45(36):3415-3537. doi:10.1093/eurheartj/ehae177
4. Mazzolai L, Teixido-Tura G, Lanzi S, et al. 2024 ESC Guidelines for the management of peripheral arterial and aortic diseases. Eur Heart J. 2024;45(36):3538-3700. doi:10.1093/eurheartj/ehae179
5. Koskinas KC, Van Craenenbroeck EM, Antoniades C, et al. Obesity and cardiovascular disease: an ESC clinical consensus statement. Eur Heart J. 2024;45(38):4063-4098. doi:10.1093/eurheartj/ehae508

Quality of life and its related predictors among acute coronary syndrome patients with coronary stents in Ho Chi Minh City, 2022

Nguyen Thi Phuong Uyen[1]✉, Le Thi Nhung[2], Huynh Thi Phuong[3]

[1] Hong Bang International University

[2] Hoan My Sai Gon Hospital

[3] An Sinh Institute of Research and Training of Medicine and Pharmacology

▶ **Correspondence to**
MSN. Nguyen Thi Phuong Uyen
Faculty of Nursing, Hong Bang International University
Email: uyenntp89@gmail.com

▶ Received 31 May 2023
Accepted 21 July 2023
Published online 30 November 2024

To cite: Nguyen TPU, Le TN, Huynh TP. *J Vietnam Cardiol* 2024;**112E**:11-19

ABSTRACT

The health-related quality of life (HRQOL) assessment after coronary stents insertion to issue a very crucial tool for evaluating outcomes. Therefore, we investigated the associations between healthy affect, resilience to improve their health status and thequality of life of patient is improving. A cross-sectional design involving patients with having acute coronary syndrome (ACS) after coronary stents insertion (CSI) and being treated in the hospital in Ho Chi Minh City. The patients (N =210) who came to Tam Duc Heart Hospital for pre- examination during treatment were asked to answerquestionnaires which included SF-36 and resilience-25. The t-test and ANOVA was applied to identify the factors related to quality of life and resilience. Result showed themean score of resilience is 70.2 ± 8.1. The score of physical components summary (PCS) was range from 32.37 to 61.6 and the mean score was 51.0 ± 8.7. For the mentalcomponent summary (MCS) was range from 39.6 to 60.0 with the mean score was 51.0±5.7. Factors including age, gender, marital status, working status, education, duration after stent treatment, experience of hospitalization for stent treatment, numberof stents in patients and regularly take medication were associated with patients' qualityof life. The mean score of quality of life was significantly different between patients' resilience level ($p < 0.05$).

Keywords: Quality of Life, Acute Coronary Syndrome, stents insertion, resilience.

INTRODUCTION

In the word, cardiovascular disease is the leading global cause of death, accounting for more than 17.6 million deaths per year in 2016. Cardiovascular disease (CVD) was the leading cause (43.2%) of deaths attributable to cardiovascular disease in the UnitedState (US) in 2016. CVD, listed as the underlying cause of death, accounted for 840,678deaths in the US in 2016, approximately 1 of every 3 deaths. Especially, heart attacks and coronary heart disease were 2 of the most expensive condition treated in US[1]. Moreover, CVD caused 17.3 million deaths globally. It accounted for 31.5% of all deaths and 45% of all non-communicable disease deaths, more than

twice that caused by cancer, the rate of death is more than 4 million people die from CVD across the continent every year in Europe[2].

In Vietnam, according to data from the National Heart Institute, the rate of CAD has gradually increased over the years. In 1991, the prevalence of CAD was 3%, 6.05% in 1996, and 9.5% in 1999. The mortality rate of CAD accounts for 11 - 36%. CAD is a burden to public health in developing countries including Vietnam[3]. Furthermore, CAD saw for 31% of total deaths in 2016 and the number of CAD deaths reached 58,452 or 11.58% of total deaths in 2017. However, there is no conclusion indicating factors related to the quality of life of patients with ACS after coronary stentings.

Moreover, those studies were carried out in European countries, which have a different culture than Vietnam. Many studies have shown the relationship between factors related to the quality of life of patients with ACS after percutaneous coronary intervention. However, the main studies in Vietnam are still very limited, there are no studies on factors related to the quality of life of patients with ACS after coronary stentings. Therefore, the objective of this study was to determine the quality of life scores, demographic characteristics and factors related to the quality of life among patients with ACS after coronary stentings.

RESEARCH METHODOLOGY

A cross-sectional study was conducted

Research conducted at the Out Department at Tam Duc Cardiology hospital

The sample size in this study included 210 people with ACS after stentingsreexamination treatment at Out Department

Inclusive criteria Including in the study, patients with Percutaneous Coronary Intervention (PCI) must take examination and treatment at the hospital in Ho Chi Minh City. Potential participants also had finished with demographic characteristics, medical record question, and Resilience-25 questionnaire and complete the self- administered SF36. The patients completely agreed to join the study. Data collection from February to March 2021 at Out Department of Cardiology.

The authors of the two questionnaires agreed to be used in this study. Participants with ACS after coronary stentings treated at the Out Department of Cardiology were invited to participate in the study and they agreed to sign the consent form. They were then invited to complete the questionnaire in time from 60-70 minutes. After the questionnaire is completed and rechecked. The data were entered into SPSS 20 softwarefor analysis.

Questionnaire

The demographic characteristics

Age, sex, level of education marital status, residence, employment status.

Medical record question

Duration of stentings, type of treatment, comorbidities, duration post stent.

The resilience-25

The population was then divided into quartiles. For the lowestquartile (i.e. from 1-25% of the general population), the score ranged from 0-73. For the second quartile (i.e. from 26-50%) the scored ranged from 74-82. For the third quartile (51-75% of the population) the score ranged from 83-90. For the highest quartile (76-100% of the population) the score ranged from 91-100[4]. The CD-RISC contains 25 items, all of which carry a 5-point range of responses, as follows: not true at all (0), rarely true (1), sometimes true (2), often true (3), and true nearly all of the time (4). The scale is ratio based on how the subject has felt over the last month. The total score ranges from 0–100, with higher scores reflecting greater resilience. They show its the scale are listed in table 1[5]. In our sample study of 210 patients, the Cronbach's alpha was 0.794.

The quality of life by the SF-36 questionnaire

The research instrument for evaluating the quality of life was the SF-36 questionnaire from The RAND 36 Items Health Survey, Version 1.0 by Vietnamese, which was checked the reliability of SF-36 questionnaire with Cronbach $\alpha = 0.67$[6]. The SF-36 questionnaire

includes eight sub-scales, that is physical functioning (PF) 10 sentences, role limitations due to physical health problems (RP) 4 sentences, bodily pain (BP) 2 sentences, general health perceptions (GH) 6 sentences, vitality (VT) 4 sentences, social functioning (SF) 2 sentences, role limitations due to personal or emotional problems (RE) 3 sentences and mental health (MH) 5 sentences. Note that all items are scored so that a high score defines a more favorable health state. In addition, each item is scored on a 0 to 100 range so that the lowest and highest possible scores are 0 and 100, respectively.

Data analysis

All results were checked the satisfied with the research's criteria and inputted into the SPSS software version 20.0 to analyze the rate and relationships. The types of data were described as the following. Demographic witth data SF-36 (PCS and MCS), Resilience (each domain) witth SF-36 (PCS and MCS), Demographic data, Resilience (Total score) with SF-36 (PCS and MCS), Multiple linear analyses adjusting for the variables showed in univariate analysis were used to determine the predictors of PCS and MCS among ACS patients with stents. Besides, T-test, One-way ANOVA, Multivariable logistical analysis have using.

RESULTS

Demographic characteristics of participants

Table 1 showed that a total of 210 participants with stents were enrolled. The mean age (SD) of the participants was 64 years old and near seventy percentages (68.1%) were male. The participants who come from urban 56.2% and rural 43.8%. Most of them (87.6 %) were married and 68.1% of them is retired. More than fifty percentage (52.8%) received education at least 9 years. 84.3% patients is over 200 USD per month.84.3% participants had received the stent treatment more than 6 months. Given 84.8% participants received one time treatment of coronary artery stent and more than eighty percentage (81.9%) had one or two stents. Most of them regular took medications.

Table 1. *Demographic characteristics, status of resilience and quality of life (n=210)*

Characteristics	n	(%)
Age, y		
<60	61	(29.0)
60-<70	91	(43.3)
≥70	58	(27.6)
Gender		
Male	143	(68.1)
Female	67	(31.9)
Residence		
Urban	118	(56.2)
Rural	92	(43.8)
Marital status		
Single	19	(9.0)
Married	184	(87.6)
Widowed / Divorced	7	(3.3)
Working status		
Working	67	(31.9)
Retired or unemployment	143	(68.1)
Education		
Less than Primary school (≤ 5 years)	0	(0.0)
Junior high school (>5 –≤ 9 years)	99	(47.1)
Senior high school (>9 – ≤ 12 years)	104	(49.5)
Higher than high school (>12 years)	7	(3.3)
Household income		
1,000,000-5,000,000VND/person/month	33	(15.7)
>5,000,000VND/person/month	177	(84.3)
Months after stent treatment		
< 6 months	33	(15.7)
≥ 6 months	177	(84.3)
No. of hospitalization for stent treatment		
One time	178	(84.8)
Two time	20	(9.5)
More than second time	12	(5.7)

Characteristics	n	(%)
Number of stents in patients		
One	80	(38.1)
Two	92	(43.8)
Three	32	(15.2)
More than three	6	(2.9)
Regularly take medication		
No	7	(3.3)
yes	203	(96.7)

Quality of Life of Acute Coronary Syndrome Patients after Coronary Stents Insertion with resilience-25

Table 2 showed the level of resilience score among 210 acute coronary syndrome patients after coronary stents insertion. As a result, the mean score of resilience is 70.2 ± 8.1. According to the Connor-Davidson Resilience Scale cut point, nearly half of patients (43.3%) was middle level of resilience, one-third of patients (31.4%) was higher level of resilience and 25.2% of patients was low level of resilience.

***Table 2**. Participants' resilience (n=210)*

Level of Resilience		Minimum		Maximum	Mean	± SD
CD-25 score			58.0	94.0	70.2	±8.1
	n	(%)				
Low (< 27%,)	53	(25.2)	58.0	62.0	60.3	±1.4
Middle (27 - 73 %)	91	(43.3)	63.0	72.0	69.2	±2.8
Higher (> 73%)	66	(31.4)	74.0	94.0	79.7	±5.2
CD-25: Connor-Davidson Resilience Scale						

Patient's Quality of Life measured by the T-scores of SF-36

Table 3 showed the results of quality of life among 210 acute coronary syndrome patients after coronary stents insertion. As the result, the score of physical componentssummary (PCS) was range from 32.37 to 61.6 and the mean score was 51.0 ± 8.7. For the mental component summary (MCS) was range from 39.6 to 60.0 with the mean score was 51.0±5.7. Meanwhile, the highest mean score was vitality (60.8±6.5), experienced on body pain (58.6±6.1) and the lowest mean score was role emotional (45.2±14.1) and mental health (47.3±5.6).

***Table 3**. The T-scores of SF-36 (n=210)*

Items of Life SF-36	Minimum	Maximum	Mean	±SD
Physical component summary (PCS)	32.37	61.6	51.0	±8.7
Mental component summary (MCS)	39.6	60.0	51.0	±5.7
Physical functioning (PF)	15.12	57.1	45.1	±11.3
Role Physical (RP)	28.0	56.2	45.6	±12.8
Body Pain (BP)	33.8	62.8	58.6	±6.1
General health (GH)	21.9	64.0	50.2	±7.4
Vitality (VT)	44.3	70.4	60.8	±6.5
Social Functioning (SF)	40.9	57.1	53.8	±3.9
Role emotional (RE)	23.7	55.3	45.2	±14.1
Mental Health (MH)	34.5	57.3	47.3	±5.6

The difference in the QoL SF-36 scores (PCS and MCS) between different categories of demographic variables

Table 4 and Table 5 indicated the results of association between the demographic variables and quality of life (both physical and mental component score) among 210 patients with stents. Table 4 showed that PCS was significantly associated with age, gender, marital status, working status, education level, duration after stent treatment, the no. of stents and regular take medication (yes or no) (all p <0.05), while other demographic variables were not. In table 5, MCS was significantly association with age, marital status, working status, education level, the time of hospitalization for stent treatment and the no. of stents, while hile other demographic variables were not.

***Table 4**. The association of PCS with demographic variables (n=210)*

PCS			
Characteristics	**Mean**	**±SD**	**p-value**
Age			
<60 (n=61)	57.6	±5.0	<0.001*
60-<70 (n=91)	50.6	±7.8	
≥70 (n=58)	44.5	±8.0	
Gender			
Male (n=143)	53.0	±7.5	<0.001*
Female (n=67)	46.5	±9.3	
Residence			0.097
Urban (n=118)	50.1	±9.0	
Rural (n=92)	52.1	±8.1	
Marital status (n=61)			0.281
Single/windowed/divorced (n=26)	52.7	±9.5	
Married (n=184)	50.7	±8.5	
Working status			<0.001*
Working (n=67)	57.2	±4.9	
Retired/unemployment(n=143)	48.0	±8.5	
Education			<0.281
≤ 9 years (n=99)	52.7	±9.5	
> 9 years (n=111)	50.7	±8.5	
Household income/person/month			0.351
1,000,000-5,000,000VND (n=33)	49.7	±10.5	
>5,000,000VND/person/month (n=210)	51.2	±8.3	
Months after stent treatment			<0.001*
< 6 months (n=130)	54.2	±6.8	
≥ 6 months (n=80)	45.6	±8.8	
No. of hospitalization for stent treatment			0.675
One time(n=178)	51.1	±8.9	
≥ Two time (n=32)	50.4	±7.4	
No. of stents in patients			0.001*
One (n=80)	51.8	±8.6	
Two (n=92)	52.1	±8.8	
≥ three (n=38)	46.3	±7.0	
Regularly take medication			0.001*
No (n=7)	40.7	±0.0	
Yes (n=210)	51.3	±8.6	
* Significant with p < 0.05			

***Table 5**. The association of MCS with demographic variables (n=210)*

MCS			
Characteristics	**Mean**	**±SD**	**p-value**
Age			
<60 (n=61)	54.7	±3.7	<0.001*
60-<70 (n=91)	50.0	±5.1	
≥70 (n=58)	48.6	±6.4	
Gender			
Male (n=143)	51.4	±5.7	0.123
Female (n=67)	50.1	±5.6	
Residence			0.341

MCS			
Characteristics	**Mean**	**±SD**	**p-value**
Urban (n=118)	50.7	±6.1	
Rural (n=92)	51.4	±5.3	
Marital status (n=61)			0.005*
Single/windowed/divorced (n=26)	53.9	±4.3	
Married (n=184)	50.6	5.8	
Working status			<0.001*
Working (n=67)	54.8	±3.6	
Retired/unemployment (n=143)	49.2	±5.7	
Education level			0.005
≤ 9 years (n=99)	53.9	±4.3	
> 9 years (n=111)	50.6	±5.8	
Household income/person/month			0.224
1,000,000-5,000,000VND (n=33)	49.9	±4.6	
>5,000,000VND/person/month (n=210)	51.2	±5.9	
Months after stent treatment			0.353
< 6 months (n=130)	51.3	±4.1	
≥ 6 months (n=80)	50.5	±7.7	
No. of hospitalization for stent treatment			<0.001*
One time(n=178)	52.0	±5.3	
≥ Two time (n=32)	45.5	±5.0	
No. of stents in patients			<0.001*
One (n=80)	52.5	±5.6	
Two (n=92)	51.6	±5.1	
≥ three (n=32)	46.3	±5.2	
Regularly take medication			0.115
No (n=7)	47.6	±0.0	
Yes (n=210)	51.1	±5.8	
* Significant with p < 0.05			

The association of Resilience level with the quality of lifeTable 6 indicated the difference of resilience level and quality of life among 210 acute coronary syndrome patients after coronary stents insertion at Tam Duc Heart Hospital. The finding indicated that the mean score of quality of life (both physical and mental components) was significantly different between patients' resilience level with p<0.05 (physical component score) and p<0.001 (mental component score). Meanwhile, the mean score of quality of life of middle resilience level was highest one and lowest one was low resilience level for both physical and mental component score.

***Table 6**. The results of Anova between categorical of resilience and quality of life (n=210)*

Resilience level	**PCS**			**MCS**		
	Mean	**±SD**	**p-value**	**Mean**	**±SD**	**p-value**
Low (< 27%, n=53)	48.4	±8.7	<0.044*	49.6	±6.4	<0.001*
Middle (27-73 %, n=91)	52.0	±9.0		52.8	±3.6	
Higher (more than 73%, n=66)	51.6	±7.8		49.7	±6.9	
*Significant with p < 0.05						

Multiple linear regression of the quality of life (PCS and MCS)

All significant variables showed in univariate analysis were put into multivariate linear analyses with stepwise method to determine the predictors of PCS and MCS among ACS patients with stents. In physical quality of life, participants with advancedage, equal to or more 6 months after stent treatmen, retired/unemployment had signoficantly poorer PCS, while participants with regularly take medication had signoficantly higher physical QoL (Table 7).

***Table 7**. The predictors of MCS using the multivariate linear regression with stepwise method*

Variable	β	p-value
Age	-0.242	0.003
Months after stent treatment (reference: < 6 months)		
≥ 6 months	-0.448	<0.001
Regularly take medication (reference: no)		
Yes (n=210)	0.202	<0.001
Working status (reference: Working)		
Retired/unemployment (n=143)	-0.232	0.003
F=52.971; R^2=0.508; Adjusted R^2=0.499		

In terms of mental quality of life, participants with retired/unemployment status, equal to or more than 2 time of hospitalization for stent treatment, more than 9 years of education had significantly poorer MCS (Table 8).

***Table 8**. The predictors of MCS using the multivariate linear regression with stepwise method*

Variable	β	p-value
Working status (reference: Working)		
Retired/unemployment (n=143)	-0.461	<0.001
No. of hospitalization for stent treatment (reference: one)		
≥ Two time (n=32)	-0.328	<0.001
Education level (ref: ≤ 9 years)		
> 9 years (n=111)	-0.196	0.004
F=32.094; R^2=0.319; Adjusted R^2=0.309		

DISCUSSION AND CONCLUSION

The quality of life (PCS and MCS)

In this study, the majority of study participants were female, which is similar to the results of Morel et al. (2008) in the study on treatment adherence of coronary patients [7], and this is in contrast to the study of Rawal et al. (2020) with a more significant number of males than females [8]. The findings showed that the mean score of resilience is high (70.2 ± 8.1), high percentage of patients was middle level (43.3%) and high level (31.4%) of resilience. This result is similar to previous studies. In the study of Yeng et al. (2016), the HRQoL was high after set primary stents in patients with ACS [9].

As the result, the score of physical components summary (PCS) was range from 32.37 to 61.6 and the mean score was 51.0 ± 8.7. For the mental component summary (MCS) was range from 39.6 to 60.0 with the mean score was 51.0±5.7. Meanwhile, the highest mean score was vitality (60.8±6.5), experienced on body pain (58.6±6.1) and the lowest mean score was role emotional (45.2±14.1) and mental health (47.3±5.6).

As for the quality of life of patients with stents, the type of stent inserted did not affect the quality of life of each patient [10]. Patients' quality of life with stent implantation less than six months is gradually improved, while patients' quality of life after six months is almost lower. This finding is similar to the study of Xue et al. (2015), who also confirmed that for patients with stent implantation for six months, quality of life is improved, and then the quality of life

is almost unchanged [11].

PCS was significantly associated with age, gender, marital status, working status, education level, duration after stent treatment, the no. of stents and regular take medication (yes or no) (all p <0.05), while other demographic variables were not. MCS was significantly association with age, marital status, working status, education level, the time of hospitalization for stent treatment and the no. of stents, while hile other demographic variables were not.

The predictors of PCS

In physical quality of life, participants with advanced age, equal to or more 6 months after stent treatmen, retired/unemployment had significantly poorer PCS, while participants with regularly take medication had significantly higher physical QoL. This result is quite similar to the previous study patients aged ≥ 70 years had poorer physical HRQOL (SF-12) and physical limitations (SAQ), but better mental HRQOL (SF-12), angina frequency and QOL (SAQ) at both time points. Age, length of hospital stay, gender, partnership status and number of stents deployed are independent predictors of HRQOL improvement over time [9]. The older patients who had many problems related to health therefore their quality of life is lower than others and in previous study also indicted that age was a significant factor related to the quality of life of patients with heart stents [12]. In opposite, the patients who regularly take medication had better physical quality of life because their health is consistent when they follow the doctor medication.

The predictors of MCS

In terms of mental quality of life, participants with retired/unemployment status, equal to or more than 2 time of hospitalization for stent treatment, more than 9 years of education had significantly poorer MCS. For the mental quality of life, Yeng et al. (2016) also found the length of hospitalization also the predictor of mental quality of life. The patients may get tired from staying long in the hospital with more than 2 times of surgery the health is worse then the mental health is getting bad. Moreover, with the retired or unemployment status, they will get more stress than others because they can't afford for hospitalization. It becomes their family's burden. They may think negatively and hopelessly. Moreover, the patients with higher education may get more anxiety than the less education one because they know about their health status, they can search more information about their disease then they get more worried than someone they do not know anything about their health status and just follow the doctor advice. These results are consistent with the result from previous study that factors related to worse HRQoL were severe symptom experience, higher depression, a lower educational level, and lower social support [13].

Recommendations

On that basis, the study recommends that more attention should be paid to patient health education to help patients participate more in physical activities after stenting. The results also confirm the role of family interest in improving the patient's quality of life after stenting. The analysis of correlations with quality of life indicates that retired patients, married people, and patients with multiple stents are patients with low quality of life who need more attention. Emotional and health education for patients to improve their quality of life.

ACKNOWLEDGEMENT

To be honest the bottom of my heart, I would like to send my gratefulness and respectfulness to Dr. Aih-Fung Chiu, Dr. Huynh Thi Phuong, Dr Do Thi Lan Anh and lecturers from Meiho and Nguyen Tat Thanh University, I would like to thank the Tam Duc Heart Hospital and patients for their participation help me complete this study.

REFERENCES

1. Benjamin EJ, Muntner P, Alonso A, et al. Heart Disease and Stroke Statistics-2019 Update: A Report From the American Heart Association. Circulation. 2019;139(10):e56-e528. doi:10.1161/CIR.0000000000000659

2. Townsend N, Wilson L, Bhatnagar P, et al. Cardiovascular disease in Europe: epidemiological update 2016. Eur Heart J. 2016;37(42):3232-3245. doi:10.1093/eurheartj/ehw334
3. Vietnam. Coronary heart disease Tropical Hospital. 2019.
4. Campbell-Sills L, Forde DR, Stein MB. Demographic and childhood environmental predictors of resilience in a community sample. J Psychiatr Res. 2009;43(12):1007-1012. doi:10.1016/j.jpsychires.2009.01.013
5. Connor KM, Davidson JR. Development of a new resilience scale: the Connor-Davidson Resilience Scale (CD-RISC). Depress Anxiety. 2003;18(2):76-82. doi:10.1002/da.10113
6. Thu PH, Thuy DT, Hung NV. Study on applying the questionnaire SF-36 to assess the quality of life in patients with rheumatoid arthritis. Medical Research. 2017;106(1):146-54.
7. Moriel M, Tzivoni D, Behar S, et al. Contemporary treatment and adherence to guidelines in women and men with acute coronary syndromes. Int J Cardiol. 2008;131(1):97-104. doi:10.1016/j.ijcard.2007.09.005
8. Rawal S, Sawant AC, Sridhar M, et al. Impact of Intravascular Brachytherapy on Patient-Reported Outcomes in Patients with Coronary Artery Disease. Cardiovasc Revasc Med. 2020;21(12):1550-1554. doi:10.1016/j.carrev.2020.05.032
9. Yeng SH, Gallagher R, Elliott D. Factors influencing health-related quality of life after primary percutaneous coronary intervention for ST-elevation myocardial infarction. Appl Nurs Res. 2016;30:237-244. doi:10.1016/j.apnr.2015.09.002
10. Bønaa KH, Mannsverk J, Wiseth R, et al. Drug-Eluting or Bare-Metal Stents for Coronary Artery Disease. N Engl J Med. 2016;375(13):1242-1252. doi:10.1056/NEJMoa1607991
11. Xue C, Bian L, Xie YS, et al. Impact of smoking on health-related quality of Life after percutaneous coronary intervention treated with drug-eluting stents: a longitudinal observational study. Health Qual Life Outcomes. 2017;15(1):1. doi:10.1186/s12955-016-0578-4
12. Rofiyati W, Pangastuti H. Factors Associated Quality of Life Patients with Coronary Stent in Dr Sardjito Hospital Yogyakarta. Jurnal Ners Dan Kebidanan Indonesia. 2020;8(9).
13. Kim HS, Kim HK, Kang KO, et al. Determinants of health-related quality of life among outpatients with acute coronary artery disease after percutaneous coronary intervention. Jpn J Nurs Sci. 2019;16(1):3-16. doi:10.1111/jjns.12209

Exploring the impact of lifestyle modification on quality of life of patients with coronary artery disease at one hospital in Ho Chi Minh City, 2022

Dang Van Sang[1]✉, Szu-Mei Hsiao[2], Phung Thanh Phong[3], Truong Hoai Nam[4]

[1] Tam Duc Heart Hospital

[2] Meiho University

[3] Cho Ray Hospital

[4] Kien Giang General Hospital

▶ **Correspondence to**
Dr. Dang Van Sang
Tam Duc Heart Hospital
Email: sangdangopsmile@gmail.com

▶ Received 19 May 2023
Accepted 15 October 2023
Published online 30 November 2024

To cite: Dang VS, Hsiao SM, Phung TP, et al. *J Vietnam Cardiol* 2024;**112E**:20-28

ABSTRACT

Improving the quality of life (QoL) of patients with Coronary Artery Disease (CAD) is a very important tool for evaluating outcomes. Therefore, we investigated Exploring the Impact of Lifestyle Modification on Quality of Life of Patients with Coronary Artery Disease. A cross-sectional design involving patients with having Coronary Artery Disease treated in the hospital in Ho Chi Minh City. The patients (N =180) who came to Tam Duc Hospital for pre-examination during CAD treatment were asked to answer questionnaires which included SF-36 and lifestyle. The Pearson correlation was applied to identify the relationship between the lifestyle and quality of life in this study. And Chi-square test, T test, and one-way ANOVA test was also used. The QoL of the male subjects with Coronary Artery Disease were higher than female (60.45 ± 12.71 vs. 34.88 ± 0.00, $p < 0.01$); living in urban was higher than living in rural (61.42 ± 15.37 vs. 53.59 ± 9.7, $p < 0.01$); and in working patients was higher than unemployment (62.45 ± 12.68 vs. 55.98 ± 14.27, $p < 0.01$). And the results showed that approximately 47.8% of the Score of SF-36 could be accounted by the Drinking Score – one of the Lifestyle modification in the CAD patients. The quality of life of male patients were higher than that of women. The QoL of urban residents were higher than that of rural people, and working people were higher than that of retirees.

Key words: Quality of Life, Coronary Artery Disease, Lifestyle Modification.

INTRODUCTION

The quality of life (QoL) of patients with coronary artery disease (CAD) is known to be impaired (Srivastava et al., 2017). Quality of life measures are useful when interventions or treatments are indicated for several reasons such as improvement of physical functioning, pain relief, to estimate the effectiveness of therapies or to predict mortality [1]. Coronary artery disease is a major cause of morbidity and mortality throughout the world [2]. Greater cardiovascular risk factor burden is associated with increased risk of cognitive decline and dementia [3,4]. In 2020, approximately 19.1 million deaths were attributed to CVD globally. The age- adjusted death rate per 100,000 population was 239.8. The age-adjusted prevalence rate was 7354.1 per 100,000. The highest mortality rates attributable to CVD in 2020 were

in Eastern Europe and Central Asia, with higher levels also seen in Oceania, North Africa and the Middle East, Central Europe, subSaharan Africa, and South and Southeast Asia [5].

In Vietnam, According to author Nguyen Lan Viet, the rate of acute coronary syndrome admitted to the Vietnam National Heart Institute accounted for 4.6% and ischemic heart disease accounted for 18.3% of cardiovascular diseases [6]. Obesity, diabetes, serum cholesterol levels, hypertension, smoking, inadequate exercise, and stress each provides an important target for efforts to reduce associated morbidity and mortality [2]. Patients with symptoms of angina react to the illness with anxiety more than depression, whereas patients with heart failure with dyspnea react to the illness with depressive symptoms more than anxiety [1]. The assessment of the health related QoL is well established as a subjective indicator of health and to measure the benefits of therapy. Frequently, it is assumed that patients with CHD have a reduced QoL, especially those who had undergone palliative surgical therapy [7].

In addition, the few studies which have investigated quality of life in patients with coronary arteries diseases in many countries. However, the studies in Vietnam are still very little, Especially, the effect of lifestyle modification on quality of life in patients with coronary arteries diseases does not study. The education of this program helps patients increase the health-related quality of life (HRQoL). So, the objective of this study was to exploring the impact of lifestyle modification on Quality of life of patients with coronary artery sisease.

RESEARCH METHODOLOGY

A cross-sectional design was applied in this study

The research collected at the Out Department at Tam Duc Cardiology hospital. The sample size was 180 people with CAD re-examination treatment at Out-patient Department.

Inclusive criteria in the study, the patients have got Coronary Artery Disease and out-patient who come to take examination in the Hospital in Ho Chi Minh city. Potential participants also had finished with demographic characteristics, medical record question, and complete the self- administered SF36 and Lifestyle-7 questionnaire. The patients completely agreed to join the study. Data collection from February to March 2021 at Out-patient Department of Cardiology. Participants agreed to sign the consent form. They were completed the questionnaire in time from 40-50 minutes. After the questionnaire is completed and rechecked. The data were entered into SPSS 20 software for analysis.

Questionnaire

The demographic question

Age, gender, residence, marital status, working status, education.

The quality of life by the SF-36

The research instrument for evaluating the quality of life was the SF-36 questionnaire from The RAND 36 Items Health Survey, Version 1.0 by Vietnamese, that was checked by the reliability of the SF - 36 questionnaire with Cronbach's $\alpha = 0.67$ [8]. The Cronbach's α for questionnaire of our study is 0.563. The SF-36 questionnaire shows eight domain. It is physical functioning (PF) 10 items, role limitations due to physical health problems (RP) 4 items, bodily pain (BP) 2 items, general health perceptions (GH) 6 items , vitality (VT) 4 items, social functioning (SF) 2 items, role limitations due to personal or emotional problems (RE) 3 items and mental health (MH) 5 items.

Questionnaire lifestyle

Low-fat diet, low-salt diet, regular exercise, weight-loss diet, stress reduction in daily life, drinking in moderation, smoking interruption.

Data analysis

The results were controled the satisfied with the research's criteria and analyzes statistic the SPSS software version 20.0 to analyze the ratio and relationships. The types of data were illustrated as the following. SF-36 (Total score) witth Demographic data, lifestyle modification (each domain) witth demographic data, SF-36 (Total score) and lifestyle modification (each domain), SF-36 (Total score), demographic data and lifestyle modification (Total score) in this study.

RESULTS

Demographic characteristics of participants

Table 1. The descriptive of demography variable (N=180)

Variables		n	Percentage
Gender	Male	166	92.2
	Female	14	7.8
Living Place	Urban	112	62.2
	Rural	68	37.8
Married Status	Single	19	10.6
	Married	135	75
	Divorced	26	14.4
Working status	Working	69	38.3
	Unemployment	111	61.7
Education	Under high school	86	47.8
	High school	34	18.9
	College/University	43	23.9
	Graduated	17	9.4

The results showed that there are 92.3% percentage male participated the survey. The participants who came from urban 62.6% and rural 37.8%. Only 10.6% and 14.4% of them were single or divorced. There are 75 % who got married. There was 38.3% participant was working and 61.7% of them was unemployment. Therefore, only 9.4% participants was graduated, 23.9% of them was graduated at college/university, 18.9% of them was high school and 47.8 % was under high school.

Table 2. The descriptive of demography variable (N = 180)

Variables	Minimum	Maximum	Mean±SD
Age	46	85	66.06 ± 13.025

The result showed that the range of age is from 46 years to 85 years, the average age was 66.06 ± 13.025.

Coronary Artery Disease Patient's Lifestyle

Table 3. The Patient's Lifestyle nominal variable (N = 180)

Variable		n	Percentage
Low-fat Diet	Yes	143	79.4
	No	37	20.6
Low-sodium Diet	Yes	139	77.2
	No	41	22.8
Low-weight	Yes	139	77.2
	No	41	22.8
Regular exercise	Yes	139	77.2
	No	41	22.8

The result showed that most of Patients with Coronary Artery Diseases have been changed their lifestyle. The percentage use Low-fat Diet, Low-sodium Diet are 79.4 % and 77.2%.

Table 4. The Patient's Lifestyle continuing variable (N=180)

Continue Variable	Minimum	Maximum	Mean
Drinking (scale 0-10)	0	8	1.24 ± 2.48
Smoking Interruption (scale 0-10)	0	5	1.12 ± 1.85
Stress reduction (scale 0- 10)	0	10	1.84 ± 3.00
Weight loss (scale 0 – 10)	0	10	2.24 ± 4.00

Almost CAD patients who used alcohol and smoking have gradually been using a Scale from 1 to 10 with a mean of 1.24 ± 2.48 and 1.12 ± 1.85.

Quality of Life of Coronary Artery Disease Patients

Table 5. The Patient's Quality of Life variable (N = 180)

Items	Minimum	Maximum	Mean
Physical functioning	0	100	60.31 ± 36.53
Role functioning/ physical	0	100	60.28 ± 45.29

Items	Minimum	Maximum	Mean
Role functioning/ emotional	0	100	75 ± 41.67
Energy/fatigue	40	75	57.86 ± 8.44
Emotional well-being	24	56	36.16 ± 10.07
Social functioning	25	100	65.21 ± 19.92
Pain	0	100	70.40 ± 33.55
General health	15	65	42.47 ± 17.83
Quality of Life SF-36	**34.88**	**74.44**	**58.46 ± 14.00**

Results indicated the range of quality of life in the CAD patients is from34.88 to 74.44 and mean scores is 58.46 ± 14.00. Some items of them, are higher, such as: Physical functioning (60.31 ± 36.53), Role functioning/ physical (60.28 ± 45.29), Role functioning/emotional (75 ± 41.67), Social functioning (65.21 ± 19.92) and Pain (70.40 ± 33.55). The others are slower: Emotional well-being (36.16 ± 10.07), General health (42.47 ± 17.83) and Energy/fatigue (57.86 ± 8.44).

The relationship between the demographic characteristics and the patient's quality of life

Table 6. *The QoL of patients with coronary artery disease*

Variables		Mean Rank	T	p
Gender	Male (n=166)	97.50	7.509	**.000**
	Female (n=14)	7.50		
Living Place	Urban (n=112)	100.82	3.766	**.000**
	Rural (n=68)	73.50		
Working status	Working (n=69)	107.97	3.170	**.002**
	Unemployment (n=111)	79.64		
Note. **T** = T-test; Dependent variable: SF-36 Score				

The results showed that there is have a significant difference about quality of life in the CAD patient in gender, living place, and Working status. With gender, the QoL in male higher than female with $p < 0.000$. With living place, the QoL of patients living in urban is higher than in rural with significant $p < 0.000$. Finally, with working status, the QoL of working patients is higher than in people who are unemployed (with significant $p < 0.002$).

Table 7. *The QoL of patients with Coronary Artery Disease (N = 180)*

Variables		n	Mean SF-36	F	Sig.	Scheffe's test
Marit al status	① Single	19	49.56 ± .00	27.732	**.000***	②>①,③
	② Married	135	62.34 ± 13.31			
	③ Divorced	26	44.81 ± 10.95			
Education	① Under high school	86	57.96 ± 12.15	20.335	**.000***	②>①,③,④ ③>④
	② High school	34	67.16 ± 1.24			
	③ College/University	43	60.20 ± 17.91			
	④ Graduated	17	39.19 ± .00			

Note. One way ANOVA test; Dependent variable: SF-36 Score

*** Levene Statistic: sig. =0.000 < 0.05*

** <0.001*

The results indicated that there is a significant difference ($p < 0.01$) among subgroups in which are married status and education. With married status, the quality of life highest in the married (62.34 ± 13.31), medium in the single (49.56 ± .00) and lowest in the divorced (44.81 ± 10.95). With education, the highest QoLis the participants with high school (67.16 ± 1.24) and lowest in the patients with graduated degree (39.19 ± .00)

The associations between the demographic characteristics and the lifestyle of patients with Coronary Artery Disease

Table 8. *Associations between the demographic characteristics and low-lipid diet*

Demographic characteristics		Low-Lipid Diet		X^2	p
		No	Yes		
Gender	Male	37 (23.3%)	129 (77.7%)	3.928	**0.047**
	Female	0 (0%)	14 (100%)		
Living place	Urban	17 (15.2%)	95 (84.8%)	5.249	**0.022**
	Rural	20 (29.4%)	48 (70.6%)		
Married status	Single	0 (0%)	19 (100%)	15.524	**0.000**
	Married	37 (27.4%)	98 (72.6%)		
	Divorced	0 (0%)	26 (100%)		
Working status	Working	32 (53.6%)	32 (46.4%)	74.922	**0.000**
	Unemployment	0 (0%)	111 (100%)		
Education	Under high school	20 (23.3%)	66 (76.7%)	23.065	**0.000**
	High school	0 (0%)	34 (100%)		
	College/University	17 (39.5%)	26 (60.5%)		
	Graduated	0 (0%)	17 (100%)		

There is an association of gender and living place with whether or not participants get lipid diet ($p < 0.05$). There is an association Married Status, working status, and Education with whether or not participants get lipid diet $p < 0.001$).

Table 9. *Associations between the demographic characteristics and low-salt diet*

Demographic characteristics		Low-Salt Diet		X^2	p
		No	Yes		
Gender	Male	41 (24.7%)	125 (75.3%)	4.478	**0.037**
	Female	0 (0%)	14 (100%)		
Living place	Urban	21 (18.8%)	91 (81.2%)	2.734	**0.098**
	Rural	20 (29.4%)	48 (70.6%)		
Married status	Single	0 (0%)	19 (100%)	17.698	**0.000**
	Married	41 (30.4%)	94 (69.6%)		
	Divorced	0 (0%)	26 (100%)		
Working status	Working	37 (53.6%)	32 (46.4%)	60.524	**0.000**
	Unemployment	4 (3.6%)	107 (96.4%)		
Education	Under high school	20 (23.3%)	66 (76.7%)	14.235	**0.003**
	High school	4 (11.8%)	30 (88.2%)		
	College/University	17 (39.5%)	26 (60.5%)		
	Graduated	0 (0%)	17 (100%)		

There is an association of between gender and whether or not participants get salt diet ($p < 0.05$). There is no association of between living place and whether or not participants get salt diet ($p > 0.05$). There is an association Married Status, working status, and Education with whether or not participants get salt diet $p < 0.01$).

Table 10. *Associations between the demographic characteristics and physical exercise*

Demographic characteristics		Physical Exercise		X^2	p
		No	Yes		
Gender	Male	41 (24.7%)	125 (75.3%)	4.478	**0.037**
	Female	0 (0%)	14 (100%)		
Living place	Urban	21 (18.8%)	91 (81.2%)	2.734	0.098
	Rural	20 (29.4%)	48 (70.6%)		
Married status	Single	0 (0%)	19 (100%)	17.698	**0.000**
	Married	41 (30.4%)	94 (69.6%)		
	Divorced	0 (0%)	26 (100%)		
Working status	Working	37 (53.6%)	32 (46.4%)	60.524	**0.000**
	Unemployment	4 (3.6%)	107 (96.4%)		
Education	Under high school	20 (23.3%)	66 (76.7%)	14.235	**0.003**
	High school	4 (11.8%)	30 (88.2%)		
	College/University	17 (39.5%)	26 (60.5%)		
	Graduated	0 (0%)	17 (100%)		

There is an association of between gender and whether or not participants get physical exercise ($p < 0.05$). There is no association of between living place and whether or not participants get physical exercise ($p > 0.05$). There is an association Married Status, working status, and Education with whether or not participants get physical exercise $p < 0.01$).

Relationship between the lifestyle and quality of life in patients with Coronary Artery Disease

Table 11. *Pearson Correlation between Lifestyle and quality of life*

	Drinking	Smoking	SF-36
Drinking	1		
Smoking	.643**	1	
SF-36	.382**	-.041	1
**Correlation is significant at the 0.01 level (2-tailed).			

The results presented that only Drinking Lifestyle significant correlated to Quality of Life in the CAD patients with the range of r = 382 is with p value < 0.01. The result indicated the formula of the relationship between the Lifestyle Modification and Quality of Life in CAD patient is the following formula: SF-36 = 60.616 + 2.8 drinking score.

Table 12. *The relationship of Lifestyle Modification and Quality of Life in CAD patient*

Variables	Estimate	Std. Error	t- value	p-value
(Intercept)	60.616	.980	61.869	.000
SF-36	2.800	.816	3.432	.001
Variables	**R^2**	**Adjusted R^2**	**F- value**	**p-value**
Lifestyle Modification	(Constant)		40.130	.000
SF-36	0.478	0.466		

Dependent Variable: SF-36

Predictors: (Constant), Lifestyle modification.

Using Linear Model analysis

The results showed that approximately 47.8% of the Score of SF-36 could be accounted by the Drinking Score – one of the Lifestyle modification in the CAD patients.

DISCUSSION AND CONCLUSION

Demographic characteristics of participants

The result showed that the rate of male higher in Coronary Artery Disease. It was similar to the research of Enas and et al. (2019) in India showed that the age of Coronary Artery Disease in men 45 years old and 50 years old in women [9]. In this results also proved that 61.7% of participant retired or unemployed. Most of participants is under high school, therefore, they cannot recognize the necessary of physical excises or nursing education after treatment. However, indicators of lifestyle-related health/behavior for each theme were used, and regression analysis showed that individuals who were sedentary prior to the program were less likely to participate in the program's physical activities than the more active individuals [10]. The lower education in CAD patients also presented at 86.7% of participant with secondary school in study to find quality of life in patients with coronary artery disease[11].

Coronary Artery Disease Patient's Lifestyle

Tobacco cessation, exercise, and weight loss are the most important lifestyle modifications in CAD treatment[12]. The result showed that most of Patients with Coronary Artery Diseases have been changed their lifestyle which are Low-fat Diet, Low-sodium Diet, Alcohol Drinking, Smoking Interruption. Li and et al. recommended that CAD patients should use medication and method which are to help treat hyperlipidemia [13].

Quality of Life of Coronary Artery Disease Patients

The quality of life in CAD patients in the study in Slovakia is (47.6 ± 2) [11] which was quite lower than in Vietnam (58.46 ± 14.00). The results showed that the CAD quality of life in Vietnam was similar to Budzyński's study was 52.9 ± 7.7 [14]. Some items in SF-36 also similar such as Physical functioning 61.6 ± 8.7 versus 60.31 ± 36.53 in Vietnam. However, the quality of life in Vietnam was lower in Emotional well-being[14]. This value maybe come from the relative caring for patients after CAD treatment.

The associations between the demographic characteristics and the patient's quality of life

Research has shown that the quality of life of CAD patients is different between male and female patients. For male patients, due to cultures in Vietnam and the East, men often care for more than women, so the quality of life of men is often higher than that of women. As women are generally older, more often have hypertension, but less often have coronary heart disease [15]. QoL was negatively influenced by the higher number of risk factors in women. The research suggests that sex differences may be driven by the greater risk factor burden in women [16]. In addition, there is a difference in the patient's employment status for working people because they are earning money. Therefore, the patient's amount of money to save is more than that of unemployed patients, so the quality of life better. As for the location, people living in urban areas have a better quality of life than people living in rural areas.

The relationships between the demographic characteristics and the lifestyle of patients with coronary artery disease

The results show that the percentage of women participating in physical activity is higher than that of men. As women were more likely to interact with friends and to participate in sports groups when compared with men [17]. Regarding marital status, it is also easy to see that the percentage of divorced and single people who are physically active is higher than that of married people. The reason may be that single and divorced people have a higher self- reliance, while married patients rely on their children and spouse. Divorce in coronary artery disease was more frequent among women (27%) compared to men (6%) [18]. In coronary artery disease, more physical activity was associated with lower mortality [19]. For the working group, the number of people participating in the exercise is lower than that

of the unemployed or retired, perhaps because working patients may be under work pressure, or relying on the money they can afford. For the educational level, the subjects with the highest rate of physical activity were the group with post-graduate level because they were aware of the nature of the disease. Joining physical activity quite low in elderly. Participating in sports groups (such as dancing, fitness, or other sports groups) could promote physical activities for the elderly [17].

The associations between the demographic characteristics and the lifestyle of patients with coronary artery disease

The study identified a positive correlation between the quality of life and alcohol consumption. For Vietnamese culture, the number of people who drink alcohol will easily smoke and vice versa. In comparison, lifestyle changes such as exercise, a low-salt regimen, or a lipid-lowering regimen do not significantly improve the patient's quality of life. Lipid-lowering therapy (LLT) improves quality of life which is a major risk factor for coronary artery disease [20]. A large majority of coronary patients have unhealthy lifestyles in terms of smoking, diet and sedentary behavior, which adversely impacts major cardiovascular risk factors [21]. Most evidence has focused on dietary fats, due to the established relationship between serum cholesterol level and CAD. Previous evidence on the association between dietary fat intake and CAD prevention is determine. The results of review determined the evidence of the effects of nutrients which are high salt and fat on CAD risks [22].

Conclusion and Recommendation

Based on the cross-sectional design, the questionnaire was surveyed on 180 patients who has been coronary artery disease. This research found the impact of lifestyle modification on quality of life of patients with coronary artery disease in Ho Chi Minh City. This result has determined the patient's quality of life, in which the score should be more concerned with the affection for the patient. The quality of life of male patients is higher than that of women. The QoL of urban residents is higher than that of rural people, and working people is higher than that of retirees. The QoL of married is highest compared to single, divorced. The quality of life of high school is highest compared to college, under high school and graduated is lowest. Most patients made lifestyle changes such as following a low-fat diet, reducing salt, and increasing exercise. However, this change had no effect on aging on quality of life. Attention should be paid to patients with an alcoholic lifestyle, as demonstrated by their lower quality outcomes in the group. They need to adhere to treatment and make positive lifestyle changes without alcohol.

ACKNOWLEDGMENT

From my heart, I would like to send my gratefulness and respectfulness to Dr. Szu-Mei Hsiao, Dr Huynh Thi Phuong, Meiho University and Nguyen Tat Thanh University. Moreover, thanks all Tam Duc hospital and patients who agreed to participate in my project.

REFERENCE

1. Moryś JM, Bellwon J, Höfer S, et al. Quality of life in patients with coronary heart disease after myocardial infarction and with ischemic heart failure. Arch Med Sci. 2016;12(2):326-333. doi:10.5114/aoms.2014.47881
2. Razavi M, Fournier S, Shepard DS, et al. Effects of lifestyle modification programs on cardiac risk factors. PLoS One. 2014;9(12):e114772. doi:10.1371/journal.pone.0114772
3. Ali MK, Bullard KM, Saydah S, et al. Cardiovascular and renal burdens of prediabetes in the USA: analysis of data from serial cross-sectional surveys, 1988-2014. Lancet Diabetes Endocrinol. 2018;6(5):392-403. doi:10.1016/S2213-8587(18)30027-5
4. Herman WH, Pan Q, Edelstein SL, et al. Impact of Lifestyle and Metformin Interventions on the Risk of Progression to Diabetes and Regression to Normal Glucose Regulation in Overweight or Obese People With Impaired Glucose Regulation. Diabetes Care. 2017;40(12):1668-1677. doi:10.2337/dc17-1116
5. Tsao CW, Aday AW, Almarzooq ZI, et al. Heart Disease and Stroke Statistics-2022 Update: A Report From the American Heart Association. Circulation.

2022;145(8):e153-e639. doi:10.1161/CIR.0000000000001052
6. Nguyen LV, Pham VT, Pham MH. Research on disease patterns in inpatients at the Vietnam National Heart Institute during 2003-2007. Vietnam National Heart Association. 2010;52:11-9.
7. Loup O, von Weissenfluh C, Gahl B, et al. Quality of life of grown-up congenital heart disease patients after congenital cardiac surgery. Eur J Cardiothorac Surg. 2009;36(1):105-111. doi:10.1016/j.ejcts.2009.03.023
8. Thu PH, Thuy DT, Hung NV. Study on applying the questionnaire SF-36 to assess the quality of life in patients with rheumatoid arthritis Medical Research. 2017;106(1):146-54.
9. Enas EA, Varkey B, Dharmarajan TS, et al. Lipoprotein(a): An underrecognized genetic risk factor for malignant coronary artery disease in young Indians. Indian Heart J. 2019;71(3):184-198. doi:10.1016/j.ihj.2019.04.007
10. Jonsdottir IH, Börjesson M, Ahlborg G Jr. Healthcare workers' participation in a healthy-lifestyle-promotion project in western Sweden. BMC Public Health. 2011;11:448. doi:10.1186/1471-2458-11-448
11. Nagyova I, Jendrichovsky M, Kucinsky R, et al. Effects of Nordic walking on cardiovascular performance and quality of life in coronary artery disease. Eur J Phys Rehabil Med. 2020;56(5):616-624. doi:10.23736/S1973-9087.20.06120-1
12. Braun MM, Stevens WA, Barstow CH. Stable Coronary Artery Disease: Treatment. Am Fam Physician. 2018;97(6):376-384.
13. Li YH, Ueng KC, Jeng JS, et al. 2017 Taiwan lipid guidelines for high risk patients. J Formos Med Assoc. 2017;116(4):217-248. doi:10.1016/j.jfma.2016.11.013
14. Budzyński J, Pulkowski G, Suppan K, et al. Improvement in health-related quality of life after therapy with omeprazole in patients with coronary artery disease and recurrent angina-like chest pain. A double-blind, placebo-controlled trial of the SF-36 survey. Health Qual Life Outcomes. 2011;9:77. doi:10.1186/1477-7525-9-77
15. Lip GY, Laroche C, Boriani G, et al. Sex-related differences in presentation, treatment, and outcome of patients with atrial fibrillation in Europe: a report from the Euro Observational Research Programme Pilot survey on Atrial Fibrillation. Europace. 2015;17(1):24-31. doi:10.1093/europace/euu155
16. Kloosterman M, Crijns HJGM, Mulder BA, et al. Sex-related differences in risk factors, outcome, and quality of life in patients with permanent atrial fibrillation: results from the RACE II study. Europace. 2020;22(11):1619-1627. doi:10.1093/europace/euz300
17. Fu C, Li Z, Mao Z. Association between Social Activities and Cognitive Function among the Elderly in China: A Cross-Sectional Study. Int J Environ Res Public Health. 2018;15(2):231. doi:10.3390/ijerph15020231
18. Daoulah A, Al-Murayeh M, Al-Kaabi S, et al. Divorce and Severity of Coronary Artery Disease: A Multicenter Study. Cardiol Res Pract. 2017;2017:4751249. doi:10.1155/2017/4751249
19. Stewart RAH, Held C, Hadziosmanovic N, et al. Physical Activity and Mortality in Patients With Stable Coronary Heart Disease. J Am Coll Cardiol. 2017;70(14):1689-1700. doi:10.1016/j.jacc.2017.08.017
20. Wittlinger T, Schwaab B, Völler H, et al. Efficacy of Lipid-Lowering Therapy during Cardiac Rehabilitation in Patients with Diabetes Mellitus and Coronary Heart Disease. J Cardiovasc Dev Dis. 2021;8(9):105. doi:10.3390/jcdd8090105
21. Kotseva K, De Backer G, De Bacquer D, et al. Lifestyle and impact on cardiovascular risk factor control in coronary patients across 27 countries: Results from the European Society of Cardiology ESC-EORP EUROASPIRE V registry. Eur J Prev Cardiol. 2019;26(8):824-835. doi:10.1177/2047487318825350
22. Chareonrungrueangchai K, Wongkawinwoot K, Anothaisintawee T, et al. Dietary Factors and Risks of Cardiovascular Diseases: An Umbrella Review. Nutrients. 2020;12(4):1088. doi:10.3390/nu12041088

The value of Hendry's Score in predicting reduced ejection fraction in chronic heart failure patients with sinus rhythm

Vu Thi Thao Hien[1]✉, Le Dieu Linh[2], Pham Manh Hung[3], Nguyen Ngoc Quang[3]

[1] Ha Dong General Hospital

[2] Hong Ngoc Hospital

[3] Hanoi Medical University

▶ **Correspondence to**
MD. Vu Thi Thao Hien
Ha Dong General Hospital
Email: vthaohien@gmail.com

▶ Received 29 November 2023
Accepted 15 December 2023
Published online 30 November 2024

To cite: Vu TTH, Le DL, Pham MH, et al. *J Vietnam Cardiol* 2024;**112E**:29-35

ABSTRACTS

Objectives: To evaluate the role of Hendry's score based on the electrocardiogram in predicting heart failure with reduced ejection fraction.

Methods: This is a cross-sectional study, including 91 inpatient heart failure patients at the Vietnam Heart Institute, divided into two groups: heart failure with reduced left ventricular ejection fraction (EF ≤ 40 %) and heart failure with preserved left ventricular ejection fraction (EF ≥ 50%). The collected information included the general characteristics of the disease group (age, gender, etiology, clinical symptoms), blood test NT-proBNP, creatinine, electrolytes, echocardiogram, and electrocardiogram.

Results: Forty-seven people were diagnosed with HFpEF, and 44 suffered from HFrEF. Multiple logistic regression analysis revealed certain ECG variables that were independent predictors of HFrEF, i.e., left atrial hypertrophy (LAH), QRS duration > 100 ms, right bundle branch block (RBBB), ST-T segment changes, and prolongation of the QT interval. Based on Hendry's Score, we obtained a score for HFpEF of -1 to +3. At the same time, HFrEF had a score of +4 to +6 with 81.3% sensitivity, 84% specificity, a 70.5% positive predictive value, an 87.2% negative predictive value, and an accuracy of 86%.

Conclusions: The scoring system derived from this study, including the presence or absence of LAH, QRS duration > 100 ms, RBBB, ST-T segment changes, and prolongation of the QT interval can be used to predict the type of HF with satisfactory sensitivity and specificity.

Keywords: Chronic heart failure; Electrocardiogram features; Hendry's Score; Type of heart failure.

INTRODUCTION

Heart failure is a complex clinical syndrome, with chronic left ventricular systolic dysfunction presenting the final stage in most heart diseases. Heart failure occurs in approximately 2% of the population and 10% of the population over 70 years of age [1].

According to ESC 2016, heart failure with reduced ejection fraction (HFrEF) when ejection fraction (EF) ≤ 40% and heart failure with preserved ejection fraction (HFpEF) when EF ≥ 50%, diagnostic criteria, approach The treatment, monitoring, and prognosis of these two types of heart failure are different[2]. The diagnosis of heart failure is based on clinical and laboratory features,

NT-proBNP, the gold standard of echocardiography. However, not all medical facilities have the full range of diagnostic and screening tests available. The 12-lead electrocardiogram (ECG) is a simple, practical test for many cardiovascular diseases.

A normal or minor change in the ECG is consistent with a low likelihood of left ventricle dysfunction. Conversely, major ECG changes usually accompany left ventricle systolic dysfunction [6]. The ECG is useful because it can serve as an initial investigative tool that physicians can use to determine the presence of systolic and diastolic dysfunction in patients with chronic HF, though it cannot replace echocardiography.

A scoring system is a simple method for diagnosing disease [7]. Several scoring systems based on ECG findings have been studied to estimate left ventricular function. In 2016, Purnasidha Bagaswoto Hendry's study published in Pubmed introduced a scoring system based on ECG abnormalities to predict HFrEF and HFpEF.

In Vietnam, up to now, there is no study on the Henry scale to analyse ECG abnormality in predicting heart failure according to reduced or preserved ejection fraction.

Therefore, we conducted the study to evaluate the role of Hendry's score based on the electrocardiogram in predicting heart failure with reduced ejection fraction.

METHODS

Study design

This cross-sectional study with a convenient sample method was conducted at the Vietnam Heart Institute from July 2021 to July 2022.

Study participants

Selection criteria

Patients aged 18 years or older were diagnosed with heart failure according to the European Society of Cardiology (ESC 20) criteria, which are diagnostic criteria for reduced and preserved ejection fraction heart failure.

Exclusion criteria

Congenital heart disease, valvular heart disease, pacemaker, atrial fibrillation, myocardial infarction, massive pericardial effusion, chronic obstructive pulmonary disease.

Data collection

Information includes age, sex, medical history, causes, risk factors, clinical symptoms, NYHA level of dyspnea, and paraclinical parameters such as blood biochemistry (NT-proBNP, glucose, hemoglobin), creatinine, cholesterol, electrolytes), chest x-ray, echocardiography, and surface electrocardiogram. For patients with clinical symptoms of heart failure, NT-proBNP test > 14.75 pmol/l (>125 pg/ml), echocardiography to evaluate left ventricular ejection fraction (EF) according to Simpson, if EF ≤ 40% is classified as HFrEF if EF ≥ 50% with left ventricular diastolic dysfunction is classified as HFpEF. Records of the 12-lead electrocardiogram were used to analyse the electrocardiographic characteristics. Conventions for left atrial thickening when P wave is > 0.12 s wide, biphasic P in V1, PQ long when > 0.2 s, QTc long when ≥ 0.46 s (female) and ≥ 0.45 s (male), wide QRS when ≥ 0.12s, ST-T changes when ST elevation or depression ≥ 1 mm, or flattened or negative T waves in 2 or more leads. Weak R wave when RV3 2mm and/or RV4 4mm and/or RV3< RV2, RV4 < RV3. HF was divided into HFrEF (EF≤40%) and HFpEF (EF>40%).

Data analysis

Data were entered, cleaned, analysed and processed using SPSS 16 software.

Quantitative variables are mean ± SD, and qualitative variables are percentages (%). Test the difference by T-test, Chi-squared, and Fisher test; the reliability $p < 0.05$ is considered statistically significant. There were two scoring systems based on the probability and cut-off point from the ROC curve. Next, the scoring system was validated in several samples to obtain the diagnostic value.

Research ethics

The conduct of the study does not harm the research subjects, and personal information is guaranteed to be kept private. The study was conducted with the permission of the Board of Directors of the Cardiovascular Institute - Bach Mai Hospital.

RESEARCH RESULTS

Characteristics of the participants

***Table 1**. Baseline characteristics of the participants by two groups of heart failure*

Variable		HFrEF (n=47)	HFpEF (n=44)	Total(n=91)	p
Age, year (±SD)		58.1 ± 16.2	65.0 ± 15.1	61.2 ± 15.9	0.004
Sex	Male, n	37 (79.5%)	21 (48.9%)	58(63.7%)	< 0.001
	Female, n	10 (20.5%)	23(51.1%)	33 (36.3%)	
BMI, kg/m^2		21.4 ± 3.5	22.1 ± 4.1		0.074
Time of heart failure (month), n		24.3 ± 38.3	9.2 ± 26.6	16.7 ± 33.6	0.035
History	Smoked (n,%)	70 (76.9%)	15 (34.1%)	5 (10.9%)	**0.008**
	Hypertension (n,%)	45 (49.5%)	22 (50%)	23 (48.9%)	0.92
	Diabetes (n,%)	25 (27.5%)	13 (29.5%)	12 (26.1%)	0.71

The mean age of the HFrEF group was 58 years lower than that of the HFpEF group of 65. In the HFrEF group, the incidence was higher in males (79.5%) than in females (20.5%). In the HFpEF group, the prevalence of women (51.1%) was higher than that of men (48.9%). The disease duration of the HFrEF group (24 months) was higher than that of the HFpEF group (9 months). Smoking was found in the HFrEF group at a higher rate than in the HFpEF group. The difference was statistically significant with $p < 0.05$. There was no significant difference in BMI, hypertension, and diabetes in the two groups.

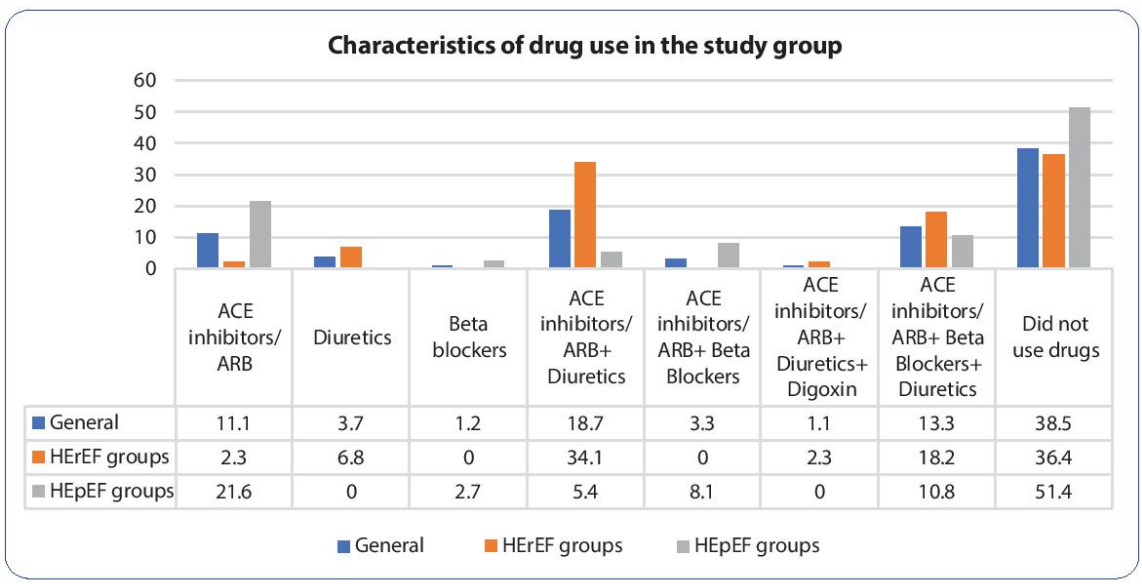

***Figure 1**. Characteristics of drug use in the study population*

The group that did not use drugs accounted for a high proportion of the study group, with the rate in the general group being 38.5% and mainly from the HEpEF group (51.4%). The two groups with the highest rates were those using ACE inhibitors + diuretics + beta blockers and those using ACE inhibitors + diuretics. The HErEF group was mainly used for ACE inhibitors rather than beta blockers.

Table 2. *Clinical characteristics of the participants*

Decreased	All patients (n=91)	HErEF group (n=44)	HEpEF group (n = 47)	p
Dyspnea				
No difficulty in breathing	4.7%	0%	9.5%	
NYHA I	9.3%	9.1%	9.5%	
NYHA II	44.2%	40.9%	47.6%	0.207
NYHA III	33.7%	40.9%	26.2%	
NYHA IV	8.1%	9.1%	7.1%	
Edema	31.4%	36.4%	26.2%	0.31
Pulmonary rales	43%	54.5%	31%	**0.027**
Enlarged heart	39.5%	63.6%	14.3%	**0.001**
Jugular vein distention	15.1%	27.3%	2.4%	**0.001**
Hepatomegaly	15.1%	25%	4.8%	**0.009**
Blood pressure				
Normal	73.3%	68.2%	78.6%	0.347
Increased	20.9%	22.7%	19.0%	
Decreased	5.8%	9.1%	2.4%	

Regarding dyspnea according to NYHA classification, the overall study group had the highest rate of NYHA class II and III (44.2% and 33.7%, respectively). The group with HErEF mainly expressed at NYHA II and III levels (40.9% and 40.9%), while the group with HEpEF showed much at NYHA II and I levels (47.6% and 9.5%, respectively)). Besides that, 9.5% of patients did not show dyspnea, and the difference between the two groups was not statistically significant, with $p > 0.05$.

Regarding other symptoms, the most common symptom was the presence of rales in the lungs and enlarged heart (accounting for about 40% in the general group). When we compared the two groups with reduced EF and preserved EF, we found the rate of these two symptoms in the group with reduced EF was statistically significant, $p<0.05$.

Echocardiographic characteristics of the participants

Table 3. *Electrocardiographic characteristics of the participants*

Characteristics	All patients (n=91)	HErEF group (n=44)	HEpEF group (n = 47)	p
EF	46.6 ± 18.1	29.4 ± 6.4	62.8 ± 7.1	0.001
LAD	38.1 ± 7.8	42.3 ± 7.2	34.2 ± 6.2	0.001
Dd	53.7 ± 12.4	63.1 ± 9.8	44.8 ± 6.9	0.001
Ds	40.9 ± 14.5	53.5 ± 0.7	29.2 ± 5.8	0.001
IVSd	12.2 ± 3.5	10.7 ± 2.4	13.6 ± 3.8	0.014
IVSs	9.0 ± 2.6	8.3 ± 2.2	9.7 ± 2.8	0.013
LVMI	131.7 ± 53.0	162.6 ± 47.6	101.5 ± 39.0	0.001
Movement disorders	55.6%	93.2%	19.6%	0.001

The mean ejection fraction value of the study group was 46.6%. The group with HErEF had an average ejection fraction of 29.4%, statistically significantly lower than the HEpEF group with 62.8%.

The mean end-systolic and diastolic left ventricular diameters were 53.7% and 40.9%, respectively. In which the group with HErEF had more enormous mean Dd and Ds than the group with preserved EF, the difference was statistically significant with $p < 0.05$.

The rate of regional movement disorders of the group with HErEF was much higher than that of the group with HEpEF (93.2% versus 19.6%), and the difference was statistically significant($p<0.05$).

***Table 4**. Electrocardiogram characteristics of the participants*

Characteristics	General Group (n=91)	HErEF group (n=44)	HEpEF group (n = 47)	p
Thick left atrium	23 (25.3%)	18 (40.9%)	5 (10.6%)	0.001
Thick left ventride	40 (44%)	35 (79.5%)	5 (10.6%)	0.001
Weak R wave at V3	22 (24.2%)	18 (40.9%)	4 (8.5%)	0.001
LBBB	13 (14.3%)	13 (29.5%)	0 (0%)	0.001
RBBB	9 (9.9%)	6 (13.6%)	3 (6.4%)	0.247
Pathological Q waves	16 (17.6%)	23 (52.3%)	4 (8.5%)	0.001
Long QT	16 (17.6%)	12 (27.3%)	4 (8.5%)	0.019
Change the ST segment	45 (49.5%)	32 (72.7%)	13 (27.7%)	0.001

The two most common signs in the general study group were left ventricular thickening and ST segment changes (44% and 49.5%), respectively. The comparison between the group with HErEF and the group with HEpEF showed features of left atrial thickening, left ventricular thickening, weak R wave in V3, Left bundle branch block, pathological Q wave, prolonged QT and regular ST segment changes.

It was found mainly in the group with reduced EF; the difference was statistically significant with $p < 0.05$. Only the characteristic feature of Right bundle branch block was no statistically significant difference between the two groups.

The Hendry's score

***Table 5**. Henry's score characteristics of the participants*

Characteristics	All patients (n=91)	HErEF group (n=44)	HEpEF group (n = 47)	p
0 points	37 (40.7%)	5 (11.4%)	32 (68.1%)	**0.001**
1 point	17 (18.7%)	8 (18.2%)	9 (19.1%)	
2 points	7 (7.7%)	5 (11.4%)	2 (4.3%)	
3 points	19 (20.9%)	17 (38.6%)	2 (4.3%)	
4 points	3 (3.3%)	2 (4.5%)	1 (2.1%)	
5 points	7 (7.7%)	6 (13.6%)	1 (2.1%)	
6 points	1 (1.1%)	1 (2.3%)	0 (0%)	

Henry's score for the participants most encountered was 0 points, which mainly in the group with preserved EF, and this difference was statistically significant, $p < 0.05$.

The HErEF group also had Henry's score mainly from 3 points or more, while the EF group mainly had Henry's score of less than 3 points. This difference was also statistically significant, $p < 0.05$.

The value of Hendry's score in predicting heart failure with reduced ejection fraction

***Table 6**. Cut-off point and corresponding specificity sensitivity value*

Threshold cut point	Sensitivity	Specificity
-1	100.0%	0.0%
0.5	88.6%	68.1%
1.5	70.5%	87.2%
2.5	59.1%	91.5%
3.5	20.5%	95.7%
4.5	15.9%	97.9%
5.5	2.3%	100.0%
7	0.0%	100.0%

When the cut-off threshold is chosen (1.5), it shows that Hendry's score has a sensitivity of 70.5% and a specificity of 87.2%. The curve area of Hendry's score is the largest AUC (0.845) in the project for diagnosing heart failure with reduced ejection fraction.

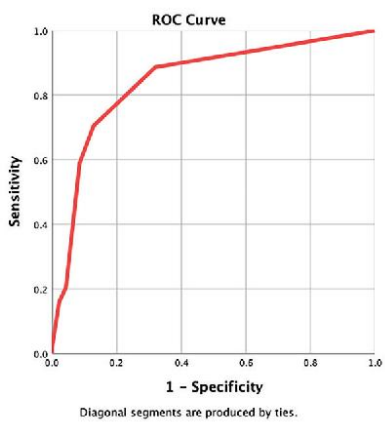

***Figure 2**. ROC curve of Hendry's score in predicting heart failure with reduced ejection fraction (The AUC = 0.845)*

DISCUSSION

Hendry's score was first published in 2016, showing the value of ECG indicators to help determine whether heart failure has reduced or preserved ejection fraction.[6] In our study, the Hendry scale scored 0 - 6 points. The 0-point level accounted for the most (40.7%), of which the group with HEpEF accounted for 32/37 cases. The level of 1 point shows that the ratio of the two groups is quite similar in that the HEpEF group is still slightly higher in 9/17 cases compared to 8/17 patients in the HErEF group. From the level of 2 points or more, it is mainly the group with reduced EF, in which the level of 3 points is seen, mainly, the group with HErEF has Hendry's score ≥ 3 points with 17/19 cases, and the highest group, Hendry 6 points. There was 1 case of HErEF and no case of HEpEF with an electrocardiogram reaching 6 points, and these differences were statistically significant with $p < 0.05$ (Table 3.9). Hendry's study also showed that the most significant value between the group of HErEF and HEpEF was at the threshold of 3 points; < 3 points is likely HFpEF, and > 3 points is likely HFrEF.In our study, when the cut-off value of the Hendry scale was chosen as 1.5, it showed the value of the Hendry scale in determining the type of heart failure whose ejection fraction is preserved or decreased with the area below curve is 0.858, sensitivity and specificity values are 81.3% and 84%. When compared with the use of this scale by Hendry, the sensitivity and specificity values are 76% and 96%, respectively. 6 Thus, our diagnostic value is lower than that of Hendry's author, and in Hendry's study, it also shows the value of diagnostic ability of corresponding values of Hendry points, in which diagnostic ability predicting heart failure EF reduction was 98.5%. In our study, there was only 1 case with Hendry's score of 6, and this case was confirmed as HErEF on echocardiography, corresponding to the determination value of Hendry's score of 6 points, determining HErEF is 100%.

CONCLUSION

Our results suggest that a scoring system

based on ECG findings that include the presence or absence of LAH, a wide QRS duration, RBBB, ST-T segment changes, and a prolonged extended QTc interval can be used to predict the type of HF (HFpEF and HFrEF) in patients with chronic HF with a good performance. A score of -1 to +3 suggests the possibility of HFpEF, while a score of +4 to +6 suggests the possibility of HFrEF.

REFERENCES

1. Roger VL. Epidemiology of heart failure. Circ Res. 2013;113(6):646-659. doi:10.1161/CIRCRESAHA.113.300268
2. Ponikowski P, Voors AA, Anker SD, et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC)Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. Eur Heart J. 2016;37(27):2129-2200. doi:10.1093/eurheartj/ehw128
3. Hendry PB, Krisdinarti L, Erika M. Scoring System Based on Electrocardiogram Features to Predict the Type of Heart Failure in Patients With Chronic Heart Failure. Cardiol Res. 2016;7(3):110-116. doi:10.14740/cr473w
4. Bhatia RS, Tu JV, Lee DS, et al. Outcome of heart failure with preserved ejection fraction in a population-based study. N Engl J Med. 2006;355(3):260-269. doi:10.1056/NEJMoa051530
5. Owan TE, Hodge DO, Herges RM, et al. Trends in prevalence and outcome of heart failure with preserved ejection fraction. N Engl J Med. 2006;355(3):251-259. doi:10.1056/NEJMoa052256
6. Tsutsui H, Tsuchihashi-Makaya M, Kinugawa S. Clinical characteristics and outcomes of heart failure with preserved ejection fraction: lessons from epidemiological studies. J Cardiol. 2010;55(1):13-22. doi:10.1016/j.jjcc.2009.09.003
7. Paulus WJ, Tschöpe C. A novel paradigm for heart failure with preserved ejection fraction: comorbidities drive myocardial dysfunction and remodeling through coronary microvascular endothelial inflammation. J Am Coll Cardiol. 2013;62(4):263-271. doi:10.1016/j.jacc.2013.02.092
8. van Veldhuisen DJ, Linssen GC, Jaarsma T, et al. B-type natriuretic peptide and prognosis in heart failure patients with preserved and reduced ejection fraction. J Am Coll Cardiol. 2013;61(14):1498-1506. doi:10.1016/j.jacc.2012.12.044
9. Karaye KM, Sani MU. Electrocardiographic abnormalities in patients with heart failure. Cardiovasc J Afr. 2008;19(1):22-25.
10. McMurray JJ, Adamopoulos S, Anker SD, et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012: The Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J. 2012;33(14):1787-1847. doi:10.1093/eurheartj/ehs104

Coronary Artery Disease Management in Ho Chi Minh City: The Role of Self-Care and Disease Knowledge in Reducing Health Risks

Nguyen Thi Phuong Uyen[1]✉, **Joanna Sanchez De Guzman**[2]

[1] Hong Bang International University

[2] Trinity University of Asia

▶ **Correspondence to**
MSN. Nguyen Thi Phuong Uyen
Faculty of Nursing, Hong Bang International University
Email: uyenntp89@gmail.com

▶ Received 06 August 2024
Accepted 15 October 2024
Published online 30 November 2024

To cite: Nguyen TPU, Joanna SDG. *J Vietnam Cardiol* 2024; **112E**:36-41

ABSTRACT

In order to avoid cardiac complications, patients with coronary artery disease (CAD) should the effect of self-care agency on health risk behaviors. Coronary artery engage in heart-healthy behaviors. Therefore, it is presumed that individuals have acquired self-care agency and a thorough understanding of their disease. Therefore, we investigated the associations between healthy affect, Self-Care, Disease Knowledge to improve their Health Risks status of patient.

A descriptive-correlational design involving patients with having coronary artery disease (CAD) and being treated in Ho Chi Minh City. The participants (N =191) who living in Binh Chanh, Nha Be, Can Gio and answer questionnaires which included Exercise in Self-care Agency scale (ECSA), Health Behavior Scale (HBS) and the Baecke questionnaire. The Linear regression correlation coefficient analysis, and computed r was applied this study. Result showed significant predictive relationships between self-care agency, disease-related knowledge, and health risk behaviors. Higher levels of self-care agency and disease-related knowledge were associated with lower health risk behaviors. Gender, marital status, and specific health conditions like hypertension and stroke also played significant roles in influencing health risk behaviors. Mediation analysis further revealed that disease-related knowledge partially mediates disease, self-care, health knowledge, health behavior.

Keywords: Coronary artery disease, self-care, health knowledge, health behavior.

INTRODUCTION

An individual's behavior and understanding of their health condition play a pivotal role in the management and outcome of their disease. According to World Health Organization (WHO) statistics from 2019, an estimated 17.9 million people worldwide succumb to cardiovascular disease annually, with atherosclerotic cardiovascular diseases primarily accounting for these deaths (World Health Organization [1]. A recent literature review reported a 5–8% prevalence of CAD throughout the world [2]. According to the Global Burden of Diseases survey, the global prevalence of CAD in 2016 was 154 million, accounting for 32.7% of the global burden of cardiovascular (CV) disease

and 2.2% of the overall global burden of disease (GBD Disease and Injury Incidence and Prevalence Collaborators. CAD impose a significant medical and economic burden worldwide [2].

Cardiovascular disease (CVD) encompasses all disorders of the circulatory system, including cerebrovascular disease, hypertension, peripheral arterial disease, rheumatic heart disease, congenital disease, heart failure, deep vein thrombosis, pulmonary embolism, and coronary heart disease [3]. In Vietnam, cardiovascular disease is also a leading cause of death. In 2016, CVDs were responsible for 31% of total deaths in Vietnam, equivalent to more than 170,000 deaths [4]. Cardiovascular diseases (CVDs) are the number one cause of death globally, representing 31% of all deaths. In Vietnam, about 200,000 people die from cardiovascular diseases per year in Vietnam, accounting for about 33% of total deaths [5]. However, there is no conclusion indicating factors related to the quality of life of patients with ACS after coronary stentings. Futhermore, those studies were brought out in European countries, that have a different culture compare in Vietnam. Many studies have shown correlation and mediation health risk behaviors of patients with CAD. However, the main studies in Vietnam are still very limited, there are no studies on relationship Self-Care, Disease Knowledge and Health Risks of participants with CAD. Therefore, the objective of this study was to determine Coronary Artery Disease Management in Ho Chi Minh City: The Role of Self-Care and Disease Knowledge in Reducing Health Risks.

RESEARCH METHODOLOGY

A cross-sectional descriptive-correlational design study was conducted with multiple phase design. Research conducted at belonging to three districts Binh Chanh, Nha Be, Can Gio. The sample size in this study included 191 adult with CAD after stentings reexamination treatment at Out Department two private hospital.

Inclusive criteria Including in the study, participants with CAD must take examination and treatment at the hospital in Ho Chi Minh City. Potential participants also had finished with demographic characteristics, and self-care agency, disease related knowledge and health risk behavior. The poeple completely agreed to join the study. Data collection from February to May 2024 at Out Department of Cardiology.

The authors of the three questionnaires agreed to be used in this study. Participants were invited to participate in the study and they agreed to sign the consent form. They were then invited to complete the questionnaire in time from 40-50 minutes. After the questionnaire is completed and rechecked. The data were entered into Jamovi statistical software program version 2.5.

Questionnaire

The demographic profile

Age, sex, marital status, religion, highest educational attainment, employment status, and income level.

Self-care agency question

Riesch and Hauck validated and modified the ESCA scale using pooled data from three studies (n=506) and principal components analysis [6]. The revised 35-item instrument comprised four factors: self-worth (12 items), motivation (12 items), knowledge and information seeking (5 items), and passivity (6 items)[6]. Cronbach's alpha coefficients ranged from 0.73 to 0.82, indicating acceptable reliability.

Disease-related knowledge question

Disease-related knowledge was assessed using the Leuven Knowledge Questionnaire [7]. Developed in Belgium, this questionnaire evaluates the understanding of adults with congenital heart disease regarding their condition, treatment, and preventive measures. The questionnaire consists of a total of 25 items comprising of four domains: knowledge and treatment of heart disease (10 items), prevention of complications (9 items), physical activities (3 items), and reproduction and contraception (3 items). With respect to the psychometric properties, the face validity and content validity of the instrument was tested. A Cronbach's alpha result of 0.7 or above is generally considered acceptable in most social science research situations.

Health risk behaviors question

Health risk behaviors was assessed using the Health

Behavior Scale (HBS) and the Baecke questionnaire. The HBS is a self-report instrument consisting of 16 questions that address 4 components of health risk behavior, focusing on: alcohol consumption (3 items), smoking (3 items), and dental hygiene (4 items) and physical activity (6 items). This scale has demonstrated robust psychometric properties with 86.3% of the items had a good to excellent content validity [8].

Psychometric properties of the instruments

The process of translating the 3 question sets Self-care agency (SCA), Disease related knowledge (DRK), and Health risk behavior (HRB) is carried out by 2 Experts are fluent in English and Vietnamese and use the back translation method. Then the two authors agreed and produced a translation. Finally, the English version back-translated from the Vietnamese version was checked by the 3 authors of the questionnaire and agreed on some issues and inappropriate topic. The reliability of the three sets of questions, SCA, DRK, and HRB, was 0.7.

Data Analysis

All results were checked the satisfied with the research's criteria and inputted into the Jamovi 25 and computed r to analyze the rate and relationships. The types of data were described as the following. The Mean and Standard Deviation method was used to describe basic demographic information, self-care, disease knowledge and risk behavior.

Associations variables and self-care, diseaser related knowledge, health behaviors used Computed r analysis. In addition, Linear regression reliability of .05 and Jamovi 25 were used to analyze the data to determine the predictors of SCA, DRK, HRB and demographic profile among adult in CAD.

RESULTS

Table 1. *Clinico-Demographic Profile of Among Adult Residents with Coronary Artery Disease in selected in Ho Chi Minh City, Vietnam*

Profile	**Mean**	**SD**
Demographic Profile	Frequency	%
Age (year)	52	6.50
Sex (F – Percentage)		
Male	144	75.4
Female	47	24.6
Marital status (F – Percentage)		
Single	48	25.1
Married	113	59.2
Divorced	30	15.7
Religion		
Christian	49	25.7
Buddhist	96	50.3
Other (Catholic and Islam)	46	24.1
Highest education attainment		
Secondary school (from 6–9 years)	25	13.1
High school (from 10–12 years)	60	31.4
College/ University	106	55.5

Profile	Mean	SD
Employment status		
Employed	139	72.8
Unemployed	19	9.9
Retired	33	17.3
Income level (person/month) (VND)		
>10,000,000 VND	52	27.2
10,000,000-20,000,000 VND	87	45.5
21,000,000-30,000,000 VND	52	27.2
Clinical Profile (Comorbidities)		
Hypertension		
Yes	179	93.7
No	12	6.3
Diabetes Mellitus		
Yes	95	49.7
No	96	50.3
Dyslipidemia		
Yes	179	93.7
No	12	6.3
Chronic Kidney Disease (CKD)		
Yes	37	19.4
No	154	80.6
Stroke		
Yes	4	2.1
No	187	97.9

The study examined the clinico-demographic characteristics of 191 adults. The participants ranged in age from 40 to 75 years, with a mean age of 52 years (SD = 6.50). The majority of the participants were male (75.4%), while females constituted 24.6% of the sample. The age profile, with a mean of 52 years, underscores the presence of CAD in middle-aged adults, aligning with the global understanding that CAD risk increases with age. Regarding marital status, 59.2% were married, 25.1% were single, and 15.7% were divorced. In terms of religious affiliation, the most common was Buddhism (50.3%), followed by Christianity (25.7%), and other religions (Catholic and Islam) (24.1%). The educational attainment of the participants varied, with 55.4% having completed high school, 31.5% had attained a college or university degree, and 13.1% had finished secondary school (6–9 years).

Employment status revealed that 72.8% of the participants were employed, 17.3% were retired, and 9.9% were unemployed. Most participants were employed and earned between 10,000,000 to 20,000,000 VND (45.5%), Income levels were distributed across three categories: 27.2% earned less than 10,000,000 Vietnamese Dong (VND) per month, 45.5% earned between 10,000,000 to 20,000,000 VND, and 27.2% earned between 21,000,000 to 30,000,000 VND. Comorbidities were prevalent among the participants, with 93.7% reporting hypertension, 49.7% had diabetes mellitus, and 93.7% had dyslipidemia. Chronic kidney disease (CKD) was present in 19.4% of the participants. Stroke had affected 2.1% of the sample.

Table 2. *Relationship between the assessed self-care agency, disease-related knowledge, health risk behaviors among adult residents with coronary artery disease in selected in Ho Chi Minh City, Vietnam*

Mediation Estimates				
Effect	**Estimate**	**SE**	**Z**	**P**
Indirect	-0.139	0.0707	-1.97	0.049
direct	-0.351	0.2064	-1.70	0.089
Total	-0.490	0.1989	-2.46	0.014

Path Estimates					
		Estimate	**SE**	**Z**	**P**
Self Care Agency ⟶	Disease Related Knowledge	0.527	0.118	4.47	< .001 (Sig.)
Disease Related Knowledge ⟶	Health Risk behaviour	-0.264	0.120	-2.19	0.029 (Sig.)
Self Care Agency ⟶	Health Risk behaviour	-0.351	0.206	-1.70	0.089(Sig.)

Mediation Estimates:

Indirect Effect: The indirect effect of self-care agency on health risk behavior through disease-related knowledge is estimated at -0.139, significant (p = 0.049). **Direct Effect:** The direct effect of self-care agency on health risk behavior, after accounting for disease-related knowledge, is estimated at -0.351(p = 0.089). **Total Effect:** The combined direct and indirect effects of self-care agency on health risk behavior amount to -0.490, significant (p = 0.014).

DISCUSSION

This sex distribution aligns with global research indicating that men are generally at a higher risk of developing CAD compared to women, particularly before the age of 60[9]. The age profile, with a mean of 52 years, underscores the presence of CAD in middle-aged adults, aligning with the global understanding that CAD risk increases with age[10]. Regarding marital status, 59.2% were married, 25.1% were single, and 15.7% were divorced. Literature suggests that married individuals often have better health outcomes due to social and emotional support, which can mitigate stress a known risk factor for CAD. In terms of religious affiliation, the most common was Buddhism (50.3%), followed by Christianity (25.7%), and other religions (Catholic and Islam) (24.1%). This diverse religious distribution reflects the multicultural and multi-religious context of Ho Chi Minh City. Comorbidities were prevalent among the participants, with 93.7% reporting hypertension, 49.7% had diabetes mellitus, and 93.7% had dyslipidemia. Chronic kidney disease (CKD) was present in 19.4% of the participants, while chronic obstructive pulmonary disease (COPD) was not reported by any participant. Stroke had affected 2.1% of the sample. These high comorbidity rates reflect the complex interplay of CAD with other chronic conditions that can exacerbate.

The path analysis shows that the beta value of 0.351 between self care and heatlh risk behaviors is lower than the beta value of 0.791 which is the combination of selfcare with knowledge and knowledge with health risk behavior. This shows that knowledge is really important factor in determining health risk behavior among patients with CAD. However, the findings also show that knowledge is a significant factor that could heighten the reduction of health risk behaviors and will not likely engage in activities such alcohol consumption, smoking, poor dental hygiene and physical activity. Aligning with the findings by Taylor et al. (2022), who observed that enhanced self-care agency and disease-related knowledge significantly mitigate health risk behaviors in cardiovascular patients, our

results reinforce the need for targeted educational interventions that focus on both self-care competencies and comprehensive health literacy[11]. Taylor et al. (2022), highlighted the potential for improved patient outcomes through structured support systems that enhance both knowledge and self-directed care practices. The overall combined effect of self-care capacity on health-risk behaviors is statistically significant, emphasizing the importance of enhancing self-care capacity as a key strategy to reduce health-risk behaviors in patients with coronary artery disease.

CONCLUSION AND RECOMMENDATIONS

The study results suggest that increasing self-care and disease-related knowledge can significantly reduce health risk behaviors in adults with coronary artery disease.

Establishing a community-based cardiac rehabilitation facility that offers exercise training, educational campaigns, and emotional support services, with a culturally sensitive approach to reach diverse populations effectively.

ACKNOWLEDGEMENT

From the bottom of my heart, I would like to send my gratefulness and respectfulness to **Dr. De Guzman Joanna** my advisor, **Dr. John Michael O. Lorena**, the Dean of St. Luke's College of Nursing, **Dr. Tristan Dela Cruz,** the GSN Program Chair, and all the panel members, thank my friends and colleagues To Thi Lien and Nguyen Truong Thanh Hai. And thank the Tam Duc Cardiology hospital, Gia An 115 hospital and participants for their participation help me complete this study.

REFERENCES

1. WHO. *Cardiovascular diseases (CVDs)*. 2021
2. Bauersachs R, Zeymer U, Brière JB, Marre C, Bowrin K, Huelsebeck M. Burden of Coronary Artery Disease and Peripheral Artery Disease: A Literature Review. *Cardiovasc Ther*. 2019;2019:8295054. doi:10.1155/2019/8295054
3. Arnett DK, Blumenthal RS, Albert MA, et al. 2019 ACC/AHA Guideline on the Primary Prevention of Cardiovascular Disease: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Circulation*. 2019; 140(11):e596-e646. doi:10.1161/CIR.0000000000000678
4. WHO. *Cardiovascular diseases (CVD) in Viet Nam*. 2024
5. VIETNAMNET GLOBAL. *200,000 people die from cardiovascular diseases per year in VN*. 2023
6. Riesch SK, Hauck MR. The exercise of self-care agency: an analysis of construct and discriminant validity. *Res Nurs Health*. 1988;11(4):245-255. doi:10.1002/nur.4770110406
7. Moons P, De Volder E, Budts W, et al. What do adult patients with congenital heart disease know about their disease, treatment, and prevention of complications? A call for structured patient education. *Heart*. 2001;86(1):74-80. doi:10.1136/heart.86.1.74
8. Goossens E, Luyckx K, Mommen N, et al. Health risk behaviors in adolescents and emerging adults with congenital heart disease: psychometric properties of the Health Behavior Scale-Congenital Heart Disease. *Eur J Cardiovasc Nurs*. 2013;12(6):544-557. doi:10.1177/1474515113475934
9. Benjamin EJ, Muntner P, Alonso A, et al. Heart Disease and Stroke Statistics-2019 Update: A Report From the American Heart Association. *Circulation*. 2019; 139(10):e56-e528. doi:10.1161/CIR.0000000000000659
10. Gu T, Fu C, Shen Z, et al. Age-Related Whole-Brain Structural Changes in Relation to Cardiovascular Risks Across the Adult Age Spectrum. *Front Aging Neurosci*. 2019;11:85. doi:10.3389/fnagi.2019.00085
11. Taylor RS, Dalal HM, McDonagh STJ. The role of cardiac rehabilitation in improving cardiovascular outcomes. *Nat Rev Cardiol*. 2022;19(3):180-194. doi:10.1038/s41569-021-00611-7

The correlation between disease awareness, disposition, and caregiving competency among parents of children with congenital heart disease in selected communities in Vietnam

Dang Van Sang [1]✉, Joanna Sanchez De Guzman [2]
Tran Thi My [1], Nguyen Nhat Tuan Trung [3]
[1] Tam Duc Heart Hospital
[2] Trinity University of Asia
[3] University of Medicine and Pharmacy at Ho Chi Minh City

Correspondence to
Dr. Dang Van Sang
Tam Duc Heart Hospital
Email: sangdangopsmile@gmail.com

Received 09 September 2024
Accepted 20 October 2024
Published online 30 November 2024

To cite: Dang VS, Joanna SDG, Tran TM, et al. *J Vietnam Cardiol* 2024;**112E**:42-48

ABSTRACT

Objectives: To investigate the relationship between disease awareness, caregiving disposition, and competency among parents of children with congenital heart disease.

Methodology: A correlational descriptive study was conducted involving 275 parents of children with congenital heart disease across three regions: the Mekong Delta, Central Highlands, and Central Coastal areas.

Results: Parents of children with congenital heart diseases demonstrated a high level of disease awareness, with a mean score of 3.82. Their atttitude towards the condition was notably positive, scoring an average of 4.65, and their caregiving competency was similarly strong, with a mean score of 4.36. While no significant correlation was found between disease awareness and both disposition or caregiving competency, a significant positive correlation was identified between attitude and caregiving competency, reflected by a high correlation coefficient and a p-value of less than 0.001. Furthermore, the study revealed that the linear regression model had an r^2 value of 0.386, indicating that 38.6% of the variability in caregiving ability could be explained by factors, such as acceptance of the condition, recognition of parental role, and support and collaboration with other parents of children with congenital heart disease.

Conclusions: Disposition and caregiving competency play a critical role in determining the health outcomes and quality of care for children with congenital heart disease. As such, it is essential to design and implement specialized training programs tailored for parents, aimed at strengthening their caregiving skills and improving the overall well-being of their children.

Keywords: Disease awareness, disposition, caregiving competency, congenital heart disease, parents.

INTRODUCTION

Congenital heart disease (CHD) is one of the most frequently diagnosed

congenital disorders, afflicting approximately 0.8% to 1.2% of live births worldwide (W Wu, 2020). CHD management is chronic, requiring ongoing hospitalizations, surgeries, and lifelong follow-up (Ruben Willems et al., 2019). This places significant demands on families, often leading to challenges such as maintaining care routines and managing financial and social constraints (Cardoso Vaz Jéssica & Marten Milbrath Viviane, 2018). Previous studies have shown that parents of children with CHD may struggle with disease management due to limited disease awareness and challenges in planning and implementing care strategies (Berto J. Bouma, 2017; Devyani Chowdhury, 2021). These difficulties can compromise the quality of care provided, potentially leading to poorer health outcomes for the child (Alina Morawska, 2015). Therefore, understanding how parental awareness, psychology, and caregiving competency are interconnected is crucial for developing targeted interventions. This study aims to explore the correlations between disease awareness, attitudes, and caregiving abilities of parents with children suffering from congenital heart disease in order to enhance these factors and support families in effectively managing their child's condition..

METHODS

Population

Parents of children aged 0-18 with congenital heart diseases living in selected areas of Vietnam: Mekong Delta (Dong Thap, Ca Mau), Central Highlands (Lam Dong, Dak Lak), and Central Coast (Phu Yen, Ninh Thuan).

Inclusion Criteria: Participants must be able to read and write and must agree to participate.

Exclusion Criteria:

• Parents of children with additional illnesses other than congenital heart diseases.

• Parents unable to complete the study due to illness, personal reasons, or unwillingness to participate.

Settings

Research period: from October 25, 2023 to July 17, 2024

Research location: conducted in three regions of Vietnam: Mekong Delta (Dong Thap, Ca Mau), Central Highlands (Lam Dong, Dak Lak) and Central Coast (Phu Yen, Ninh Thuan).

Design

A correlational descriptive study was used.

Sample size

The sample size was determined using G Power software, version 3.1.9.2. With an effect size (ρ) of 0.20, a power of 80%, and a margin of error of 5%, the estimated sample size was 275.

Data collection

The questionnaire was developed based on relevant studies and content-validated by five cardiovascular disease experts (Cardoso Vaz Jéssica & Marten Milbrath Viviane, 2018; Kunnara Maneekunwong, 2022; Osama Hafiz Elshazali & Farah, 2020). It was pilot-tested with 25 respondents who met the inclusion criteria but were not part of the final study. The questionnaire showed good internal consistency, with a Cronbach's alpha of 0.805.

Data were collected directly using a self-administered questionnaire with a 5-point Likert scale, including:

+ Part A of the questionnaire deals with study characteristics

+ Part B of the questionnaire pertains to the disease awareness on congenital heart disease

+ Part C of the questionnaire pertains to the disposition among parents of children with congenital heart disease

+ Part D of the questionnaire pertains to the caregiving competency among parents in caring for their children with congenital heart disease.

Data Analysis

The data were processed and analyzed using Jamovi 2.5, with techniques including frequency, percentage, mean, and Pearson's correlation coefficient analysis.

Research Ethics

The study was conducted after approval from Trinity University of Asia and subsequently with the specific community where the research was carried

out. Participants' personal information and data obtained from the research were kept confidential and used only for research purposes.

RESULTS

Characteristics of the study subjects

Table 1. Characteristics of the Study Population (n=275)

Demographic	Frequency	Percentage (%)
Sex		
Female	180	65.5%
Male	95	34.5%
Others	0	0%
Highest educational attainment		
Primary level	57	20.7%
Secondary level	179	65.1%
College level	36	13.1%
Postgraduate level	0	0%
None	3	1.1%
Occupational status		
Employed	193	70.2%
Unemployed	81	29.5%
Student	0	0%
Retired	1	0.4%
Area of Residence		
Urban	226	82.2%
Rural	49	17.8%
Civil Status		
Single	14	5.1%
Married	255	92.7%
Divorced	4	1.5%
Widow	2	0.7%
Socioeconomic Status		
Poor level (<65 USD)	55	20.0%
Near-poor level (~65 USD – ~85 USD)	98	35.6%
Average level (~65 USD – ~130 USD)	82	29.8%
Above average level (>130 USD)	40	14.5%

The study involved 275 participants with the following key characteristics:

The age range of parents in the study spans from 19 to 68 years, with a mean age of 38 years. The children's ages range from 1 to 17 years, with a mean age of 6.5 years.

Majority were female (65.5%), with males making up 34.5%.

Most participants had secondary education (65.1%), while primary education was held by 20.7%, and university education by 13.1%.

The majority were employed (70.2%), and 29.5% were unemployed. A significant majority lived in urban areas (82.2%).

Most were married (92.7%), with a small proportion being single (5.1%).

The largest group had a medium socioeconomic status (35.6%), followed by upper-medium (29.8%) and low (20.0%).

Most were mothers (59.6%), followed by fathers (32.0%).

Table 2. Characteristics of congenital heart disease in children (n=275)

Demographic	Frequency	Percentage (%)
Relationship with child		
Father	88	32.0%
Mother	164	59.6%
Others	23	8.4%
Child's initial diagnosis		
Hypoplastic left-heart syndrome	1	1.8%
Univentricular physiology	9	3.3%
Tetralogy of Fallot	34	12.4%
Double-outlet right ventricle	20	7.3%
Double-inlet left ventricle	12	4.4%
Truncus arteriosus	0	0%
Transposition of the great arteries (TGA)	0	0%
Congenitally-corrected TGA	3	1.1%
Coarctation of the aorta	35	12.7%

Demographic	Frequency	Percentage (%)
Atrioventricular septal defect	19	6.9%
Atrial septal defect, type 1	4	1.5%
Ebstein malformation	10	3.6%
Pulmonary valve abnormality	14	5.1%
Aortic valve abnormality	1	0.4%
Aortic abnormality	3	1.1%
Left ventricle outflow tract obstruction	3	1.1%
Atrial septal defect, type 2	7	2.5%
Ventricular septal defect	75	27.3%
Mitral valve abnormality	20	7.3%
Pulmonary vein abnormality	1	0.4%
Other	0	0%

The most common initial diagnoses were Ventricular septal defect at 27.3%, Coarctation of the aorta at 12.7% and Tetralogy of Fallot at 12.4%.

Disease awareness among parents of children with congenital heart disease

***Table 3**. Disease Awareness Among Parents of Children with Congenital Heart Disease*

Dimension	Mean	Interpretation
A. Disease	3.83	Strongly Agree/ High awareness
B. Symptoms	3.90	Strongly Agree/ High awareness
C. Treatment	3.84	Strongly Agree/ High awareness
D. Prevention	4.01	Strongly Agree/ High awareness
E. Complications	3.50	Neither Agree Nor Disagree / Moderate Awareness
Overall Rating	**3.82**	**Agree/High awareness**

Legend:
4.51 – 5.00 – Strongly Agree / Very High Awareness
3.51 – 4.50 – Agree / High Awareness
2.51 – 3.50 – Neither Agree Nor Disagree / Moderate Awareness
1.51 – 2.50 – Disagree / Low Awareness
1.00 – 1.50 – Strongly Disagree / Very Low Awareness

The average scores for various aspects of congenital heart disease awareness were as follows: Disease (3.83), Symptoms (3.90), Treatment (3.84), Prevention (4.01), and Complications (3.50). Overall, general awareness was high, with a mean score of 3.82, indicating strong agreement with a high level of awareness.

Disposition Among Parents of Children with Congenital Heart Disease

***Table 4**. Disposition Among Parents of Children with Congenital Heart Disease*

Dimension	Mean	Interpretation
A. Acceptance of the Condition	4.59	Strongly Agree / Very Good disposition
B. Acknowledgement of Role	4.66	Strongly Agree / Very Good disposition
C. Support and Collaboration	4.71	Strongly Agree / Very Good disposition
Overall Rating	**4.65**	**Strongly Agree / Very Good disposition**

Legend:
4.51 – 5.00 – Strongly Agree / Very Good disposition
3.51 – 4.50 – Agree / Good disposition
2.51 – 3.50 – Neither Agree Nor Disagree / Fair disposition
1.51 – 2.50 – Disagree / Poor disposition
1.00 – 1.50 – Strongly Disagree / Very Poor disposition

The mean scores for different aspects of parental attitudes towards congenital heart disease were: Acceptance of the condition (4.59), Role perception (4.66) and Support and cooperation (4.71). Overall, the general attitude was very positive with a mean score of 4.65, indicating strong consensus and very good attitudes towards caring for children with congenital heart disease.

Caregiving Competency Among Parents of Children with Congenital Heart Disease

***Table 5**. Caregiving Competency Among Parents of Children with Congenital Heart Disease*

Dimension	Mean	Interpretation
A. Care after surgery	4.46	Often/ Good competency
B. Nutritional care	4.37	Often/ Good competency

C. Compliance to medication	4.63	Always/ Very Good competency
D. Physical Activity	4.09	Often/ Good competency
E. Oral Care	4.11	Often/ Good competency
F. Caring in emergency situation	4.52	Always/ Very Good competency
Overall Rating	**4.36**	**Often/ Good competency**
Legend: 4.51 – 5.00 – Always/ Very Good competency 3.51 – 4.50 – Often/ Good competency 2.51 – 3.50 – Sometimes/ Fair competency 1.51 – 2.50 – Seldom/ Poor competency 1.00 – 1.50 – Never/ Very Poor competency		

The average scores for various aspects of caregiving are as follows: Post-operative Care (4.46), Nutritional Care (4.37), Medication Adherence (4.63), Physical Activity (4.09), Oral Care (4.11), and Emergency Care (4.52). Overall, caregiving competency is rated as good with a mean score of 4.36, indicating that parents frequently exhibit good caregiving skills.

Linear relationship between the assessed disease awareness, disposition and caregiving competency among parents of children with congenital heart disease

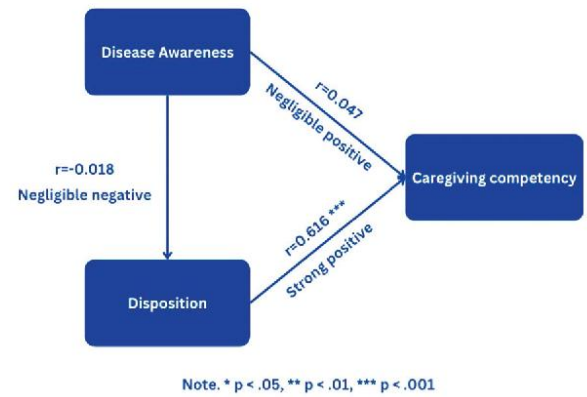

***Figure 1**. Linear relationship between the assessed disease awareness, disposition and caregiving competency among parents of children with congenital heart disease*

The study found a statistically significant correlation between attitudes and caregiving ability, suggesting that positive attitudes may be associated with better caregiving ability. Other factors such as illness awareness did not show a significant effect on attitudes or caregiving ability.

The predictive relationship between the assessed disposition and caregiving competency among parents of children with congenital heart disease

***Table 6**. The predictive relationship between the assessed disposition and caregiving competency among parents of children with congenital heart disease*

Variables	Caregiving Competency		
	Coefficients	95% Confidence Interval – 95% CI	p-value
Intercept	0.2459		
A. Acceptance of the Condition	0.0696	-0.0336 ; 1.695	0.139
B. Acknowledgement of Role	0.0615	0.1413 ; 0.383	< .001
C. Support and Collaboration	0.310	0.1724 ; 0.447	< .001
	R^2	**0.386**	

The findings showed that both acknowledgement of Role and Support and Collaboration were significantly positively associated with caregiving competency, as indicatedby confidence intervals that did not include zero, confirming statistical significance. In contrast, Acceptance of the Condition

had a positive coefficient, its confidence interval includes zero, suggesting the relationship was not statistically significant. The model explains 38.6% of the variance in caregiving competency, highlighting the strong predictive power of the key dispositions. The resulting predictive equation was:

Caregiving Competency = 0.2459 + (0.0696 * Acceptance of the Condition) + (0.0615 * Acknowledgement of Role) + (0.310 * Support and Collaboration).

Intercept (0.2459): Baseline caregiving competency.

Acceptance of the Condition: Increases caregiving competency by 0.0696 units per one-unit increase but is not statistically significant ($p = 0.139$).

Acknowledgement of Role: Increases caregiving competency by 0.0615 units per one-unit increase and is statistically significant ($p < 0.001$).

Support and Collaboration: Increases caregiving competency by 0.310 units per one-unit increase and is statistically significant ($p < 0.001$).

These results highlighted the importance of support and collaboration in improving caregiving competency, while suggesting further research on other influential factors.

DISCUSSION

The study highlights several key characteristics of the participants. The majority are female (65.5%) and married (92.7%), with mothers comprising 59.6% and fathers 32.0% of the respondents. In terms of education, 65.1% have completed secondary education, reflecting a similar trend in developing countries (Osama Hafiz Elshazali & Farah, 2020). Regarding employment, 70.2% are employed, which is higher compared to previous studies that reported lower employment rates (Kunnara Maneekunwong, 2022; Osama Hafiz Elshazali & Farah, 2020). Most participants live in urban areas (82.2%), consistent with the increasing trend of urbanization. Socioeconomic status is categorized as follows: 20.0% are classified as "poor," 35.6% as "near-poor," 29.8% as "middle," and 14.5% as "above average," differing from other studies that reported higher percentages in lower socioeconomic categories (Kunnara Maneekunwong, 2022; Osama Hafiz Elshazali & Farah, 2020).

The study found that awareness of congenital heart disease (CHD) prevention is high, with an average score of 4.01, reflecting effective public health initiatives. In contrast, awareness of complications is lower, with a score of 3.50, indicating a need for better education on severe CHD outcomes such as arrhythmias and heart failure. Similarly, Elshazali et al. (2020) and Maneekunwong et al. (2022) emphasize that educational campaigns have improved general knowledge but often fail to address the complexities of CHD complications (Kunnara Maneekunwong, 2022; Osama Hafiz Elshazali & Farah, 2020). Therefore, enhancing education on CHD complications is crucial for better disease management and achieving improved outcomes.

The study shows that "Support and Cooperation" has the highest average score of 4.71. On the other hand, "Acceptance of the Condition" has the lowest score of 4.59. This is consistent with findings from Chowdhury et al. (2021) and other studies indicating that acceptance of illness can be a gradual process (Devyani Chowdhury, 2021; Kunnara Maneekunwong, 2022; Osama Hafiz Elshazali & Farah, 2020). Overall, enhancing informational and psychological support for parents could further improve their coping and acceptance of their child's condition.

The study indicates high competency in "Medication Adherence," with an average score of 4.63, reflecting strict adherence to medication regimens for controlling congenital heart disease (CHD). This is crucial for effective treatment and preventing complications, consistent with findings by Bouma (Berto J. Bouma, 2017) and Maneekunwong (Kunnara Maneekunwong, 2022). However, "Physical Activity" also scored 4.63, suggesting a need for improved management of physical activity in CHD care. This contrasts with the higher emphasis found in other studies in 2023, which highlighted the importance of balanced physical activity (Macarena Lorente, 2023). This study underscores the need for a comprehensive care approach that also addresses physical activity and emergency care.

The study reveals a statistically significant correlation between attitude and caregiving ability, indicating that a positive attitude may be related to better caregiving. This highlights the need for support programs focused on emotional management and communication skills for caregivers. Further research could enhance understanding of these dynamics and improve intervention strategies (Kunnara Maneekunwong, 2022; Lorente et al., 2023).

CONCLUSION AND RECOMMENDATIONS

There is a no significant linear relationship between disease awareness and disposition among parents of children with congenital heart disease, nor between disease awareness and caregiving competency. However, a significant linear relationship exists between disposition and caregiving competency. This highlights the need to focus on enhancing caregiving attitudes as a critical factor in improving care quality.

There is no significant linear relationship between disease awareness and disposition among parents of children with congenital heart disease (CHD), nor between disease awareness and caregiving competency. However, a significant linear relationship exists between disposition and caregiving competency. This highlights the need to focus on enhancing caregiving attitudes as a critical factor in improving care quality.

A comprehensive training program has been developed to improve the quality of life for children with congenital heart disease (CHD) through education on complications, early detection, and physical activity. Raising awareness among parents and caregivers is crucial, with a focus on early diagnosis, treatment options, and regular medical follow-ups. Social and psychological support, along with improved access to pediatric cardiology services, are essential, as is expanding outreach through educational initiatives and community partnerships.

REFERENCES

1. Morawska A, Calam R, Fraser J. Parenting interventions for childhood chronic illness: a review and recommendations for intervention design and delivery. J Child Health Care. 2015;19(1):5-17. doi:10.1177/1367493513496664
2. Bouma BJ, Mulder BJ. Changing Landscape of Congenital Heart Disease. Circ Res. 2017;120(6):908-922. doi:10.1161/CIRCRESAHA.116.309302
3. Cardoso VJ, Marten MV. Care for families of children with chronic disease. Journal of Nursing UFPE/Revista de Enfermagem UFPE 12.5. 2018.
4. Chowdhury D, Johnson JN, Baker-Smith CM, et al. Health Care Policy and Congenital Heart Disease: 2020 Focus on Our 2030 Future. J Am Heart Assoc. 2021;10(20):e020605. doi:10.1161/JAHA.120.020605
5. Kunnara M. Factors influencing caregivers' uncertainty of children undergoing cardiac surgery in Bangkok, Thailand. Journal of health research. 2022;36(5), 919-928.
6. Lorente M, Azpiroz MJ, Guedes P, et al. Nutrition, dietary recommendations, and supplements for patients with congenital heart disease. International Journal of Cardiology Congenital Heart Disease. 2023;12(12):100449. doi:10.1016/j.ijcchd.2023.100449
7. Osama HE, Tayseer FF, Mariam Z. Knowledge, attitude and practice of parents' of children with congenital heart disease in a developing country. Journal pediatric neonatal care. 2020;10(5):126-132. doi:10.15406/jpnc.2020.10.00424
8. Willems R, Werbrouck A, De Backer J, et al. Real-world healthcare utilization in adult congenital heart disease: a systematic review of trends and ratios. Cardiol Young. 2019;29(5):553-563. doi:10.1017/S1047951119000441
9. Wu W, He J, Shao X. Incidence and mortality trend of congenital heart disease at the global, regional, and national level, 1990-2017. Medicine (Baltimore). 2020;99(23):e20593. doi:10.1097/MD.0000000000020593

Improve knowledge about nutrition and nourishment in patients with acute heart failure in 2023

Pham Minh Tuan[1]✉, Nguyen Thi Hong Nhung[2], Nguyen Thi Hue[2], Le Thi Men[1], Ta Thi Anh[2]

[1] Hanoi Medical University

[2] Vietnam National Heart Institute, Bach Mai Hospital

▶ **Correspondence to**
Dr. Pham Minh Tuan
Hanoi Medical University
Vietnam National Heart Institute,
Bach Mai Hospital
Email: ngminhtuan82@yahoo.com

▶ Received 26 September 2024
Accepted 18 November 2024
Published online 30 November 2024

To cite: Pham MT, Nguyen THN, Nguyen TH, et al. *J Vietnam Cardiol* 2024;**112E**:49-57

ABSTRACT

To improve the quality of treatment and care for heart failure patients, there is an importance of educating patients about self-care and coordinating among cardiologists, cardiological nurses and nutritionists. A prospective and interventional study was conducted in 86 patients who admitted due to acute heart failure at the department of cardiological emergency and intensive care in Vietnam National Heart Institute, Bach Mai Hospital, from July 1st, 2022 to October 31th, 2023.

Results: Of the 86 participants, the highest age group was over 75 years old, accounting for 45.5%, males were 55.8%, higher than females being 44.2%. The general nutritional knowledge score was 11.4%, with 72.5% of participants having cognition at a medium level. The knowledge of them about weight was about half (53.8%), about sodium restriction was 51.2% and they were in medium level. After 1-month of discharging, there was improvement in practice (10.78%), compared to 7.8% in admission. There was a significant difference about nutritional self-care between before and after discharged 1 month (t=10.88, p<0.001). There was no statistical significance between the percentage of malnutrition at admission (23.3%) and at discharge (29.1%). 46.5% of patients were interrupted in nourishment while practicing procedures, accounting for 23.3%. After intervention, three-fourths achieved more energy and the most in the sixth day.

Keywords: acute heart failure, malnutrition, nourishment, nutritional knowledge

INTRODUCTION

Heart failure is the leading cause of mortality, compared to other non-communicable diseases as cancer and stroke. Acute heart failure is represented to a social health problem carried global burden and challenged the modern cardiological research. According to author Agra Bermejo et al. (2017), patients with heart failure are susceptible to malnutrition, which might worsen the prognosis and treatment outcomes, especially in progressive heart failure[1]. Malnutrition and exhaustion are the main causes of hospitalization of chronic heart failure patients with the prevalence was estimated 25-40%[2,3]. These also increase the cardiovascular complications, the duration of hospitalization, the mortality rate and readmission[4]. Moreover, nutritional intervention may minimize these causes and improve the quality of life of patients. In recent

years, there have been many breakthrough medical advances which contribute to the treatment for heart failure such as: pharmaceutical methods, heart transplants, cardiac resynchronization therapy (CRT) and so on. Besides, non-pharmaceutical treatments like rest time, level of action, dietary patterns, and the compliance of treatment also make the prognosis better. These influence the patient's self-care behaviors and then impact their prognosis. Research about heart failure by Linkoping University in 15 countries, including Vietnam, conducted in 126 Vietnamese heart failure patients (in the total of 5964 participants) through 22 trial experiments in 22 places showed that Vietnam is the one of the three lowest countries about the rate of disobeying with sodium restriction with 22%. The research of Nguyen Thi Thuy Ha revealed knowledge and self-care behaviors of heart failure patients were low. The rate of general cognition about drugs and the usage of medication was only 2.1%, about self-care behaviors was 9.8%, and about the compliance with treatment ranged from 25% to 61% (6). Another study conducted in Uong Bi Hospital in 2022 pointed 53.8% had knowledge at medium level and 10.3% had knowledge at good level [7]. In terms of evaluating nutritional condition and nourishment in heart failure patients, 20.4% were malnourished and 60.2% were interrupted while fed, according to the research in Vietnam National Heart Institute, Bach Mai Hospital in 2020.

Nurses play an important role in discovering early complications, educating the way to respond to any change of health problem and the way to adapt to heart failure condition. So that, to improve the quality of care and treatment prognosis for acute heart failure patients, building up a project to innovate the multidisciplinary approach is essential: nutritional intervention and nourishment, education for homecare and the co-ordination among cardiologists, nutritionists and cardiological nurses. Improved of heartcare also improves the treatment.

With these mentioned reasons, we conducted the study named: "Improve the knowledge about nutrition and nourishment in patients with acute heart failure in Vietnam National Heart Institute, Bach Mai Hospital in 2023" with 3 objectives:

Improve the knowledge about nutrition in patients with acute heart failure acute at admission and discharge.

Improve nutrition condition and nourishment in patients admitted due to acute heart failure.

Improve the education for patients and their families' patients at the discharge timepoint.

PARTICIPANTS AND STUDY METHODS

Participants

Acute heart failure patients admitted in department of cardiology emergency and intensive care from July 1st to October 31th, 2023.

The inclusion criteria include:

- Patients with a diagnosis of acute heart failure according to the criteria for heart failure of the European Society of Cardiology (ESC).
- Duration of hospitalization was more than 5 days.
- Age > 18 years old.
- Patients consent to involve the study and could provide information correctly.
- Coma patients were approval by their family.

The exclusion criteria include:

- Duration of hospitalization was less than 5 days.
- Patients had mental disorders.
- Patients had amputation in upper and lower extremities because of cannot calculating anthropometric indexes.
- Patients had participated to last study.

Methods

Time and location

Department of cardiology emergency and intensive care from July 1st to October 31th, 2023.

Study design

A prospective – interventional study.

Sample method and sample size

A convenience study was conducted in the total of patients admitted with the diagnosis of acute heart failure or acute period of chronic heart failure. Patients can eat by mouth or through gastroenteric sonde. The number of participants were 86.

Variables

General information:

- Age: the percentage of each age group
- Gender: the percentage of male and female
- Job: the percentage of each job group
- Education level: the percentage of each education level group (primary school, secondary school, high school and higher)

The knowledge about nutrition:

- General knowledge about nutrition for heart failure patients: the percentage of awareness level.
- Knowledge about weight: %
- Knowledge about following-up weight: % (how to weight, when)
- Knowledge about nutrition principle: %
- Knowledge about sodium restriction diet: %
- Knowledge about restricting fluid: %
- Practice about following-up weight: %
- Practice about sodium restriction diet: %
- Practice about control weight: %

Nourishment:

- Nutrition condition: classify according to BMI (body mass index)
- The percentage of barriers impacted to nourishment
- The energy level in reality.

Data collection

According to the medical record, feeding monitoring form and 24-hour diet record for the patient. Oral and tube diet: all products the patient eats during the day, quantity in each meal, whole day, formula from product label and from the nutrition department. Nourishment through intravenous vein: all intravenous nutrition fluids collected from the medical record

Data analysis

Excell software, SPSS version 20.0.

Ethical consideration

The investigation was conducted on a voluntary basis, with consent, without coercion, and in a respectful manner. All information about the subject was kept confidential and used only for research purposes. The study was approved by the leadership of the Vietnam National Heart Institute, Bach Mai Hospital.

RESEARCH RESULTS

General information:

***Table 1**. The characteristics of participants*

Characteristics		N	%
Age group	<60 years old	16	18,6
	60-74 years old	31	36
	≥ 75 years old	39	45,4
Gender	Male	48	55,8
	Female	38	44,2
Occupation	Farmer	13	15,2
	Worker	7	8,1
	Retired	66	76,7
Education level	Primary school	20	23,3
	Secondary school	28	32,5
	High school or higher	38	44,2

Comments: The age group over 75 was dominant at 45.4%. Gender: Males were 55.8%, higher than females were 44.2%. Occupation: Most patients were elderly, the percentage of retired accounted for 76.7% . Education level: Most patients had studied from high school or higher, accounting for 44.2%.

General knowledge of patients about nutrition

***Table 2**. General knowledge about nutrition of patients with heart failure*

Level	Percentage (%)
Poor	9,7
Medium	72,5
Good	17,8
Very good	0
Total	100

Comments: The overall knowledge score of the 86 patients studied was 11.4. The lowest score was 1 and the highest was 20 points. The majority of patients had an average level of understanding about

nutrition (72.5%) and had no patient achieved a good level of understanding.

***Table 3**. Knowledge about weight monitoring*

Level	Percentage (%)
Poor	27.5
Medium	53.8
Good	18.7
Very good	0
Total	100

Comments: Patients' knowledge about weight monitoring was not good, had no patient achieved good knowledge level, up to 53.8% of the study patients had average knowledge level and 27.5% achieved poor knowledge level, only 18.7% of patients achieved fair knowledge level.

***Table 4**. Knowledge about salt reduction diet in patients*

Level	Percentage (%)
Poor	7.5
Medium	51.2
Good	36.3
Very good	5.0
Total	100

Comment: Patients' knowledge about salt reduction diet was mainly at an average level, accounting for more than half of the studied patients, 51.2%, followed by a fair level, accounting for 36.3%. Patients with good and poor knowledge accounted for a very small proportion, only 5% and 7.5%.

***Table 5**. Knowledge about fat selection*

Level	Percentage (%)
Poor	37.5
Medium	51.2
Good	7.5
Very good	3.8
Total	100

Comments: Patients' knowledge about fat selection, the percentage of patients with poor knowledge was 37.5%, the percentage of patients with average knowledge was highest at 51.2%. The percentage of patients with good and fair knowledge was very low at 3.8% and 7.5%.

***Table 6**. Nutritional care practices of heart failure patients before discharge*

	Options	n	(%)
The frequency of monitoring weight	None or seldom	43	53,8
	Usually	23	28,7
	Almost always	12	15,0
	Every day	2	2,5
Reduction of sodium intake	None or seldom	23	28,7
	Usually	23	28,7
	Almost always	13	16,3
	Every day	21	26,3
Weight control	None or seldom	49	61,3
	Usually	17	21,3
	Almost always	6	7,5
	Every day	8	10
The frequency of exercising	None or seldom	37	46,3
	Usually	14	17,5
	Almost always	12	15,0
	Every day	17	21,3

Comments: The practice of self-monitoring and weight control of patients before discharge was quite low, almost none or very little, accounting for 53.8% and 61.3%. The practice of low-salt diet was best performed by patients with a daily rate of 26.3%.

***Table 7**. Nutritional care practices of heart failure patients before and one month after discharge from hospital*

Level	Before discharge (%)	After discharge 1 month (%)	p
Poor	18.8	0	P<0.001
Medium	40	11.3	
Good	25.3	68.8	
Very good	16.3	20	

Comments: - The average of practice level after 1 month of discharge (10.78) was higher than the practice level before discharge (7.8).

-There was a difference in nutritional care practices of heart failure patients before and after 1 month of hospitalization (t=10.88, p<0.001). Specifically, practice after 1 month of discharge was higher than before discharge.

- Before discharge, 18.8% of patients had poor practice, but after 1 month of discharge, there were no patients with poor practice.

Patient nutrition

Table 8*. Nutritional status during hospitalization according to BMI*

Nutrition condition	Admission	Discharge	p
Malnutrition	20 (23,3%)	25 (29,1%)	p>0.05
Not malnutrition	66(76,7%)	61 (70,9%)	
Total	86	86	

Comment: The rate of malnutrition in patients at admission was 23.3% lower than at discharge 29.1% but this difference was not statistically significant with p >0.05 (Chi-Square).

Change in patient weight during the first week of hospitalization

Table 9*. Change in patient weight during the first week of hospitalization*

	X+-SD	Min	Max	P
Admission	53±10,7	33	94	P<0,05 (Pair T-test)
Discharge	51,7±11,05	31	93	
The change	-2±3.1	-8	7	

Comment: Average weight at admission was higher than weight at discharge. This difference was statistically significant with p<0.05.

Reasons for feeding interruption

There were 40 patients with feeding interruptions, accounting for 46.5%.

Table 10*. Changes in patient weight during the first week of hospitalization*

Causes of feeding interruption	n	%
High gastric residual (>250ml)	17	19,7
Procedure (Dialysis, remove endotracheal tube, tracheostomy, surgery, cardiopulmonary resuscitation,….)	20	23,3
Other causes	10	11,6

Comments: The most common reason for feeding interruption was procedure 23.3% followed by high gastric residual 19.7%.

Actual energy received before and after intervention

Table 11*. Actual energy received compared to actual energy provided before and after intervention*

Actual energy received / Total	Before intervention	After intervention
Day 1	49,5%	55%
Day 3	61,5%	65%
Day 6	68,3%	75%

Comments: After the intervention, the actual amount of energy the patient received was higher and reached a peak of 75% on the 6th day.

DISCUSSION

The characteristics of participants:

As the results mentioned in chapter 3, the characteristics of 86 participants was showed in tables 3.1 and 3.2. Through that, we had some comments:

The mean of age was 65.6 ± 12.9 with the minimum age was 29 years old and the maximum age was 88 years old. Participants were almost elderly. The median age in the research of Nguyen Ngoc Huyen was 20.38±8.14 with the oldest patient was 90 years old. Most participants in their research were 60 and older. Moreover, in the research of Wal MH et al (2006), the mean of age was 72±11, the youngest patient was 23 and the oldest one was 93. The similar in the median among these researches were acceptable because the incidence of heart failure was increased

with age all over the world. It affected patients over 65 years old up to nearly 10%. Heart failure was the main cause of admission and rehospitalization with the rate of readmission was reported increasing from 877.000 to 1.106.000 in 2006, accounting 171% in American.

About gender, in our research, male were nearly two thirds compared to the 45.4% in the research of Nguyen Ngoc Huyen and 60% in the Wal MH et al.'s research. This proved that male at higher risk than female. There was no difference among education level groups so that heart failure patients could get in any age groups. The number of patients diagnosed with heart failure were 58.8%, was higher than the number of patients have not diagnosed (41.3%). However, patients had been treating (44%) were lower than the ones had not been treated (56%). This indicated that almost patients were examined and diagnosed but them did not obey the treatment.

Knowledge about heart failure disease

Knowledge about sodium restriction diet

Our research was pointed more than a half of patients (51.2%) had the knowledge about sodium restriction diet in medium level, 36.3% was in good level, 5% was in good level and 7.5% was in poor level. These results were opposite to results of Peggy Paulbee (2009) which said that all heart failure patients should avoid high-sodium food. The misunderstanding of selecting food could affected to the practice decreasing sodium in diet because they did not know how much of sodium was enough.

Knowledge about following-up weight

The knowledge about following-up weight in heart failure was restricted in our research. There were no patients had very good knowledge, 53.8% was in medium, 27.5% was in poor and 18.8% was in good level, which were unsimilar to the research of Wal MH et al (50). This impressed that the way of propaganda about following-up weight had not been focused, heart failure patients knew the reason why needed to monitored weight every day but did not know how to do.

Knowledge about nutrition

In our research, the score of general nutritional knowledge was not high with the median score was 11.4 in 20, the lowest score was 1 and the highest score was 20. There was the significance change in their cognition about heart failure disease. Almost patients (72.5%) were considered categorizing general knowledge in medium level and having no ones in very good level. Educating knowledge about nutrition for heart failure patients played an important role in the treatment. Poor knowledge about that could impacted to the decision of choosing food and worsen the prognosis.

The practice about self-care in heart failure population

Practice restricting sodium on the diet

In this research, the percentage of patients practicing a sodium-restriction diet was still not high, responsible for 26.3% which was not same with the research of Linkoping University, Sweden (88%) or of the Wal MH's (79%). The reason of poor compliance was having no knowledge about why need to restrict sodium in the diet. Restricting sodium was not different thing when they understood. Patients would eat sodium less than normal. In the other hands, who would not obey this principle were due to having not enough ambition to change this habit.

Practice following-up weight

The study results showed that up to 53.8% of the subjects did not monitor their weight at all or only occasionally. The daily monitoring of the patients in the study accounted for a very low rate, only 2.5%, which was completely suitable for the rate of knowledge that the patients had in the study. This result was similar to the results of the research group at Linkoping University, Sweden and colleagues [45] at 40.0%, or the study of Wal MH and colleagues [50] at 35.0%. The reason might be that the patients have not seen the effects of weight gain on people with heart failure, so they did not create a habit of daily weight control.

Practicing exercises

Only 36.3% of patients exercised regularly, up to 63.7% of research subjects practiced occasionally, or very little or even not exercise at all. There were also similar to the research group at Linkoping University, Sweden and colleagues [45] that 40.0% of participants did not exercise, or the study of Wal MH and colleagues [50] up to 60.0%. The main reason for

this might be due to health conditions, patients had many difficulties, evenly their body was always in a state of fatigue, depression, so the spirit also became depressed and did not want to exercise. It was also possible that the feature of each patient's work made them unable to spend time on exercise. And about the geography, living conditions in each patient's life also hinder them exercising.

Practicing nutritional care of heart failure patients before and after one month of discharge.

There was a difference in nutritional care practices of heart failure patients before and after one month of hospitalization (t=10.88, p<0.001). Specifically, the practicing after one month of discharge was higher than before discharge (10.78>7.8). During hospitalization, 18.8% of patients had poor practice, but after one month of discharge, having no patients had poor practice. This was completely reasonable because during the treatment and recovery process after discharge, patients are often provided with nutritional information and guidance by doctors, nurses, and nutritionists. They could provide patients with basic knowledge about important nutritional factors for heart failure and how to adjust their diet to improve the immune system.

CONCLUSION

Knowledge and practice of patients with chronic heart failure

- The average general knowledge score of patients with heart failure was 11.4. The lowest score is 1 and the highest score is 20. The majority of patients had an average level of understanding of nutrition (72.5%) with no patient achieving a good level of understanding.

- The knowledge of patients about reducing salt intake was mainly at an average level, accounting for more than half of the patients studied, accounting for 51.2%, followed by good level with a rate of 36.3%, patients with very good and poor knowledge account for a very small proportion, respectively only 5 and 7.5%.

- There was no patient achieved a good level of knowledge, up to 53.8% of the study patients had an average level and 27.5% achieved a poor level, only 18.8% of the patients achieved a good level of knowledge.

- In the study, the percentage of patients following a low-salt diet was quite low at 26.3%.

- Up to 53.8% of the subjects did not monitor their weight at all or only occasionally. The daily weight monitoring of the patients in the study accounted for a very low rate, only 2.5%.

- Only 36.3% of patients exercised regularly, while 63.7% of the study subjects exercised occasionally, very little, or not at all.

The differences in nutritional care practices of heart failure patients before and after one month of discharge

Patients who discharge one month had a better level of compliance with nutritional care practices than before discharge, 10.78 points compared to 7.8 points. In summary, this study showed a significant improvement in nutritional care practices of heart failure patients after hospitalization and one month after discharge. This can be considered a positive result and showed the important impact of treatment and education on the patient's nutritional care process.

RECOMMENDATIONS

At the hospital

- Update knowledge about heart failure for cardiovascular nurses, both basic and advanced, so that nurses can be more proactive in advising patients.

- Organize specialized talks on heart failure for patients and their families.

- Distribute leaflets with basic knowledge as well as instructions for self-care at home for heart failure patients.

In the community:

-There needs to be more extensive communication activities on different information channels about heart failure in the community about knowledge and practice of self-care at home.

- This study only stops at the descriptive level at a central hospital, so the results are not representative of the whole country, especially for lower-level hospitals. Therefore, further studies are needed on a larger sample size.

TÀI LIỆU THAM KHẢO

1. Agra Bermejo RM, González Ferreiro R, Varela Román A, et al. Nutritional status is related to heart failure severity and hospital readmissions in acute heart failure. Int J Cardiol. 2017;230:108-114. doi:10.1016/j.ijcard.2016.12.067
2. Corish CA, Kennedy NP. Undernutrition in hospitals. Br J Nutr. 2001;85(4):509-510. doi:10.1079/bjn2000295
3. Kyle UG, Pirlich M, Schuetz T, et al. Prevalence of malnutrition in 1760 patients at hospital admission: a controlled population study of body composition. Clin Nutr. 2003;22(5):473-481. doi:10.1016/s0261-5614(03)00049-9
4. Bonilla-Palomas JL, Gámez-López AL, Anguita-Sánchez MP, et al. Influencia de la desnutrición en la mortalidad a largo plazo de pacientes hospitalizados por insuficiencia cardiaca [Impact of malnutrition on long-term mortality in hospitalized patients with heart failure]. Rev Esp Cardiol. 2011;64(9):752-758. doi:10.1016/j.recesp.2011.03.009
5. Jaarsma T, Strömberg A, Ben Gal T, et al. Comparison of self-care behaviors of heart failure patients in 15 countries worldwide. Patient Educ Couns. 2013;92(1):114-120. doi:10.1016/j.pec.2013.02.017
6. Ha TT, Nguyen TT, Bui TH. Knowledge and self–care behavior of heart failure patients. VMJ. 2022;512(2). doi:10.51298/vmj.v512i2.2311
7. Nguyen TL, Nguyen TLT. Self-care knowledge of patients with chronic heart failure at Viet Nam – Thuy Dien Uong Bi Hospital in 2022. Journal of Nursing Science. 2023;6(04):68-76. doi: 10.54436/jns.2023.04.647
8. Go AS, Mozaffarian D, Roger VL, et al. Heart disease and stroke statistics--2014 update: a report from the American Heart Association. Circulation. 2014;129(3):e28-e292. doi:10.1161/01.cir.0000441139.02102.80
9. Fang J, Mensah GA, Croft JB, et al. Heart failure-related hospitalization in the U.S., 1979 to 2004. J Am Coll Cardiol. 2008;52(6):428-434. doi:10.1016/j.jacc.2008.03.061
10. Jessup M, Brozena S. Heart failure. N Engl J Med. 2003;348(20):2007-2018. doi:10.1056/NEJMra021498
11. Adams KF Jr, Fonarow GC, Emerman CL, et al. Characteristics and outcomes of patients hospitalized for heart failure in the United States: rationale, design, and preliminary observations from the first 100,000 cases in the Acute Decompensated Heart Failure National Registry (ADHERE). Am Heart J. 2005;149(2):209-216. doi:10.1016/j.ahj.2004.08.005
12. Nieminen MS, Brutsaert D, Dickstein K, et al. EuroHeart Failure Survey II (EHFS II): a survey on hospitalized acute heart failure patients: description of population. Eur Heart J. 2006;27(22):2725-2736. doi:10.1093/eurheartj/ehl193
13. Maggioni AP, Anker SD, Dahlström U, et al. Are hospitalized or ambulatory patients with heart failure treated in accordance with European Society of Cardiology guidelines? Evidence from 12,440 patients of the ESC Heart Failure Long-Term Registry. Eur J Heart Fail. 2013;15(10):1173-1184. doi:10.1093/eurjhf/hft134
14. Zannad F, Mebazaa A, Juillière Y, et al. Clinical profile, contemporary management and one-year mortality in patients with severe acute heart failure syndromes: The EFICA study. Eur J Heart Fail. 2006;8(7):697-705. doi:10.1016/j.ejheart.2006.01.001
15. Loehr LR, Rosamond WD, Chang PP, et al. Heart failure incidence and survival (from the Atherosclerosis Risk in Communities study). Am J Cardiol. 2008;101(7):1016-1022. doi:10.1016/j.amjcard.2007.11.061
16. Aghababian RV. Acutely decompensated heart failure: opportunities to improve care and outcomes in the emergency department. Rev Cardiovasc Med. 2002;3 Suppl 4:S3-S9.
17. Jong P, Vowinckel E, Liu PP, et al. Prognosis and determinants of survival in patients newly hospitalized for heart failure: a population-based study. Arch Intern Med. 2002;162(15):1689-1694. doi:10.1001/archinte.162.15.1689
18. Maggioni AP, Dahlström U, Filippatos G, et al. EUROObservational Research Programme: regional differences and 1-year follow-up results of the Heart Failure Pilot Survey (ESC-HF Pilot). Eur J Heart Fail. 2013;15(7):808-817. doi:10.1093/eurjhf/hft050
19. Artinian NT, Magnan M, Sloan M, et al. Self-care behaviors among patients with heart failure. Heart Lung. 2002;31(3):161-172. doi:10.1067/mhl.2002.123672
20. Kent DM, Trikalinos TA. Therapeutic innovations, diminishing returns, and control rate preservation.

JAMA. 2009;302(20):2254-2256. doi:10.1001/jama.2009.1679

21. He FJ, MacGregor GA. How far should salt intake be reduced?. Hypertension. 2003;42(6):1093-1099. doi:10.1161/01.HYP.0000102864.05174.E8
22. He FJ, Li J, Macgregor GA. Effect of longer term modest salt reduction on blood pressure: Cochrane systematic review and meta-analysis of randomised trials. BMJ. 2013;346:f1325. Published 2013 Apr 3. doi:10.1136/bmj.f1325
23. Aldous D. Eating Plan for Heart Failure. Continuing Medical Implementation ® Inc. 2010.
24. Gupta D, Georgiopoulou VV, Kalogeropoulos AP, et al. Dietary sodium intake in heart failure. Circulation. 2012;126(4):479-485. doi:10.1161/CIRCULATIONAHA.111.062430
25. Hunt SA, Abraham WT, Chin MH, et al. ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Update the 2001 Guidelines for the Evaluation and Management of Heart Failure): developed in collaboration with the American College of Chest Physicians and the International Society for Heart and Lung Transplantation: endorsed by the Heart Rhythm Society. Circulation. 2005;112(12):e154-e235. doi:10.1161/CIRCULATIONAHA.105.167586
26. Lemon SC, Olendzki B, Magner R, et al. The dietary quality of persons with heart failure in NHANES 1999-2006. J Gen Intern Med. 2010;25(2):135-140. doi:10.1007/s11606-009-1139-x
27. Heer M, Baisch F, Kropp J, et al. High dietary sodium chloride consumption may not induce body fluid retention in humans. Am J Physiol Renal Physiol. 2000;278(4):F585-F595. doi:10.1152/ajprenal.2000.278.4.F585
28. Mosterd A, Cost B, Hoes AW, et al. The prognosis of heart failure in the general population: The Rotterdam Study. Eur Heart J. 2001;22(15):1318-1327. doi:10.1053/euhj.2000.2533
29. Horwich TB, Fonarow GC, Hamilton MA, et al. The relationship between obesity and mortality in patients with heart failure. J Am Coll Cardiol. 2001;38(3):789-795. doi:10.1016/s0735-1097(01)01448-6
30. Lissin LW, Gauri AJ, Froelicher VF, et al. The prognostic value of body mass index and standard exercise testing in male veterans with congestive heart failure. J Card Fail. 2002;8(4):206-215. doi:10.1054/jcaf.2002.126812
31. Davos CH, Doehner W, Rauchhaus M, et al. Body mass and survival in patients with chronic heart failure without cachexia: the importance of obesity. J Card Fail. 2003;9(1):29-35. doi:10.1054/jcaf.2003.4
32. Lavie CJ, Osman AF, Milani RV, et al. Body composition and prognosis in chronic systolic heart failure: the obesity paradox. Am J Cardiol. 2003;91(7):891-894. doi:10.1016/s0002-9149(03)00031-6
33. Miller CA. Nursing for wellness in older adults. 5th ed: Lippincott Williams & Wilkins; 2010.
34. Reilly CM, Higgins M, Smith A, et al. Development, psychometric testing, and revision of the Atlanta Heart Failure Knowledge Test. J Cardiovasc Nurs. 2009;24(6):500-509. doi:10.1097/JCN.0b013e3181aff0b0
35. Nguyen NH, Nguyen TD. Factors Related to Self-Care Behaviors of Elderly Heart Failure Patients at Thai Nguyen Central General Hospital. JVC. 2014;64:26-33.

Survey on blood glucose and electrolyte levels in patients with acute myocarditis treated at Bach Mai Hospital

La Thi Duong✉, Bui Anh Thong, Duong Thi Khuyen, Do Trung Thanh
Nguyen Thi Phuong Thuy, Nguyen Duc Duy
Vietnam National Heart Institute, Bach Mai Hospital

▶ **Correspondence to**
MSN. La Thi Duong
Vietnam National Heart Institute,
Bach Mai Hospital
Email: laduong1979@gmail.com

▶ Received 30 September 2024
Accepted 18 November 2024
Published online 30 November 2024

To cite: La TD, Bui AT, Duong TK, et al. *J Vietnam Cardiol* 2024;**112E**:58-64

ABSTRACT

Background and Objectives: Myocarditis is a condition characterized by inflammation of the heart muscle tissue due to various causes, with viruses being a common cause. During the progression of the disease, damage to the heart muscle can lead to acute heart failure, dangerous arrhythmias, cardiogenic shock, or even cardiac arrest, which can result in rapid death. Clinical markers such as chest pain, shortness of breath, and arrhythmias, along with diagnostic tools like electrocardiograms and cardiac ultrasounds, play a crucial role in diagnosing and predicting the disease. In addition to monitoring vital signs, tracking blood glucose and electrolyte levels is an important criterion for nurses in managing patients with acute myocarditis. This aids in making appropriate care and treatment decisions for each specific patient. The study aims to investigate blood glucose and electrolyte levels and their relationship with the severity of heart failure and ventricular arrhythmias in patients with acute myocarditis.

Methods: A retrospective review was conducted on the records of 119 patients with acute myocarditis treated at Bach Mai Hospital from 2017 to 2021. Biochemical results were included in a regression model to assess their correlation with the occurrence of adverse clinical outcomes during hospitalization.

Results: Among the 119 patients (66.4% male; average age 33.93 ± 15.87 years), significant electrolyte disturbances included severe hyponatremia (6.7%), severe hypokalemia (5.8%), hyperkalemia (8.1%), and blood glucose disorders (31.1%). Severe hyponatremia was found to be predictive of ventricular arrhythmias and in-hospital mortality. Severe hypokalemia was also predictive of ventricular arrhythmias and in-hospital mortality. Hyperkalemia was associated with a higher risk of ventricular arrhythmias. Patients with severe conditions requiring intensive care, such as intravenous feeding or intravenous insulin administration, demonstrated a higher risk of in-hospital mortality.

Conclusion: Severe electrolyte disturbances, such as severe hyponatremia, severe hypokalemia, and hyperkalemia, have prognostic significance in patients with acute myocarditis.

Keywords: Acute myocarditis, arrhythmias in patients with acute myocarditis.

SUBJECTS AND METHODS

Research Design

The study was conducted as a retrospective cross-sectional descriptive study.

Research Procedure:

- Step 1: Select patients diagnosed with acute myocarditis for the study.
- Step 2: Collect information on symptoms, clinical and subclinical signs, and surface electrocardiographic parameters based on medical records.
- Step 3: Divide the study population into groups based on specific criteria: presence/absence of blood glucose and electrolyte abnormalities.
- Step 4: Record the level of heart failure (NYHA classification) and the forms of arrhythmias diagnosed in patients across groups.
- Step 5: Summarize nursing interventions for the group of patients studied.

Study Population

Patients diagnosed (or suspected) with acute myocarditis at Bach Mai Hospital from 2017 to 2021.

Inclusion Criteria

Patients diagnosed (or suspected) with acute myocarditis according to the 2013 European Society of Cardiology criteria. The information in medical records must be complete and clear.

Exclusion Criteria

Patient data from electrocardiograms that are not sufficient for measurement, analysis, and evaluation.

Study Variables

Biochemical changes, including increased/decreased blood glucose levels, increased/decreased blood electrolyte levels, arrhythmias (such as ectopic beats, ventricular tachycardia, atrioventricular block), and the degrees of heart failure (based on NYHA classification).

RESULTS

Main Clinical Characteristics of Patients with Acute Myocarditis

Clinical characteristics of patients with acute myocarditis... (Note: The original text ends abruptly, so further details on clinical characteristics may follow in the full document.)

***Table 1**. Clinical Characteristics of Patients with Acute Myocarditis*

Characteristics	Value
Age (TB ± SD)	33,93 ± 15,87
Male (n,%)	79 (66,4%)
Fever (n,%)	31 (26,05%)
Flu-like symptoms (n,%)	20 (16,8%)
Chest pain (n,%)	105 (88,2%)
Shortness of breath (n,%)	90 (75,6%)
Heart rate (cycles/min)	94,66 ± 26,41
Systolic blood pressure (mmHg)	106,11 ± 19,65

Comments: Patients with myocarditis tend to be relatively young, with an average age of 33.93 ± 15.87 years, and a predominance of male patients. The common symptoms leading to hospital admission are chest pain and shortness of breath. Most patients have stable blood pressure at the time of admission.

Blood Biochemistry Results

***Table 2**. Blood Biochemistry Characteristics of the Study Population*

Characteristics	Value
Troponin T (ng/L)	1860,4 ± 1914,2
NT-proBNP (pmol/L)	439,5 ± 674,8
CK-MB (U/L)	77,1 ± 57,8
CRP-hs elevated (n;%)	45 (37,8%)
Creatinine (µmol/L)	73,0 ± 30,9
Glucose (mmol/L)	5,6 ± 3,2
Na+ (mmol/L)	134 ± 8,8
K+ (mmol/L)	3,6 ± 0,9
AST (U/L)	96,5 ± 83,6
ALT (U/L)	71,6 ± 93,1
Lactat (mmol/L)	2,9 ± 2,8

Comments: The biochemical tests reveal two characteristic conditions in acute myocarditis: myocardial cell damage and increased inflammatory response. A third characteristic is acute heart failure, which is indicated by elevated NT-proBNP levels.

Progression and Treatment Outcomes

Progression	Rate (%)
Mechanical circulatory support	16
Mortality rate	4,2

Comments: The majority of patients were discharged in stable condition. There were 5 deaths (4.2%), and 19 patients (16%) required mechanical circulatory support via extracorporeal membrane oxygenation (ECMO).

Results of Blood Glucose and Electrolyte Levels in the Study Group

Some important changes in blood glucose and electrolyte levels of the study group

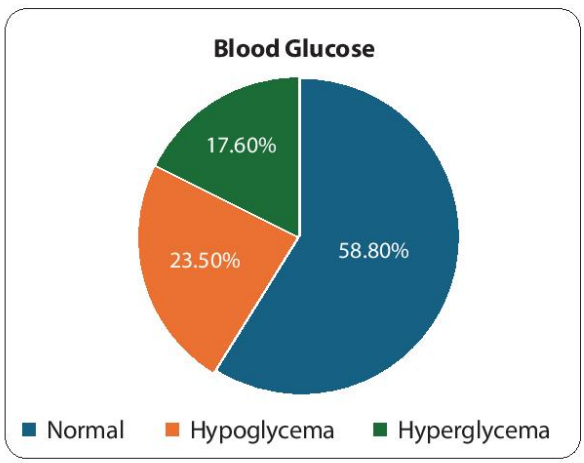

Chart 1*. Blood glucose levels of the study group*

Comments: From the survey of 119 patients with Myocarditis, nearly 60% of the patients had normal blood glucose levels, however, ¼ of the patients experienced hypoglycemia, and 1/5 of the patients admitted to the hospital had hyperglycemia. In our study, 28 patients (23.5%) had hyperglycemia, of which 20 patients (71.4%) had a history of diabetes and were undergoing treatment with medication.

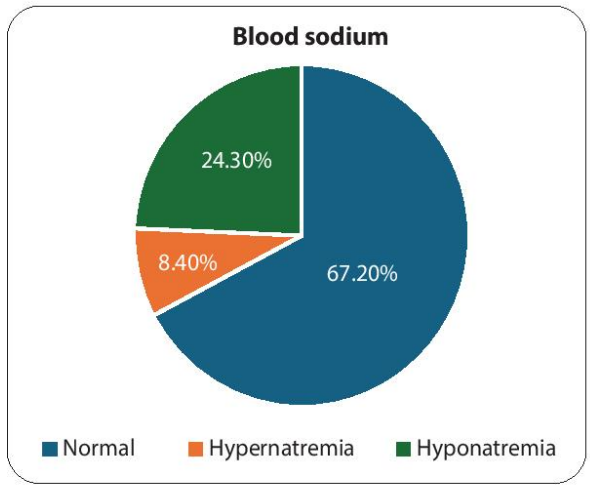

Chart 2*. Blood sodium levels of the study group*

Comments: ¼ of the patients had hyponatremia. In our study, 10 patients had hypernatremia, of which 6 patients (60%) had a prior history of kidney failure.

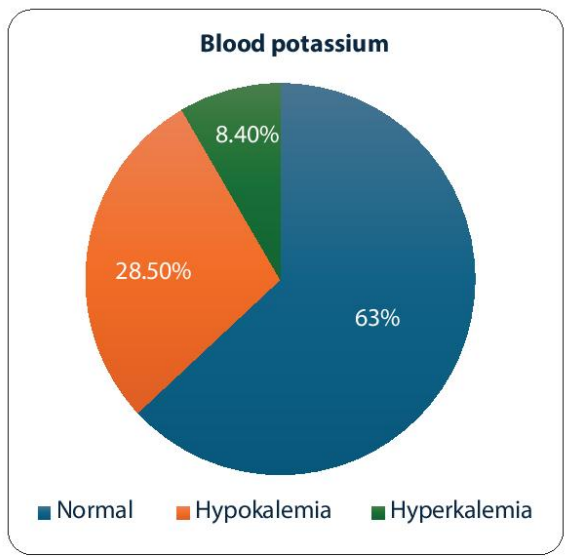

Chart 3*. Blood potassium levels of the study group.*

Comments: Nearly 30% of patients had hypokalemia, while the majority had normal potassium levels (63%). In our study, 10 patients had elevated potassium levels upon admission, of which 8 patients (80%) had a history of kidney failure or were diagnosed with kidney failure at the time of admission.

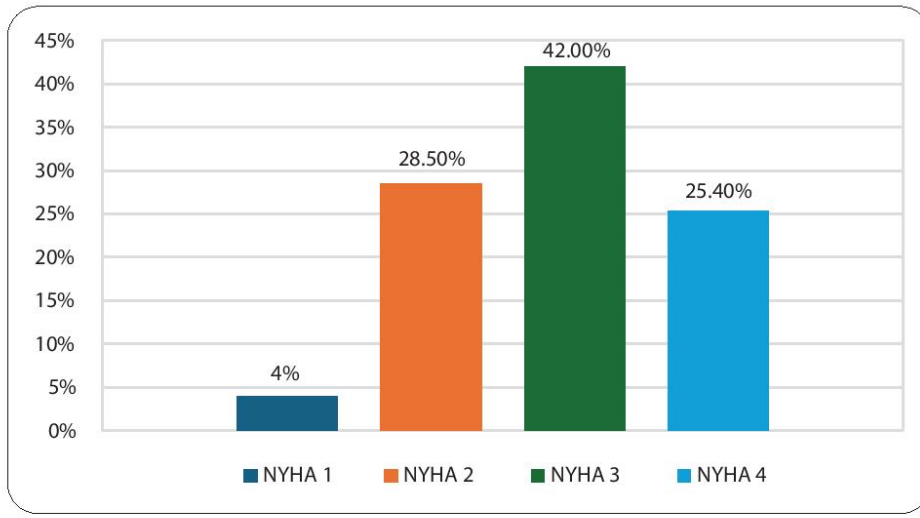

***Chart 4**. NYHA classification of the study group at the time of admission*

Comments: Nearly half of the patients admitted had respiratory failure at NYHA level 3, with only 4% exhibiting mild respiratory failure at NYHA level 1.

Correlation between Heart Failure Severity and Blood Glucose and Electrolyte Levels

***Table 4**. Correlation of NYHA heart failure levels 1,2 – NYHA 3,4 with blood glucose and electrolyte levels.*

Index	OR	95% CI	p
Blood glucose	1,48	[0,53-5,62]	0,45
Blood sodium	2,56	[0,62-7,34]	0,27
Blood potassium	1,23	[0,42-12,3]	0,87

Comments: No correlation has been observed between blood glucose fluctuations, electrolyte levels, and heart failure severity between the two groups, NYHA 1,2 and NYHA 3,4.

Relation to In-Hospital Ventricular Arrhythmias

***Table 5**. Correlation between ventricular arrhythmias and severe electrolyte disturbances.*

Index	OR	95% CI	p
Severe Hyponatremia (Natri < 125 mmol/L)	2,6	[2,14 – 10,42]	**0,02**
Hypernatremia (Natri >150 mmol/L)	1,56	[0,62 – 2,91]	0,27
Severe Hypokalemia (Kali < 2,5 mmol/L)	7,8	[1,2 – 12,4]	**0,03**
Hyperkalemia (Kali > 5 mmol/L)	3,5	[2,34 – 7,42]	**0,04**

Comments: Severe electrolyte disturbances (severe hyponatremia, severe hypokalemia, hyperkalemia) are significant predictors of increased rates of ventricular arrhythmias in the study group.

Relation to Mortality Outcomes

Table 6.*Correlation of clinical outcomes (mortality and non-mortality) with severe electrolyte disturbances.*

Index	OR	95% CI	p
Severe Hyponatremia (Natri < 125 mmol/L)	10,2	[1,2 – 22,1]	**0,018**
Hypernatremia (Natri >150 mmol/L)	1,15	[0,58 – 3,6]	0,97
Severe Hypokalemia (Kali < 2,5 mmol/L)	8,7	[2,12 – 18,3]	**0,023**
Hyperkalemia (Kali > 5 mmol/L)	1,45	[0,78 – 3,4]	0,54

Comments: Severe electrolyte disturbances (severe hyponatremia, severe hypokalemia) are significant predictors of increased mortality rates in the study group.

Results of Some Nursing Care in the Study Group

Nursing Care for Patients with Blood Glucose Disorders

Table 7*. Some nursing care for patients with blood glucose disorders and its correlation with clinical outcomes (mortality and non-mortality) in the study group.*

Chỉ số	OR	95% CI	p
Hypoglycema			
Intravenous glucose infusion	1,15	[0,58 – 9,6]	0,97
Oral feeding	8,7	[0,76 - 18,3]	0,78
Intravenous feeding	6,85	[1,27 – 10,4]	0,002
Tube feeding	10,2	[0,46 – 22,1]	0,82
Hyperglycema			
Blood glucose monitoring	1,9	[0,58 –10,6]	0,82
Intravenous insulin infusion	4,6	[3,6 - 102,3]	0,03
Subcutaneous insulin injection	3,85	[0,27 – 9,4]	0,54
Oral diabetes medication	5,2	[0,46 – 8,1]	0,69

Comments: In the group of patients requiring intravenous feeding or intravenous insulin infusion to treat hyperglycemia, there is a significant predictive value for mortality outcomes in the study group. In our study, there were 10 patients who needed intravenous feeding, among whom 6 were critically ill, had acute myocarditis with complications of cardiogenic shock, required ECMO, and were experiencing multi-organ failure, making enteral feeding impossible and necessitating intravenous nutrition.

Additionally, in the group of patients requiring intravenous insulin infusion, there were 9 patients, all of whom had a prior history of diabetes that had been diagnosed previously.

***Table 8**. Some nursing care for patients with electrolyte disturbances and its correlation with clinical outcomes (mortality and non-mortality) in the study group.*

Index	OR	95% CI	p
Sodium level distubances			
Hypertonic sodium infusion	8	[5,8 – 39,6]	**0,004**
Salty diet	4,7	[0,76 - 18,3]	0,78
Hypotonic sodium infusion	6,85	[0,27 – 19,4]	0,92
Potassium level distubances			
Oral potassium suplementation	2,3	[0,28 –12,6]	0,72
Intravenous potassium infusion	6,6	[3,6 - 82,3]	**0,02**
Medication for hypokalemia	4,25	[0,25 – 7,4]	0,89
Dialysis	5,9	[4,2 – 119,1]	**0,001**

Comments: In the group of patients receiving hypertonic sodium infusion or intravenous potassium infusion/dialysis for potassium lowering, there is a significant association with predicting mortality outcomes in the studied group of patients.

DISCUSSION

Prognostic Value of Certain Blood Sugar and Electrolyte Disturbances in Patients with Acute Myocarditis

Blood Glucose Disturbances

Through our study, we found that blood glucose disturbances occurred in about 40% of the patients, with hypoglycemia (28 patients, accounting for 23.5%) and hyperglycemia (20 patients, accounting for 17.6%). In our research, blood glucose disturbances were not related to mortality outcomes or increased risk of ventricular arrhythmias. However, in the group of patients requiring intravenous nutritional fluid (10 patients), there was a significant association predicting mortality outcomes in the studied group with p=0.002. Most of these patients were severely ill with myocarditis, having complications such as cardiogenic shock, leading to multiple organ failure, where the gastrointestinal tract could not absorb food, necessitating intravenous nutrition.

Electrolyte Disturbances

Sodium Disturbances

In our study, sodium disturbances occurred in about 30% of patients, with hyponatremia (29 patients, accounting for 24.3%), which is consistent with the study by Ali K and colleagues; hypernatremia (10 patients, accounting for 8.4%). Among these, the group with severe hyponatremia (sodium levels <125 mmol/L) had 8 patients, significantly predicting mortality outcomes (p=0.018) and increased risk of ventricular arrhythmias (p=0.02). Regarding the pathophysiological mechanism, low sodium levels lead to ionic imbalances in cells, including cardiac myocytes, affecting electrical conduction in the heart and increasing the risk of ventricular arrhythmias. Additionally, hyponatremia impacts the metabolism of other vital organs such as the brain and kidneys, increasing the risk of mortality, especially in patients with severe hyponatremia.

In our study, there were 29 patients with hyponatremia, of which 9 patients (31%) had severe hyponatremia. Among this group, there were 6 cases of cardiogenic shock requiring ECMO intervention, with multiple organ failure, necessitating hypertonic sodium infusion.

Potassium Disturbances

In our study, potassium disturbances occurred in nearly 40% of patients, with hypokalemia (34 patients, accounting for 28.5%), similar to the findings of Jiacong Lu. In our research, patients with hyperkalemia primarily had a history of diagnosed renal failure or this was the first time it was detected. Therefore, when there is hyperkalemia, dialysis methods should be applied, alongside medication to adjust potassium levels. In the context of myocarditis, alongside potassium level disturbances, these are factors that promote arrhythmias in this patient group.

Both the severe hypokalemia group and hyperkalemia group significantly predict mortality outcomes and increased risk of ventricular arrhythmias.

Nursing Care

Nursing care plays a crucial role in managing patients with blood sugar and electrolyte disturbances. In our study, the parameters predicting mortality risk were present in severely ill patients requiring intensive care treatment, such as those needing intravenous nutrition, severe hyponatremia requiring hypertonic sodium infusion, or patients with hypokalemia needing intravenous potassium infusion. This helps improve clinical practice, and nurses need to collaborate with doctors to make timely and accurate treatment decisions.

CONCLUSION

Through the study of 119 cases of acute myocarditis, we found that electrolyte disturbances, including severe hyponatremia and severe hypokalemia, are significant prognostic parameters for adverse clinical outcomes. Additionally, nursing care plays an essential role, especially in patients with severe electrolyte disturbances.

REFERENCES

1. Gore I, Saphir O. Myocarditis; a classification of 1402 cases. *Am Heart J*. 1947;34(6):827-830. doi:10.1016/0002-8703(47)90147-6
2. Sagar S, Liu PP, Cooper LT Jr. Myocarditis. *Lancet*. 2012;379(9817):738-747. doi:10.1016/S0140-6736(11)60648-X
3. Doolan A, Langlois N, Semsarian C. Causes of sudden cardiac death in young Australians. *Med J Aust*. 2004;180(3):110-112. doi:10.5694/j.1326-5377.2004.tb05830.x
4. Caforio AL, Pankuweit S, Arbustini E, et al. Current state of knowledge on aetiology, diagnosis, management, and therapy of myocarditis: a position statement of the European Society of Cardiology Working Group on Myocardial and Pericardial Diseases. *Eur Heart J*. 2013;34(33):2636-2648d. doi:10.1093/eurheartj/eht210
5. Ali K, Workicho A, Gudina EK. Hyponatremia in patients hospitalized with heart failure: a condition often overlooked in low-income settings. *Int J Gen Med*. 2016;9:267-273. doi:10.2147/IJGM.S110872
6. Luo J, Brunelli SM, Jensen DE, et al. Association between Serum Potassium and Outcomes in Patients with Reduced Kidney Function. *Clin J Am Soc Nephrol*. 2016;11(1):90-100. doi:10.2215/CJN.01730215
7. Guzmán-Bofarull J, Forado-Benatar I, Farrero M. 4A score: prognostic value of clinical assessment in paucisymptomatic tricuspid regurgitation. *Rev Esp Cardiol (Engl Ed)*. 2023;76(11):838-840. doi:10.1016/j.rec.2023.05.012

The Influence of Teamwork Skills and Challenges on Team-Based Learning of Nursing Students in a Selected University in Vietnam

Pham Thi Kien[1]✉, **Leslie F. Lazaro**[2]

[1] Dong A University

[2] Trinity University of Asia – St. Luke's College of Nursing and Graduate School of Nursing

▶ **Correspondence to**
MA. Pham Thi Kien
Faculty of Nursing, Dong A University, Da Nang
Email: kienpham.hk.2201@gmail.com

▶ Received 24 September 2024
Accepted 28 October 2024
Published online 30 November 2024

To cite: Pham TK, Leslie FL. *J Vietnam Cardiol* 2024;**112E**:65-71

ABSTRACT

Objectives: To explore the influence of teamwork skills and challenges on the team-based learning, in order to optimize the experiences and outcomes of team-based learning for nursing students.

Methodology: A descriptive correlational study was conducted with the participation of 280 second, third, and fourth-year students studying in the Bachelor of Nursing program at a selected university in Da Nang city.

Results: The findings of the study provide valuable insights into the factors influencing teamwork skills and the challenges faced by nursing students when team-based learning. The overall assessment of teamwork skills was answered by students with an average score of 4.03, indicating that students generally had "Agree" teamwork skills, with "communication skills" rated as "Strong Agree". The average score for the challenges encountered was 3.92, which is interpreted as "Usually". This suggests that students generally encountered these challenges frequently, but not always. Specific challenges identified included engagement, time management, motivation, personality conflicts, and social context, all rated as "Often" occurring. Student ratings of team-based learning were rated as "agree" with a mean of 3.91. The relationship between teamwork skills agree team-based learning was found to be highly correlated, with Pearson's r = 0.51. The challenges and team-based learning were also highly correlated, with Pearson's r = 0.61. All the correlations were statistically significant, with a p-value of less than 0.001.

Conclusions: These correlations were supported by high Pearson r coefficients and low p-values, indicating a very strong and significant positive relationship. Nursing students demonstrated strong teamwork skills, particularly in adaptability, coordination, decision-making, and communication. The results of this study also suggest that although team-based learning is generally effective, nursing students still face significant challenges, particularly in areas such as time management, motivation, and resolving personality conflicts. Keywords: Team-Based Learning (TBL); Teamwork Skills; Challenges; nursing students

INTRODUCTION

In recent years, the significance of teamwork in nursing education has become increasingly evident, particularly as healthcare systems worldwide

strive for improved patient outcomes through collaborative practice. Team-Based Learning (TBL) has emerged as a pedagogical strategy that fosters teamwork skills among nursing students, equipping them with the necessary competencies to function effectively in interdisciplinary teams. Research indicates that TBL enhances critical thinking, engagement, and satisfaction among nursing students, ultimately leading to better educational outcomes (Zeb et al., 2022).

Team-based learning (TBL) was initiated by Larry Michaelson, a management professor, in the 1970s, and later applied to medical education to facilitate theme-oriented discussions (Huang & Wang, 2020). TBL was effectively introduced into medical education in the late 1990s. The Boonshoft School of Medicine at Wright State University is the first medical school in the United States to fully adopt Team-Based Learning as an educational strategy. Boonshoft School has successfully implemented Team-Based Learning in all pre-clinical courses and most courses. Up to now, many medical universities in general and nursing universities in particular have successfully applied the TBL method to nursing education, popular in countries such as Singapore, Australia, the United States, Canada, Spain, etc…(Michaelsen et al., 2023).

In Vietnam, the nursing profession is evolving rapidly, with increasing demands for healthcare services. As the healthcare system adapts to these changes, it is crucial for nursing education to incorporate effective teaching strategies that enhance teamwork skills among students (Nguyen et al., 2020). TBL offers an opportunity to develop these skills, but its effectiveness can be influenced by various challenges that students face, including communication barriers, differing levels of participation, and conflict resolution difficulties. Understanding how these challenges affect the learning experience is vital for educators aiming to optimize team-based learning methods in nursing programs. Therefore, this study aims to explore the influence of teamwork skills and challenges on the team-based learning experiences of nursing students at selected universities in Vietnam, in order to optimize the experiences and outcomes of team-based learning for nursing students.

METHODS

Population

The 2nd, 3rd and 4th year nursing students, both male and female, studying the bachelor of nursing program.

Inclusion Criteria: Learned about teamwork skills; Currently learning the Team-Based Learning (TBL) teaching method; Between 20-30 years old.

Exclusion Criteria: The first year student; Students with unusual absences during the data collection period; Students in bridging programs

Research location

Conducted in a selected university in Da Nang city in Vietnam.

Design

A descriptive correlational study was used.

Sample size

The sample size was determined using G*Power software, version 3.1.9.4. With an effect size (ρ) of 0.20, a power of 95%, and a margin of error of 5%, the estimated sample size was 262. The final sample size of the study was 280.

Data collection

The questionnaire was developed based on relevant studies and validated by five experts in nursing education, psychology, and team-based learning. The questionnaires were pilot tested with 30 respondents who met the inclusion criteria but did not participate in the final study. The questionnaire showed good internal consistency, with a high Cronbach's alpha.

Data were collected directly using a self-administered questionnaire with a 5-point Likert scale, including:

+ Part B of the questionnaire related to teamwork skills (Marshall et al., 2005), with a Cronbach's alpha of 0.949.

+ Part C of the questionnaire related to challenges in team-based learning, with a Cronbach's alpha of 0.904.

+ Part D of the questionnaire related to team-

based learning (Ibrahim, 2020), with a Cronbach's alpha of 0.829.

+ Part A of the questionnaire related to characteristics of the study subjects.

Data Analysis

The data were processed and analyzed using SPSS 26.0, with techniques including frequency, percentage, mean, and Pearson's correlation coefficient analysis.

Research Ethics

The study was conducted after being approved by the Institutional Review Board (IRB) of Trinity University Asia with approval code 015-R02. It was also approved by the University Leadership where the data was collected. Participants' personal information and data obtained from the research were kept confidential and used only for research purposes.

RESULTS

Characteristics of the study subjects

***Table 1**. Characteristics of the Study Population (n=280)*

Profile Characteristics		n	Percent (%)
Age	20	95	33.93
	21	19	6.79
	22	53	18.93
	23	33	11.79
	24	15	5.36
	25	10	3.57
	26	19	6.79
	27	22	7.86
	28	14	5.00
Sex	Male	24	8.6
	Female	256	91.4
Year level	Level 2	112	40.0
	Level 3	89	31.8
	Level 4	79	28.2

The study involved 280 participants with the following main characteristics:

The age of the study subjects ranged from 20 to 28 years old. The highest distribution was in the 20s, with 40%, and the lowest was 5% in the 28s.The proportion of female students participating in the study was 91.4%, while male students accounted for 8.6%. The distribution was quite even across all levels of education.

Nursing Student's Assessment of Teamwork Skills Influence in Team-Based Learning

***Table 2**. Descriptive Interpretation Teamwork Skills on Team-Based Learning (n=280)*

Statements	Mean	SD	Descriptive Interpretation
Adaptability	3.94	0.65	Agree
Coordination	4.01	0.56	Agree
Decision making	4.11	0.58	Agree
Leadership	3.80	0.73	Agree
Interpersonal skills	4.22	0.67	Strongly Agree
Communication	4.12	0.65	Agree
Overall mean	**4.03**	**0.58**	**Agree**

***Legend:** 4.21 – 5.00: Strongly Agree; 3.41 – 4.20: Agree; 2.61 – 3.40: Neutral; 1.81 – 2.60: Disagree; 1.00 – 1.80: Strongly Disagree.*

The majority of the statements related to teamwork skills received an "Agree" rating, with mean scores ranging from 3.80 to 4.12. Among them, Interpersonal skills received the highest rating of "Strongly Agree" with a mean score of 4.22. The overall score for teamwork skills is 4.03, with an "Agree" rating.

Nursing Student's Assessment of Challenges Influence in Team-Based Learning

***Table 3**. Descriptive Interpretation Challenges on Team-Based Learning (n=280)*

Statements	Mean	SD	Descriptive Interpretation
Participation	4.05	0.72	Usually,
Time Management	4.12	0.65	Usually
Motivation	4.05	0.65	Usually
Personality Conflicts	3.49	0.91	Usually
Social Context	3.76	1.00	Usually
Overall mean	**3.92**	**0.59**	**Usually**

Legend: *4.21 – 5.00: Always; 3.41 – 4.20: Usually; 2.61 – 3.40: Often; 1.81 – 2.60: Sometime; 1.00 – 1.80: Rarely.*

All statements about challenges in team-based learning received a rating of "Usually" with mean scores ranging from 3.49 to 4.12. The overall mean score for challenges was 3.92, which ranked them as "Usually".

Nursing Students' Assessment of Team-Based Learning

Table 4. *Descriptive Interpretation on Team-Based Learning*

Statements	Mean	SD	Descriptive Interpretation
Team' learning accountability	4.12	0.65	Agree
Preference	3.75	0.59	Agree
Preference of TBL than lecture	3.96	0.68	Agree
Preference of lecture than TBL	3.32	0.95	Neutral
TBL preference in information recall	4.07	0.63	Agree
Teamwork contribution	4.03	0.64	Agree
TBL satisfaction	4.02	0.65	Agree
Overall mean	**3.91**	**0.56**	**Agree**

Legend: *4.21 – 5.00: Strongly Agree; 3.41 – 4.20: Agree; 2.61 – 3.40: Neutral; 1.81 – 2.60: Disagree; 1.00 – 1.80: Strongly Disagree.*

Most of the statements related to the nursing students' team-based learning experience were rated as "Agree". However, the aspect of "Preference of lecture than TBL" was rated as "Neutral". The overall mean score of team-based learning was 3.91, with a level of "Agree".

Correlations Between Between Teamwork Skills and Team-Based Learning

Table 5. *Correlation Analysis Results on The Relationship Between Teamwork Skills and Team-Based Learning*

Variable	Computed r	Degree of Relationship	p value	Decision	Conclusion
Correlation Between Teamwork Skills and Team-Based Learning According to Teamwork Skills Variables					
Adaptability	0.538 ***	Strong relationship	0.0001	Reject H_0	Significant
Coordination	0.343 ***	Moderate relationship	0.0001	Reject H_0	Significant
Decision making	0.496 ***	Strong relationship	0.0001	Reject H_0	Significant
Leadership	0.420 ***	Strong relationship	0.0001	Reject H_0	Significant
Interpersonal	0.501 ***	Strong relationship	0.0001	Reject H_0	Significant
Communication	0.451 ***	Strong relationship	0.0001	Reject H_0	Significant
Correlation Between Teamwork Skills and Team Based Learning According to Team Based Learning Variables					
Team' learning accountability	0.520 ***	Strong relationship	0.0001	Reject H_0	Significant
Preference:	0.454 ***	Strong relationship	0.0001	Reject H_0	Significant
Preference of TBL than lecture	0.557***	Strong relationship	0.0001	Reject H_0	Significant
Preference of lecture than TBL	0.365 ***	Moderate relationship	0.0001	Reject H_0	Significant
TBL preference in information recall	0.583 ***	Strong relationship	0.0001	Reject H_0	Significant
Teamwork contribution	0.482 ***	Strong relationship	0.0001	Reject H_0	Significant
TBL satisfaction	0.428 ***	Strong relationship	0.0001	Reject H_0	Significant
Correlation Between Teamwork Skills and Team Based Learning					
Teamwork Skills and Team Based Learning	0.51 ***	Strong relationship	0.0001	Reject H_0	Significant

Pearson's r coefficient: *0.01 -0.19: No or Negligible relationship; 0.20-0.29: Weak relationship; 0.30-0.39: Moderate relationship; 0.40 -0.69: Strong relationship; ≥ 0.70 Very strong relationship. *** Correlation is significant at the 0.001 level (3-tailed).*

Most of the statements related to teamwork skills have a strong relationship with team-based learning, with Pearson's r coefficients ranging from 0.420 to 0.538. Only the statement of "Coordination" has a Moderate relationship. All are statistically significant with p-value<0.001.

All statements of team-based learning have a strong correlation with teamwork skills, with Pearson's r coefficients ranging from 0.428 to 0.520, and they are statistically significant with p-value<0.001.

The overall correlation between teamwork skills and team-based learning is strong relationship, with Pearson's r coefficient = 0.510, p-value < 0.001.

The Correlations Between Challenges and Team-Based Learning

Table 6. *The Correlation Analysis Results on The Relationship Between Challenges and Team-Based Learning*

Variable	Computed r	Degree of Relationship	p value	Decision	Condusion
Correlation Between Challenges and Team-Based Learning According to Challenges Variables					
Participation	0.363***	Moderate relationship	0.0001	Reject H_0	Significant
Time Management	0.458***	Strong relationship	0.0001	Reject H_0	Significant
Motivation	0.588***	Strong relationship	0.0001	Reject H_0	Significant
Personality Conflicts	0.470***	Strong relationship	0.0001	Reject H_0	Significant
Social Context	0.396***	Moderate relationship	0.0001	Reject H_0	Significant
Correlation Between Challenges and Team Based Learning According to Team Based Learning According Variables					
Team'learning accountability	0.583***	Strong relationship	0.0001	Reject H_0	Significant
Preference:	0.553***	Strong relationship	0.0001	Reject H_0	Significant
Preference of TBL than lecture	0.557***	Strong relationship	0.0001	Reject H_0	Significant
Preference of lecture than TBL	0.365***	Moderate relationship	0.0001	Reject H_0	Significant
TBL preference in information recall	0.583***	Strong relationship	0.0001	Reject H_0	Significant
Teamwork contribution	0.573***	Strong relationship	0.0001	Reject H_0	Significant
TBL satisfaction	0.515***	Strong relationship	0.0001	Reject H_0	Significant
Correlation Between Teamwork Skills and Team Based Learning					
Challenges and Team Based Learning	0.61***	Strong relationship	0.0001	Reject H_0	Significant

Pearson's r coefficient: 0.01 - 0.19: No or Negligible relationship; 0.20-0.29: Weak relationship; 0.30-0.39: Moderate relationship; 0.40 -0.69: Strong relationship; ≥ 0.70 Very strong relationship. *** Correlation is significant at the 0.001 level (3-tailed).

There are 3 statements related to challenges section that have a strong correlation with team-based learning, with Pearson's r coefficients ranging from 0.458 to 0.588. Out of these, 2 statements: "Participation" and "Social Context" have a Moderate relationship, with Pearson's r coefficients of 0.363 and 0.396, respectively. All relationships are statistically significant with p-values < 0.001.

All statements of team-based learning have a strong correlation with the Challenges, with Pearson's r coefficients ranging from 0.515 to 0.583, and they are statistically significant with p-value<0.001.

The overall correlation between challenges and team-based learning is strong relationship, with Pearson's r coefficient = 0.610, p-value < 0.001.

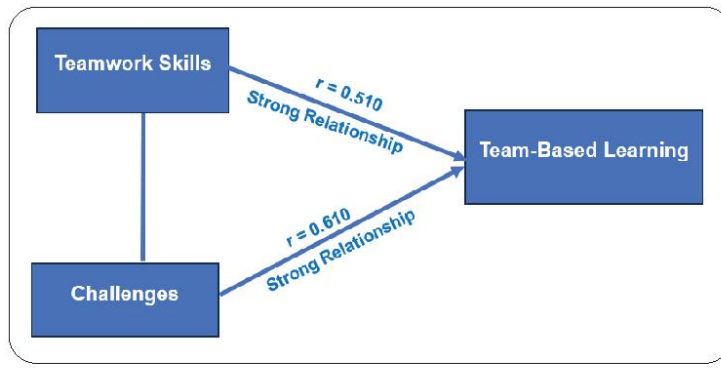

***Figure 1**. The Correlation Between Teamwork Skills, Challenge and Team-Based Learning*

The study found a strong, and statistically significant correlation between teamwork skills, challenges, and team-based learning. The study showed that higher teamwork skills lead to higher adaptability and greater team-based learning outcomes, and that the challenges all have an impact on the team-based learning outcomes.

DISCUSSION

The majority of students are aged 20, accounting for 33.93% of the sample. Other age groups are more evenly distributed, with a noticeable decline in representation as the age increases. This is consistent with the typical learning age in Vietnamese education. The participants were mainly female nursing students, with 91.4%, and only 8.6% being male. This also reflects the general situation in the nursing industry in Vietnam.The demographic results in this study are consistent with those from the study by (Pham Thi Thuy Vu & Vo Thanh Ton, 2022), where the average age of students was 21.60 ± 0.64 years, and females accounted for 92.5%.

The results of the summary of values regarding teamwork skills in team-based learning (TBL) indicate a generally positive perception of teamwork skills, with an overall mean score of 4.03, categorized as "Agree." This suggests that nursing students feel confident in their teamwork abilities, which helps them adapt to team-based learning more easily and will bring them better experiences and results in team-based learning. This result is consistent with the research of(Anderson & Hewner, 2021; Marshall et al., 2005).

The overall mean for challenges was 3.92 was rated as usually, indicating that challenges in team-based learning are common among nursing students. This finding is consistent with the conclusion of (Gallagher & Savage, 2023), who emphasized the importance of recognizing and addressing these challenges to enhance student engagement and satisfaction in the team-based learning experience.

Most of the statements related to nursing students' team-based learning experiences were rated as "Agree", with mean scores ranging from 3.75 to 4.12. However, the aspect "Preferring lectures over TBL" was rated as "Neutral" with a mean score of 3.32. The overall mean score for team-based learning was 3.91, with a level of "Agree", indicating a generally positive perception of team-based learning among nursing students. These findings are consistent with studies by (Ibrahim, 2020; Prada et al., 2022), suggesting that team-based learning effectively fosters accountability, teamwork, and satisfaction in nursing education.

The Strong correlations were observed across various aspects of teamwork skills, such as Adaptability, Decision Making, Interpersonal, or Communication, with Pearson's r correlation coefficients ranging from 0.451 to 0.538. Only the Coordination aspect had a Moderate relationship, with a Pearson's r correlation

coefficient of 0.343. All of these correlations were statistically significant with p-value < 0.0001. The overall, the correlation between teamwork skills and team-based learning was strong, with a Pearson's r correlation coefficient = 0.510 and p < 0.0001. This emphasizes the important role of teamwork skills in enhancing the group learning experience in nursing students. The results in this study are similar to those in the studies of (Kakemam et al., 2021; Nguyen et al., 2020).

The result in this study showed that although nursing students adapted and were satisfied with the team-based learning experience, the challenges they faced were unavoidable, such as time management, motivation, personality conflicts, and social factors. The overall correlation coefficient between challenges and team-based learning was 0.610, indicating a strong correlation with p<0.001. This result is also consistent with the assessment in the studies of (Nguyen et al., 2020) .

CONCLUSION AND RECOMMENDATIONS

The results of this study demonstrate a strong and statistically significant correlation between teamwork skills, challenges, and team-based learning (TBL) (p-value < 0.001).

Therefore, university administrators, nursing faculty, and students should continue to maintain and further promote teamwork skills for students, considering this a strength for them to improve their communication skills, behavior, and adaptation to learning activities. At the same time, team-based learning methods should be expanded in various activities of the nursing industry, such as applying TBL in teaching laboratory skills, simulation, and clinical practice.

Increasing resources on team-based learning methods in the library, organizing group activities, seminars, exchanges, and retraining for both lecturers and students about TBL, etc., are things that should be done to further enhance students' positive experiences with TBL and to bring the best learning outcomes for students.

REFERENCES

1. Anderson A, Hewner S. Care Coordination: A Concept Analysis. Am J Nurs. 2021;121(12):30-38. doi:10.1097/01.NAJ.0000803188.10432.e1
2. Gallagher SE, Savage T. Challenge-based learning in higher education: An exploratory literature review. Teaching in Higher Education. 2023;28(6):1135–1157. doi:10.1080/13562517.2020.1863354
3. Huang CY, Wang YH. Toward an Integrative Nursing Curriculum: Combining Team-Based and Problem-Based Learning with Emergency-Care Scenario Simulation. Int J Environ Res Public Health. 2020;17(12):4612. doi:10.3390/ijerph17124612
4. Ibrahim ME. Team-based learning student assessment instrument (TBL-SAI) for assessing students acceptance of TBL in a Saudi medical school. Psychometric analysis and differences by academic year. Saudi Med J. 2020;41(5):542-547. doi:10.15537/smj.2020.5.25054
5. Kakemam E, Hajizadeh A, Azarmi M, et al. Nurses' perception of teamwork and its relationship with the occurrence and reporting of adverse events: A questionnaire survey in teaching hospitals. J Nurs Manag. 2021;29(5):1189-1198. doi:10.1111/jonm.13257
6. Marshall L, O'Neil H, Chen A, et al. Teamwork Skills: Assessment and Instruction. In Innovations in Instructional Technology. Routledge. 2005
7. Michaelsen LK, Knight AB, Fink LD. Team-Based Learning: A Transformative Use of Small Groups in College Teaching. Taylor & Francis. 2023
8. Nguyen DT, Wright EP, Pham TT, et al. Role of School Health Officers in Mental Health Care for Secondary School Students in Can Tho City, Vietnam. School Mental Health. 2020;12(4):801–811. doi:10.1007/s12310-020-09386-7
9. Pham TTV, Vo TT. Assessment of nursing students' research capacity and factors related to capacity access in scientific research activities of nursing students. 2022;6(12).
10. De Prada E, Mareque M, Pino-Juste M. Teamwork skills in higher education: is university training contributing to their mastery?. Psicol Reflex Crit. 2022;35(1):5. doi:10.1186/s41155-022-00207-1
11. Zeb MA, Mahboob U, Shaheen N. Effect of team-based learning on critical thinking: A quasi-experimental study. Pakistan Journal of Medical Sciences. 2022;38(8):2234–2238. doi:10.12669/pjms.38.8.6146

The impact of compassionate care on patient satisfaction with the care provided

Le Thi Thao Hien [1]✉, Emerson Galang Aliswag [2], Tristan Dela Cruz [3], Lam Hoai Phuong [4], Le Thi Kim Phung [4]

[1] Nguyen Tat Thanh University

[2] Far Eastern University (FEU)

[3] Trinity University of Asia – St. Luke's College of Nursing and Graduate School of Nursing

[4] My Thien Odonto – Stomatology Hospital

▶ **Correspondence to**
Le Thi Thao Hien
Nguyen Tat Thanh University,
Ho Chi Minh City
Email: thaohien1410@gmail.com

▶ Received 06 October 2024
Accepted 21 November 2024
Published online 30 November 2024

To cite: Le TTH, Emerson GA, Tristan DC, et al. *J Vietnam Cardiol* 2024;**112E**:72-79

ABSTRACT:

Objectives: This study investigated the relationship between quality of nursing care, compassionate care, and patient satisfaction. It identifies key factors that contribute to patient satisfaction, allowing nursing managers to develop a targeted model that enhances the quality of care and improves the patient experience.

Research Subjects: The study involved 266 patients hospitalized for a minimum of 72 hours at hospital in Vietnam, selected from the General Internal Medicine and General Surgery departments.

Research Results: Overall patient satisfaction ratings for nursing care, quality of nursing care, and compassionate care were positive, with mean scores of 3.54 ± 0.69, 3.46 ± 0.86, and 3.54 ± 0.67, respectively. Results showed that 71.1% of patients received compassionate care at the level of "Sometimes", with 22.9% at the level of "Always". The relationship between the level of compassionate care and patient satisfaction was statistically significant ($p < 0.001$), with patient expectations being the main predictor of satisfaction ($\beta = 0.661$, $p = 0.003$).

Conclusion: Research highlights the importance of maintaining quality of nursing care and incorporating compassionate care attributes to enhance patient satisfaction. Healthcare organizations should focus on improvement quality of nursing care and foster a culture of compassionate care to optimize patient experiences and outcomes.

Keywords: Compassionate care, patient satisfaction.

INTRODUCTION

Patient satisfaction with the care provided is a crucial aspect to consider when evaluating hospital quality[1]. Patient satisfaction serves as a key indicator of how patients perceive the services they receive, encompassing their evaluation of care outcomes and the extent to which their expectations are met. When patients are satisfied with nursing care, they are more likely to comply with treatment plans, emphasizing the importance of satisfaction in promoting overall health and well-being. Conversely, patient dissatisfaction

can lead to premature discharge or non-adherence to treatment plans [2]. Furthermore, patients who express satisfaction with the care provided are more inclined to strictly adhere to their treatment regimens, resulting in positive health outcomes and reduced hospital stays [3].

Besides, compassion is the essence and core of nursing care. The nature of nursing work is inherently infused with affection and emotions, which give rise to numerous caring behaviors that form the foundation of providing compassionate care[4]. Through the application of care skills, including compassionate care and emotional support, nurses contribute greatly to enhancing the well-being of patients [5]. Compassion can directly impact the quality of care delivered to patients, as they often evaluate service quality based on the level of compassion displayed by nurses. Delivering compassionate nursing care can result in increased patient satisfaction, improved safety in care provision, time and cost savings, enhanced staff satisfaction and effectiveness, and increased confidence and coping skills among healthcare professionals [6].

The landscape of healthcare research in Vietnam lacks any substantial examination of compassionate care practices and their impact on patient satisfaction. Despite the recognized importance of compassion in enhancing the patient experience, there remains a conspicuous void of academic inquiry into this critical domain. Recognizing this significant gap, the present research endeavors to rigorously investigate the compelling question: 'The Impact Of Compassionate Care On Patient Satisfaction With The Care Provided."'

Statement of the problem:

1. What is compassionate care and patient satisfaction with the care provided according to the patients?

2. What is the impact of compassionate care on patient satisfaction with care provided?

Hypothesis:

There is no significant correlation between compassionate care and patient satisfaction with the care provided.

MATERIALS AND METHODS

Study design

Cross sectional study. The data of the study was collected from two questionnaires.

Research Locale

My Thien Hospital, Ho Chi Minh city.

Population and Sample

This study uses the formula to determine the average score to calculate sample size:

$n = Z^2 * p(1-p) / d^2$ Where:

n is the required sample size

Z is the Z-value corresponding to the desired confidence level (typically 90%, Z=1.645)

p is the expected proportion or outcome (there is no prior research, chosen p=0.5)

d is the desired margin of error (chosen 6%)

Applying the formula:

$n = (1.645)^2 * 0.5(1-0.5) / (0.06)^2$

$n = 2.7025 * 0.25 / 0.0036$

$n = 0.675625 / 0.0036$

$n = 265.97 \sim 266$

This study would require 266 participants.

Inclusion criteria:

The patient consents to participate in the study.

Patients who have been hospitalized for at least 3 days or more.

Patients who are in a stable condition at the time of data collection.

Patients who have received a discharge order on the day of data collection.

Patients or who are 18 years of age or older (representative of the patient or parent).

Exclusion criteria:

Patients diagnosed with dementia.

Patients who are critically ill.

Patients who are unable to listen, speak, or read.

Sampling Technique

This study employed a convenience sampling technique. Participants were recruited from My Thien hospital over a period of 2 month. All patients who met the inclusion criteria and were present in the hospital during the data collection period were invited to participate in the study.

Research Instrument

The study employed two questionnaire to gather data on compassionate care and patient satisfaction with care provided.

The patient satisfaction with nursing care questionnaire (PSNCQQ) is a 19-item scale designed to measure patient satisfaction with various aspects of nursing care, including attention, kindness, respect, skill, and responsiveness. It was originally developed by Laschinger et al. in 2005 and has been used in multiple countries, including Turkey, Ethiopia, and Vietnam, with high reliability (Cronbach's α = 0.97-0.98) . The questionnaire employs a 5-point Likert scale, with scores ranging from 19 to 95. Higher scores indicate greater patient satisfaction, with the following interpretation: ≤19: poor, 20–38: fair, 39–57: good, 58–76: very good, 77–95: excellent.

Compassionate Care: 20 Items

This study employed the concept of Compassionate Care introduced by Burnell (2011), who evaluated compassionate nursing care for cancer patients. In 2013, Burnell developed the Compassionate Care Assessment Tool and adapted it for use in a study by Asghar Dalvandi [6,7]. The tool encompasses four factors, each with specific statements: (a) Meaningful connection (8 statements, Cronbach's α=0.867), (b) Patients' expectations (5 statements, Cronbach's α=0.801), (c) Caring attributes (4 statements, Cronbach›s α=0.774), (d) Capable practitioner (3 statements, Cronbach›s α=0.781)

Using the questionnaires is done as follows:

The author granted the researchers permission to use the two sets of questionnaires in their investigation. This permission was granted via email correspondence between the researchers and the original author. A certified translator then expertly translated the questionnaires into Vietnamese from the original language. A second independent translator then performed a back-translation of the Vietnamese translations into the original tongue to guarantee accuracy.

Ethical Safeguards

The study included several ethical safeguards to protect participant rights and wellbeing. Informed consent was obtained from all participants after they were provided with a detailed explanation of the study purpose, procedures, potential risks and benefits, and their right to withdraw at any time without penalty. To maintain confidentiality, participant names and other identifying information were removed from all data, and each participant was assigned a unique code number. The institutional Ethics Review Committee of Trinity University review board carefully reviewed and approved the study protocol to ensure it met all relevant ethical guidelines and regulations.

Data Analysis

Jamovi was utilized to enter and analyze data

Descriptive statistics were used to summarize patient satisfaction, compassionate care. Pearson's correlation coefficient analysis was then conducted to examine the associations between these variables. To further explore these relationships, the researchers utilized multiple regression analysis.

RESULTS

The study conducted a survey on 266 healthy patients, the results are as follows:

***Table 1**. The compassionate care according to the patients*

Compassionate care items		Mean ± STD
Meaningful connection		**3.52 ± 0.46**
1.	Having a sense of humor	3.56 ± 0.59
2.	Providing unconditional love/respect	3.54 ± 0.60
3.	Providing outside connection	3.45 ± 0.66
4.	Including in plan of care	3.52 ± 0.60
Patient expectation		**3.51 ± 0.45**
5.	Supporting spiritual beliefs	3.35 ± 0.62
6.	Providing access to spiritual support	3.39 ± 0.61
7.	Excusing shortcomings	3.41 ± 0.63
8.	Dealing with difficult issues	3.56 ± 0.67
9.	Controlling pain	3.55 ± 0.68
10.	Giving timely treatments	3.65 ± 0.68
11.	Checking frequently	3.60 ± 0.65

Compassionate care items		Mean ± STD
12.	Presenting professional image	3.54 ± 0.65
13.	Appreciating patient and family	3.57 ± 0.67
14.	Considering of personal needs	3.54 ± 0.69
Caring attributes		**3.50 ± 0.51**
15.	Possessing inner beauty	3.45 ± 0.63
16.	Encouraging	3.48 ± 0.67
17.	Being empathetic	3.58 ± 0.66
Capable practitioner		**3.61 ± 0.63**
18.	Appearing competent	3.58 ± 0.66
19.	Displaying confidence	3.68 ± 0.66
20.	Showing skill	3.58 ± 0.77
Overall Mean of Compassionate care		**3.53 ± 0.44**

Legend: *4.21 – 5.00: Often; 3.41 – 4.20: Always; 2.61-3.40: Sometimes; 1.81 – 2.60: Rarely; 1.00 – 1.80: Never*

The overall Mean of Compassionate care is 3.53 ± 0.44 within " Always" range and the overall scores for the Compassionate Care items are generally high, with most factors falling within the "Always" range (3.41 - 4.20).

However, there are a few items that scored slightly lower, falling within the "Sometimes" range (2.61 - 3.40). These include "Supporting spiritual beliefs" (3.35 ± 0.62) and "Providing access to spiritual support" (3.39 ± 0.61) under the "Patient expectation" factor. Additionally, the item "Possessing inner beauty" under the "Caring attributes" factor scored 3.45 ± 0.63, which is also on the lower end of the "Always" range.

Table 2. *The respondent's patient satisfaction with care provided*

Patient satisfaction with care provided items		Mean ± STD
Provide health information		3.50 ± 0.55
1.	Information you were given: how clear and complete the nurses' explanations were about tests, treatments, and what to expect.	3.46 ± 0.68
2.	Instructions: how well nurses explained how to prepare for tests and operations.	3.55 ± 0.69
3.	Ease of getting information: willingness of nurses to answer your questions.	3.50 ± 0.67
4.	Information given by nurses: how well nurses communicated with patients, families, and doctors.	3.52 ± 0.70
5.	Discharge instructions: how clearly and completely the nurses told you what to do and what to expect when you left the hospital.	3.50 ± 0.69
Counseling and care		**3.49 ± 0.50**
6.	Informing family or friends: how well the nurses kept them informed about your condition and needs.	3.47 ± 0.67
7.	Involving family or friends in your care: how much they were allowed to help in your care.	3.50 ± 0.66
8.	Concern and caring by nurses: courtesy and respect you were given; friendliness and kindness.	3.42 ± 0.67
9.	Recognition of your opinions: how much nurses ask you what you think is important and give you choices.	3.52 ± 0.64
10.	Consideration of your needs: willingness of the nurses to be flexible in meeting your needs.	3.55 ± 0.67
11.	The daily routine of the nurses: how well they adjusted their schedules to your needs.	3.45 ± 0.63
12.	Helpfulness: ability of the nurses to make you comfortable and reassure you.	3.51 ± 0.66
Attending the emotional needs of the patients		**3.53 ± 0.51**
13.	Attention of nurses to your condition: how often nurses checked on you and how well they kept track of how you were doing.	3.56 ± 0.64
14.	Restful atmosphere provided by nurses: amount of peace and quiet.	3.56 ± 0.68
15.	Privacy: provisions for your privacy by nurses.	3.56 ± 0.69

Patient satisfaction with care provided items		Mean ± STD
Professional-technical competencies		**3.47 ± 0.63**
16.	Nursing staff response to your calls: how quick they were to help.	3.50 ± 0.67
17.	Skill and competence of nurses: how well things were done, like giving medicine and handling ivs.	3.54 ± 0.66
18.	Coordination of care: the teamwork between nurses and other hospital staff who took care of you.	3.50 ± 0.65
Advice and guidance on care when discharged from the hospital		**3.47 ± 0.63**
19.	Coordination of care after discharge: nurses' efforts to provide for your needs after you left the hospital.	3.47 ± 0.63
Overall mean of patient satisfaction with care provided		**3.50 ± 0.49**

Legend: *4.21 – 5.00: Excellent; 3.41 – 4.20: Very Good; 2.61 – 3.40: Good; 1.81 – 2.60: Fair; 1.00 – 1.80: Poor*

Overall mean of patient satisfaction with care provided: 3.50 ± 0.49.

The overall scores for the Patient Satisfaction with Care Provided items are quite high, with most factors falling within the "Very Good" range (3.41 - 4.20).

However, there are a few items that scored slightly lower, falling within the upper end of the "Good" range (2.61 - 3.40). These include: "Concern and caring by nurses: courtesy and respect you were given; friendliness and kindness" (3.42 ± 0.67). "The daily routine of the nurses: how well they adjusted their schedules to your needs" (3.45 ± 0.63)

Additionally, the "Professional-technical competencies" and "Advice and guidance on care when discharged from the hospital" factors both scored 3.47 ± 0.63, which is at the lower end of the "Very Good" range.

Table 3*. The Relationship between Compassionate Care and Patient Satisfaction with care provied*

			Patient satisfaction with care provided			Total
			Good	Very good	Excellent	
Compassionate care	Rarely	Frequency	5	1	0	6
		Percent	11.6%	0.5%	0.0%	2.3%
	Sometimes	Frequency	31	149	9	189
		Percent	72.1%	78.8%	26.5%	71.1%
	Always	Frequency	6	38	17	61
		Percent	14.0%	20.1%	50.0%	22.9%
	Often	Frequency	1	1	8	10
		Percent	2.3%	0.5%	23.5%	3,8%
Total		Frequency	43	189	34	266
		Percent	16.2%	71.1%	12.8%	100.0%

With p< 0.001, Cramer's = 0.4

The distribution suggests that the majority of patients (71.1%) received "Sometimes" rated compassionate care, while a significant proportion (22.9%) received the highest "Always" rated compassionate care. A small percentage (2.3%) received the lowest "Rarely" rated compassionate care, and 3.8% received "Often" rated compassionate care.

The distribution of patient satisfaction levels, reveals that the majority of patients (71.1%) reported "Very Good" satisfaction with the care provided. A smaller proportion of patients reported "Excellent" (12.8%) or "Good" (16.2%) satisfaction levels.

When looking at the "Good" level of patient

satisfaction, 11.6% of patients received "Rarely" compassionate care, 72.1% received "Sometimes" compassionate care, 14.0% received "Always" compassionate care, and 2.3% received "Often" compassionate care.

For "Very Good" patient satisfaction, 0.5% of patients received "Rarely" compassionate care, 78.8% received "Sometimes" compassionate care, 20.1% received "Always" compassionate care, and 0.5% received "Often" compassionate care.

At the "Excellent" level of patient satisfaction, 0.0% received "Rarely" compassionate care, 26.5% received "Sometimes" compassionate care, 50.0% received "Always" compassionate care, and 23.5% received "Often" compassionate care.

Overall, the results show a statistically significant ($p < 0.001$) and moderately strong (Cramer's $V = 0.4$) relationship between the level of compassionate care and patient satisfaction with the care provided.

Table 4. *Regression Analysis on The Significant Relationship on the the compassionate care and patient satisfaction with care provided*

Predictors	β	SE	T	p	Pearson's r
Intercept	28.713	4.013	7.155	< .001	
Meaningful connection	0.438	0.464	0.943	0.346	0.45
Patient expectation	0.661	0.221	2.991	0.003	0.50
Caring attributes	0.289	0.595	0.486	0.627	0.45
Capable practitioner	0.507	0.386	1.314	0.190	0.41

R= 0.571, R2=0.26, F=23.8, P ≤ 0.01

≥0.7: Very Strong Correlation; ± 0.40-0.69: Strong Correlation; ± 0.30-0.39: Moderate Correlation; ± 0.20-0.29: Weak Correlation; ± 0.01-0.19: No/Negligible Correlation

Patient satisfaction with care provided = 28.713 + 0.661 Patient expectation

The baseline level of patient satisfaction is 28.713 and is statistically significant ($p < 0.001$). Looking at the four predictors of patient satisfaction, the data indicates that patient expectation has a statistically significant relationship with patient satisfaction ($\beta = 0.661$, $SE = 0.221$, $t = 2.991$, $p = 0.003$). The other three predictors - meaningful connection ($\beta = 0.438$, $SE = 0.464$, $t = 0.943$, $p = 0.346$), caring attributes ($\beta = 0.289$, $SE = 0.595$, $t = 0.486$, $p = 0.627$), and capable practitioner ($\beta = 0.507$, $SE = 0.386$, $t = 1.314$, $p = 0.190$) - were not statistically significant, meaning their relationships with patient satisfaction were not strong enough to be considered meaningful.

DISCUSSION

The overall results of this study indicate that patients generally perceive a high level of compassionate care and satisfaction with the care provided. The mean score for compassionate care was 3.53 ± 0.44. The findings of the current study are consistent with the results reported in previous research of Asghar Dalvandi, et al. in 2019 with Mean compassionate care score of 3.27 ± 0.52 [6]. Further analysis of the compassionate care factors revealed that most items were scored within the "Always" range, demonstrating that healthcare providers are successfully meeting patient expectations in areas such as emotional support, attentiveness, and demonstrating caring attributes. However, a few items related to supporting spiritual beliefs and providing access to spiritual support fell slightly lower, within the "Sometimes" range.

Similarly, the overall patient satisfaction with the care provided was quite high, with a mean score of 3.50 ± 0.49, indicating that patients perceive the care they receive as "Very Good." The research results are similar to previous study of Karaca, and higher than in the study of Esraa Mohammed Alhussin [2,9]. While most

factors were scored within the "Very Good" range, a few items related to nurses' courtesy, respect, and adjusting their schedules to patient needs were rated slightly lower, within the upper end of the "Good" range. In the research by author Nguyen Thi Nguyet, only 1.96% of patients assessed their satisfaction with nursing care as average; 71.51% of patients rated it as good or very good, and 26.54% as good [10].

These findings suggest that the healthcare organization is generally providing high-quality, compassionate care that meets or exceeds patient expectations. However, there are opportunities for improvement, particularly in addressing patients' spiritual needs and ensuring consistently excellent communication and coordination of care by nursing staff [11].

The distribution of compassionate care levels shows that the majority of patients (71.1%) received "Sometimes" rated compassionate care, while a significant proportion (22.9%) received the highest "Always" rated compassionate care. A small percentage (2.3%) received the lowest "Rarely" rated compassionate care, and 3.8% received "Often" rated compassionate care. The distribution of patient satisfaction levels reveals that the majority of patients (71.1%) reported "Very Good" satisfaction with the care provided, with a smaller proportion of patients reporting "Excellent" (12.8%) or "Good" (16.2%) satisfaction levels. However, it is worth noting that the level of perceived good compassionate care in this study (22.9%) is lower than that reported in a study by Agmas Wassie Abate, which found the level of perceived good compassionate care to be 47.5% [12].

When examining the relationship between compassionate care and patient satisfaction, the data indicates that for patients with "Good" satisfaction, the majority (72.1%) received "Sometimes" compassionate care, while 11.6% received "Rarely" compassionate care. For "Very Good" satisfaction, the majority (78.8%) received "Sometimes" compassionate care, while 20.1% received "Always" compassionate care. At the "Excellent" satisfaction level, 50.0% received "Always" compassionate care, and 23.5% received "Often" compassionate care. The statistical analysis shows a statistically significant ($p < 0.001$) and moderately strong (Cramer's $V = 0.4$) relationship between the level of compassionate care and patient satisfaction.

Regarding the predictors of patient satisfaction, the baseline level of patient satisfaction is 28.713 and is statistically significant ($p < 0.001$). Among the four predictors of patient satisfaction, only patient expectation has a statistically significant relationship ($\beta = 0.661$, $SE = 0.221$, $t = 2.991$, $p = 0.003$).

These findings highlight the importance of compassionate care in shaping patient satisfaction, with patient expectations emerging as a key factor in driving overall satisfaction [6]. The results provide valuable insights for healthcare organizations to focus on improving compassionate care, particularly in areas where patients currently experience lower levels, to enhance the overall patient experience and satisfaction [9].

CONCLUSION

The study found high levels of patient satisfaction with nursing care and compassionate care. Patient satisfaction was strongly correlated with both quality of care and compassionate care, with compassionate care explaining a significant portion of the variance in satisfaction. These results highlight the importance of delivering high-quality, compassionate nursing care to achieve positive patient outcomes.

RECOMMENDATION

Based on the specific findings of the study, the following recommendations are proposed:

Maintain a high level of compassionate care: The study found that a high level of compassionate care was strongly correlated with increased patient satisfaction. Therefore, it is recommended that healthcare organizations prioritize the delivery of compassionate, patient-centered care as a key strategy to enhance overall patient satisfaction.

Strengthen spiritual, emotional, and psychological support: The results suggest that there is room for improvement in the area of providing spiritual,

emotional, and psychological support to patients. Healthcare providers, especially nurses, should be encouraged to increase their efforts in addressing the patients' holistic needs, including their spiritual, emotional, and psychological well-being.

REFERENCES

1. Wardah, Usman S, Wardani E. An Evaluation of Patient Satisfaction with Nursing Care: A Qualitative Study in an Indonesian Hospital. Ethiop J Health Sci. 2020;30(6):1011-1016. doi:10.4314/ejhs.v30i6.20
2. Karaca A, Durna Z. Patient satisfaction with the quality of nursing care. Nurs Open. 2019;6(2):535-545. doi:10.1002/nop2.237
3. Alharbi HF, Alzahrani NS, Almarwani AM, et al. Patients' satisfaction with nursing care quality and associated factors: A cross-section study. Nurs Open. 2023;10(5):3253-3262. doi:10.1002/nop2.1577
4. Babaei S, Taleghani F, Farzi S. Components of Compassionate Care in Nurses Working in the Cardiac Wards: A Descriptive Qualitative Study. J Caring Sci. 2022;11(4):239-245. doi:10.34172/jcs.2022.24
5. Rasheed MA, Bharuchi V, Mughis W, et al. Development and feasibility testing of a play-based psychosocial intervention for reduced patient stress in a pediatric care setting: experiences from Pakistan. Pilot Feasibility Stud. 2021;7(1):63. doi:10.1186/s40814-021-00781-8
6. Dalvandi A, Vaisi-Raygani A, Nourozi K, et al. The Importance and Extent of Providing Compassionate Nursing Care from The Viewpoint of Patients Hospitalized in Educational Hospitals in Kermanshah - Iran 2017. Open Access Maced J Med Sci. 2019;7(6):1047-1052. doi:10.3889/oamjms.2019.204
7. Burnell L. Compassionate Care, the Patient Perspective. Dissertations. 2011. doi:10.22371/07.2011.004
8. Laschinger HS, Hall LM, Pedersen C, et al. A psychometric analysis of the patient satisfaction with nursing care quality questionnaire: an actionable approach to measuring patient satisfaction. J Nurs Care Qual. 2005;20(3):220-230. doi:10.1097/00001786-200507000-00006
9. Alhussin EM, Mohamed SA, Hassan AA, et al. Patients' Satisfaction with the Quality of Nursing Care: A Cross-Section Study. 2023. doi:10.21203/rs.3.rs-3106384/v1
10. Nguyet NT, Hang DT, Nga NTV, et al. Survey on satisfaction of inpatients with nursing care and some related factors at Saint Paul General Hospital. JNS. 2022;5(02). doi:10.54436/jns.2022.02.426
11. Malenfant S, Jaggi P, Hayden KA, Sinclair S. Compassion in healthcare: an updated scoping review of the literature. BMC Palliat Care. 2022;21(1):80. doi:10.1186/s12904-022-00942-3
12. Abate AW, Menberu M, Belete H, et al. Perceived compassionate care and associated factors among patients with mental illness at Tibebe Ghion specialized and Felege Hiwot comprehensive specialized hospital, Northwest Ethiopia. BMC Health Serv Res. 2023;23(1):650. doi:10.1186/s12913-023-09665-4

SCAI cardiogenic shock classification for predicting short-term mortality in acute myocardial infarction

Bui Vinh Ha[1], **Van Duc Hanh**[1]✉, **Pham Manh Hung**[2], **Bui Thi Thanh Huyen**[2], **Nguyen Ngoc Quang**[2]

[1] Vietnam National Heart Institute, Bach Mai Hospital

[2] Hanoi Medical University

▶ **Correspondence to**
Dr. Van Duc Hanh
Vietnam National Heart Institute, Bach Mai Hospital
Email: duchanhvan@gmail.com

▶ Received 22 October 2024
Accepted 23 November 2024
Published online 30 November 2024

To cite: Bui VH, Van DH, Pham MH, et al. *J Vietnam Cardiol* 2024;**112E**:80-86

ABSTRACT

Background: Cardiogenic shock (CS) remains a critical complication of acute myocardial infarction (AMI) with severe outcomes. The Society for Cardiovascular Angiography and Interventions (SCAI) classification is a valuable tool for assessing the severity and progression of CS.

Objectives: Our study aimed to evaluate the association between initial SCAI classification and 30-day mortality in AMI patients and assess the prognostic value of SCAI changes within 24 hours post-admission.

Methods: All patients with AMI were classified according to the SCAI stages at admission and re-evaluated after 24 hours. 30-day mortality rates were compared across SCAI stages, and Cox regression analysis was used to assess the risk of death based on 24-hour transition SCAI classification.

Results: At admission, among 232 AMI patients, 50.8% were classified as SCAI A, 21.6% as SCAI B, 23.3% as SCAI C, and 4.3% as SCAI D/E. The 30-day mortality rates for each classification were 1.7% for SCAI A, 30.0% for SCAI B, 68.5% for SCAI C, and 90% for SCAI D/E. Within 24 hours of admission, 14.5% of patients experienced a worsening SCAI stage, 73.4% remained unchanged SCAI, and 12.1% showed improved SCAI. Patients with a worsening SCAI classification had a significantly higher risk of 30-day mortality, with an adjusted hazard ratio (HR) of 50.4 compared to those with stable SCAI status (p log-rank = 0.00001). Conversely, patients with stable or improved SCAI stages had notably lower mortality rates.

Conclusion: The initial SCAI stage at admission and its changes within 24 hours are crucial predictors of 30-day mortality in AMI patients with CS.

Keywords: Cardiogenic shock, SCAI classification, acute myocardial infarction, mortality rate, prognosis.

List of abbreviations

AMI: Acute Myocardial Infarction, EF = Ejection Fraction**,** SCAI: Society for Cardiovascular Angiography and Interventions, STEMI: ST-segment elevation myocardial infarction, Non-STEMI: non ST-segment elevation myocardial infarction.

INTRODUCTION

Cardiogenic shock due to myocardial infarction is a severe condition with high mortality rates; however, the treatment strategies remain challenging

in clinical practice.[1] Various definitions, classifications, and diagnostic criteria for cardiogenic shock have been published based on clinical trials or treatment guidelines.[1–9] The inconsistency in the definition and classification of cardiogenic shock can pose difficulties for clinicians in practice as well as in the research application. Therefore, the Society for Cardiovascular Angiography and Interventions (SCAI) introduced a standardized classification of cardiogenic shock, known as the SCAI Cardiogenic Shock Classification.[10,11] This classification was subsequently validated and updated for improved clarity and precision.[12] In Vietnam, limitted studies have been conducted to classify cardiogenic shock patients; therefore, our study was designed to evaluate the ability of the SCAI classification at the time of admission and 24-hour transition SCAI classification to predict short-term mortality in patients with myocardial infarction.

STUDY SUBJECTS AND METHODS

Study site

Vietnam National Heart Institute, Bach Mai Hospital.

Study period

01/08/2022 – 02/04/2023.

Study subjects

232 patients with acute myocardial infarction (AMI) with ST-segment elevation (STEMI) and acute myocardial infarction without ST-segment elevation (NSTEMI).

Inclusion criteria

Diagnosis of STEMI based on the 2018 Fourth Universal Definition of Myocardial Infarction.[13] Diagnosis of NSTEMI based on the 2020 European Society of Cardiology Guidelines.[14]

Exclusion criteria

Patients or their families who refused to participate in the study. Patients with severe comorbidities, such as end-stage liver, kidney, or respiratory diseases, which could affect short-term mortality outcomes.

Study design

Cohort study.

Sampling method

We included all patients diagnosed with acute myocardial infarction admitted and treated at the Vietnam National Heart Institute, Bach Mai Hospital, from 01/08/2022 to 02/04/2023.

SCAI Classification of Cardiogenic Shock applied in the study (evaluated at admission and 24 hours post-admission):

SCAI Stage A: All patients diagnosed with acute myocardial infarction at the Vietnam National Heart Institute identified as being at risk of developing cardiogenic shock. SCAI Stage A includes patients presenting with clinical signs such as cool extremities, palpable peripheral pulses, normal consciousness, no pulmonary rales, systolic blood pressure (SBP) ≥ 100 mmHg, and normal renal function.

- **SCAI Stage B**: Patients with cool extremities, palpable peripheral pulses, normal consciousness, possible pulmonary rales, SBP < 90 mmHg or a drop in SBP > 30 mmHg from baseline, heart rate ≥ 100 beats/min, and normal lactate levels.

- **SCAI Stage C**: Clinically congested, cool and moist skin, pulmonary rales, oliguria, lactate ≥ 2 mmol/L, creatinine increase 1.5 times above normal values, elevated NT-proBNP.

- **SCAI Stage D**: Severe, refractory congestion, extensive pulmonary rales, prolonged lactate ≥ 2 mmol/L, requiring high-dose vasopressors or mechanical circulatory support.

- **SCAI Stage E**: Unconsciousness, circulatory collapse, lactate ≥ 8 mmol/L, pH < 7.2, severe hypotension despite maximal hemodynamic support.

24-hour transition SCAI classification: SCAI classification was assessed upon patient admission and reassessed 24 hours later. Based on these classifications, we categorized the patients as follows: "***unchanged SCAI***" if the classification remained the same after 24 hours, "***worsening SCAI***" if the classification worsened compared to admission, and "***improved SCAI***" if the classification improved after 24 hours.

Study outcome

All-cause mortality within 30 days of admission. Data on this outcome was collected through phone calls to the patient's family.

Data collection method

A standardized research medical record form was used to collect data for all patients enrolled in the study. Information included demographics, medical history, clinical symptoms, echocardiographic parameters, blood test results, and all-cause mortality status within 30 days.

Data Analysis

Data was entered using SPSS 20.0 software and checked internally for inconsistencies or errors. Data analysis was performed using Stata 14.0 software. For qualitative variables, we calculated frequency and percentage to describe the characteristics of the study population. For quantitative data, we calculated mean ± standard deviation. We computed adjusted HR using Cox regression to explore the association between early cardiovascular events and cardiogenic shock classification. Kaplan-Meier curves and log-rank tests were conducted to compare the differences in the timing of mortality events among patients with different cardiogenic shock classifications. For statistical significance, $p < 0.05$ was considered significant. For HR or adjusted HR, statistical significance was determined when the 95% CI did not include 1.

Ethics of the Study

The study was conducted in compliance with ethical principles in medical research.

RESULTS

***Table 1**. Clinical and Paraclinical Characteristics of Study Subjects According to SCAI Classification*

Characteristics	Overall (n = 232)	SCAI Classification at Admission				
		SCAI A (n = 118)	SCAI B (n = 50)	SCAI C (n = 54)	SCAI D/E (n = 10)	p
Age (years)	70.1 ± 12.7	67.5 ± 13.5	70.9 ± 12.5	73.4 ± 10.1	70.1 ± 12.7	0.001
Female	73 (31.5%)	33 (28.0%)	16 (32.0%)	21 (38.9%)	3 (30.0%)	0.56
Hypertension	147 (63.4%)	81 (68.6%)	26 (52.0%)	34 (63.0%)	6 (60.0%)	0.23
Diabetes	60 (25.9%)	22 (18.6%)	16 (32.0%)	16 (29.6%)	6 (60.0%)	0.01
Dyslipidemia	6 (2.6%)	5 (4.2%)	1 (2.0%)	0 (0%)	0 (0%)	0.39
Systolic Blood Pressure (mmHg)	121.3 ± 23.5	132.9 ± 11.0	122.1 ± 21.5	100.6 ± 15.9	95.0 ± 22.2	0.001
Diastolic Blood Pressure (mmHg)	74.6 ± 13.2	79.9 ± 11.0	75.6 ± 12.9	64.2 ± 9.9	60. 0 ± 13.1	0.001
Heart Rate (beats/min)	87.1 ± 22.5	80.8 ± 13.7	90.4 ± 25.7	97.4 ± 26.6	88.3 ± 42.2	0.001
ST-Elevation Myocardial Infarction	166 (71.6%)	83 (70.3%)	30 (60.0%)	46 (85.2%)	7 (70.0%)	0.04
Creatinin (µmol/L)	109.8 ± 86.8	90.1 ± 44.7	117.0 ± 106.1	123.4 ± 58.4	226.3 ± 251.3	0.0001
Troponin T (ng/L)	2,140.7 ± 2,957.9	1,714.9 ± 3,157.3	1,664.3 ± 1,868.2	3,604.9 ± 3,152.3	1,744.1 ± 1,144.8	0.001
NT-proBNP (pg/mL)	9,446.5 ± 11,472.4	3,868.7 ± 7,546.9	9,197.2 ± 11,178.1	14,976.3 ± 12,173.9	11,728.5 ± 1,144.8	0.0001
(Ejection Fraction) EF (%)	45.2 ± 11.5	50.4 ± 9.4	41.9 ± 10.6	38.0 ± 9.2	34.6 ± 17.6	0.0001
pH at Admission	7.38 ± 0.10	7.42 ± 0.03	7.42 ± 0.06	7.37 ± 0.11	7.23 ± 0.10	0.0001
Lactate at Admission (mmol/L)	3.8 ± 4.0	1.3 ± 0.6	1.7 ± 0.9	4.1 ± 2.6	12.7 ± 6.2	0.0001
30-Day Mortality	63 (27.2%)	2 (1.7%)	15 (30.0%)	37 (68.5%)	9 (90.0%)	0.001

Comment: The more severe the SCAI classification of cardiogenic shock, the more deteriorated the clinical parameters (systolic blood pressure, diastolic blood pressure, and heart rate) and laboratory test results (blood pH, admission blood lactate, creatinine, troponin T, NT-proBNP, and EF).

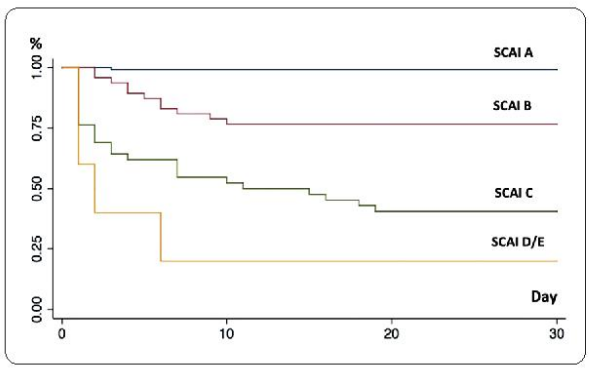

Figure 1*. 30-day Mortality Rate by Changes in SCAI Classification*

Comment: The severe cardiogenic shock group (SCAI C/D/E) has a significantly lower survival rate compared to the mild shock group (SCAI A/B), with a log-rank p-value of 0.0001.

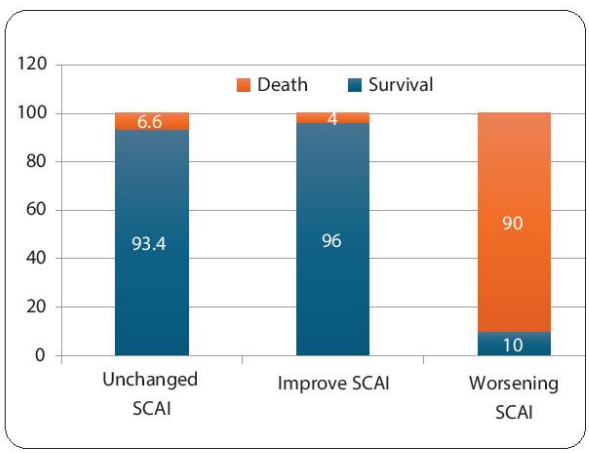

Figure 2*. 30-day Mortality Rate by Changes in SCAI Classification*

Comment: The 30-day mortality rate is significantly higher in the group with worsening SCAI classification, while it is lower in the group with improved or unchanged SCAI classification.

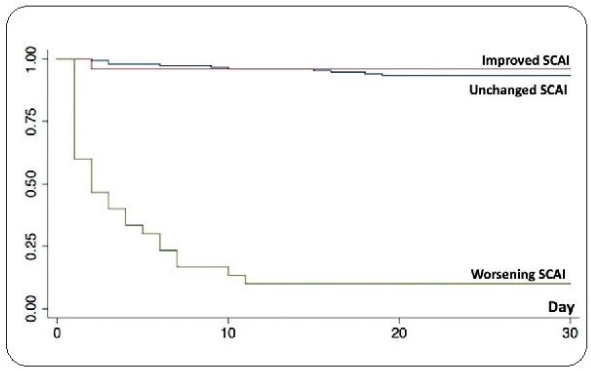

Figure 3*. 30-day mortality by 24-hour SCAI transition*

Comment: The group with worsening SCAI classification within 24 hours has a significantly lower survival rate compared to the group with unchanged or improved SCAI classification within 24 hours, with a log-rank p-value of 0.0000.

Table 2*. 30-day Mortality Risk by SCAI Improvement*

Variable	Crude HR (95% CI)	Adjusted HR (95% CI)
Improved SCAI	0.6 (0.1 – 4.8)	1.1 (0.1 – 8.9)
Worsening SCAI	127.8 (32.9 – 495.0)	50.4 (17.9 – 141.6)
Male	0.4 (0.2 – 0.8)	0.6 (0.3 – 1.4)
Age ≥ 70	5.7 (2.4 – 13.8)	3.5 (1.3 – 9.8)
Coronary artery stenting	0.1 (0.05 – 0.4)	0.4 (0.2 – 0.9)
Reference group: unchanged SCAI		

Comment: Compared to patients with unchanged SCAI classification, those with worsening SCAI classification after 24 hours have a 50.4-fold higher risk of 30-day mortality (adjusted for gender, age, and coronary stenting status).

DISCUSSION

Clinical and paraclinical characteristics by SCAI Classification at admission

The mean age of patients with acute myocardial infarction (AMI) in our study was 70.1 years, with 31.5% female. Previous studies reported a mean age of 69.3 years with 37% female among patients in cardiovascular intensive care units, and 67 years with

28% female in cardiogenic shock patients.[15,16] In our study, apart from diabetes, no significant differences in the prevalence of cardiovascular conditions and risk factors were observed among the SCAI shock subgroups. However, other studies have noted significant differences in cardiovascular history and risk factors across these subgroups.[16] Therefore, demographic characteristics, cardiovascular history, and risk factors may vary across studies depending on the population. Despite these variations, most studies consistently indicate that the mean age of patients in the more severe shock categories (SCAI C/D/E) is generally higher than those in the milder shock categories (SCAI A/B)).[15,17] Clinical parameters such as heart rate, systolic blood pressure, and diastolic blood pressure showed significant variation across SCAI shock subgroups. Additionally, laboratory parameters at admission, including white blood cell count, urea, creatinine, glucose, NT-proBNP, troponin T, pH, blood lactate levels, and left ventricular ejection fraction (EF), differed significantly among SCAI subgroups (Table 1). These findings align with previous reports.[15–18]

The distribution of AMI patients across SCAI classifications at admission in our study was 50.8% for SCAI A, 21.6% for SCAI B, 23.3% for SCAI C, 3.4% for SCAI D, and 0.9% for SCAI E. Variations in SCAI classification rates at admission are influenced by the study population and clinical setting. Studies conducted in shock centers reported that around 80% of patients were classified as having severe shock (SCAI C/D/E) upon admission.[16,17] In contrast, over 70% of patients in cardiovascular intensive care units (CICU) presented with mild shock (SCAI A/B) at admission.[15]

Relation between SCAI Classification at admission and 30-day mortality

The more severe the SCAI classification, the higher the 30-day mortality rate. In our study, all patients classified as SCAI E at admission died, while 75% of those classified as SCAI D did not survive. In contrast, the 30-day mortality rates for patients in the SCAI A and SCAI B groups were 1.7% and 30.0%, respectively. Patients classified as SCAI C and SCAI D/E had a significantly higher mortality rate compared to those in the SCAI A and SCAI B groups, with a log-rank p-value of 0.0001 (Figure 1). Previous research has shown similar results. A study involving over 1,000 patients demonstrated a clear distinction in short-term survival probabilities among SCAI subgroups, with the highest 30-day survival observed in SCAI A, followed by progressively lower survival in SCAI B, SCAI C, SCAI D, and the lowest in SCAI E.[16] Another analysis of mortality risk based on SCAI classification found that, using SCAI C as the reference, the mortality risk for patients classified as SCAI D and SCAI E was 4.1 times and 10.3 times higher, respectively, in those diagnosed with either AMI or acute heart failure.[17]

30-day mortality based on 24-hour SCAI transiton

SCAI classification at admission offers a good prognostic insight, but it becomes even more predictive when reassessed 24 hours post-admission.[19,20] In our study, among the 207 AMI patients who survived 24 hours from admission, 73.4% had unchanged SCAI after 24 hours, while 12.1% improved and 14.5% worsened. We observed that patients with improved or unchanged SCAI had a better 30-day survival prognosis than those whose SCAI classification worsened (Figure 2 and 3). We performed a Cox regression analysis to assess 30-day mortality risk based on SCAI improvement. Variables included in the model were gender, age, and coronary stenting status, with the unchanged SCAI group as the reference. The results indicated that patients with worsening SCAI after 24 hours had a 50.4-fold higher mortality risk compared to the unchanged SCAI group, while the improved SCAI group did not show a significant reduction in mortality. Additionally, age over 70 years was an independent predictor of increased mortality risk, with a 3.5-fold increase compared to those under 70 (Table 2).

A study involving 237 patients with cardiogenic shock, of whom 43% had AMI and 37% had acute heart failure, ranging from SCAI B to SCAI D, across 11 cardiac centers in Italy, indicated that SCAI classification is dynamic and suggested that reassessment at 24 hours post-admission provides better prognostic accuracy for mortality than admission-based classification alone.

Adjusting for factors such as age, gender, lactate levels, glomerular filtration rate, central venous pressure, vasopressor use, and mechanical support devices, the study concluded that SCAI classification at 24 hours was an independent predictor of in-hospital mortality. This underscores the importance of early and aggressive intervention in cardiogenic shock to stabilize hemodynamics, particularly in patients with severe presentations.[19] In another study, 300 AMI patients classified as SCAI C, D, and E were monitored using left ventricular assist devices (LVADs) and assessed for cardiogenic shock severity at admission and 24 hours post-admission, using both invasive and non-invasive hemodynamic measurements. The results indicated that for patients with similar initial shock severity, a deterioration in shock severity after 24 hours led to decreased survival at discharge, emphasizing the critical nature of the "golden hours" in managing shock.[21] Baran et al. evaluated 166 cardiogenic shock patients classified by SCAI stage at admission and at 24 hours, following them for 30-day mortality. They found that reassessment of the SCAI stage at 24 hours served as a strong predictor of 30-day survival, with patients whose shock severity improved demonstrating better outcomes than those with stable or worsening conditions. Notably, patients with unchanged shock severity after 24 hours had outcomes similar to those whose condition worsened.[20]

Limitations of the Study

Our study has several limitations. First, the sample size is relatively small, predominantly comprising patients classified as SCAI A, with a limited number of cases in the SCAI D and SCAI E groups. As a result, we could not thoroughly analyze the clinical characteristics, paraclinical findings, and cardiovascular events of the SCAI D and SCAI E subgroups. Second, the in-hospital mortality rate could not be directly assessed, as families often requested discharge when the patient's condition deteriorated. Consequently, instead of reporting in-hospital mortality, we evaluated the proportion of patients who either died or were discharged in critical condition. It should be noted that many of these patients did not die immediately after discharge but may have passed away days later. Third, the assessment of 30-day mortality was based on follow-up phone calls to the patients' relatives, as there is no centralized mortality management database in Vietnam. This method may introduce recall bias concerning the exact date of death. To minimize this limitation and improve the accuracy of our data, we often cross-checked the date of death using both lunar and solar calendars during follow-up calls.

CONCLUSION

The SCAI classification effectively predicts 30-day mortality in acute myocardial infarction patients with cardiogenic shock. A higher SCAI stage at admission and 24 hours post-admission is associated with increased 30-day mortality rates. Monitoring changes in SCAI classification over time can guide treatment decisions and enhance patient outcomes.

REFERENCE

1. Vahdatpour C, Collins D, Goldberg S. Cardiogenic Shock. *J Am Heart Assoc*. 2019;8(8):e011991. doi:10.1161/JAHA.119.011991
2. Sciaccaluga C, Mandoli GE, Ghionzoli N, et al. Risk stratification in cardiogenic shock: a focus on the available evidence. *Heart Fail Rev*. 2022;27(4):1105-1117. doi:10.1007/s10741-021-10140-7
3. Hochman JS, Sleeper LA, Webb JG, et al. Early revascularization in acute myocardial infarction complicated by cardiogenic shock. SHOCK Investigators. Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock. *N Engl J Med*. 1999;341(9):625-634. doi:10.1056/NEJM199908263410901
4. Thiele H, Zeymer U, Neumann FJ, et al. Intraaortic balloon support for myocardial infarction with cardiogenic shock. *N Engl J Med*. 2012;367(14):1287-1296. doi:10.1056/NEJMoa1208410
5. Bauer T, Zeymer U, Hochadel M, et al. Use and outcomes of multivessel percutaneous coronary intervention in patients with acute myocardial infarction complicated by cardiogenic shock (from the EHS-PCI Registry). *Am J Cardiol*. 2012;109(7):941-946. doi:10.1016/j.amjcard.2011.11.020

6. Ponikowski P, Voors AA, Anker SD, et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC)Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. *Eur Heart J*. 2016;37(27):2129-2200. doi:10.1093/eurheartj/ehw128
7. Ouweneel DM, Eriksen E, Sjauw KD, et al. Percutaneous Mechanical Circulatory Support Versus Intra-Aortic Balloon Pump in Cardiogenic Shock After Acute Myocardial Infarction. *J Am Coll Cardiol*. 2017;69(3):278-287. doi:10.1016/j.jacc.2016.10.022
8. Thiele H, Akin I, Sandri M, et al. PCI Strategies in Patients with Acute Myocardial Infarction and Cardiogenic Shock. *N Engl J Med*. 2017;377(25):2419-2432. doi:10.1056/NEJMoa1710261
9. Lee JM, Rhee TM, Hahn JY, et al. Multivessel Percutaneous Coronary Intervention in Patients With ST-Segment Elevation Myocardial Infarction With Cardiogenic Shock. *J Am Coll Cardiol*. 2018;71(8):844-856. doi:10.1016/j.jacc.2017.12.028
10. Baran DA, Grines CL, Bailey S, et al. SCAI clinical expert consensus statement on the classification of cardiogenic shock: This document was endorsed by the American College of Cardiology (ACC), the American Heart Association (AHA), the Society of Critical Care Medicine (SCCM), and the Society of Thoracic Surgeons (STS) in April 2019. *Catheter Cardiovasc Interv*. 2019;94(1):29-37. doi:10.1002/ccd.28329
11. Burkhoff D, Garan AR, Kapur NK. The SCAI Cardiogenic Shock Staging System Gets Taken for a Test Drive. *J Am Coll Cardiol*. 2019;74(17):2129-2131. doi:10.1016/j.jacc.2019.08.1020
12. Naidu SS, Baran DA, Jentzer JC, et al. SCAI SHOCK Stage Classification Expert Consensus Update: A Review and Incorporation of Validation Studies: This statement was endorsed by the American College of Cardiology (ACC), American College of Emergency Physicians (ACEP), American Heart Association (AHA), European Society of Cardiology (ESC) Association for Acute Cardiovascular Care (ACVC), International Society for Heart and Lung Transplantation (ISHLT), Society of Critical Care Medicine (SCCM), and Society of Thoracic Surgeons (STS) in December 2021. *J Am Coll Cardiol*. 2022;79(9):933-946. doi:10.1016/j.jacc.2022.01.018
13. Thygesen K, Alpert JS, Jaffe AS, et al. Fourth universal definition of myocardial infarction (2018). *Eur Heart J*. 2019;40(3):237-269. doi:10.1093/eurheartj/ehy462
14. Collet JP, Thiele H, Barbato E, et al. 2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. *Eur Heart J*. 2021;42(14):1289-1367. doi:10.1093/eurheartj/ehaa575
15. Jentzer JC, Wiley BM, Anavekar NS, et al. Noninvasive Hemodynamic Assessment of Shock Severity and Mortality Risk Prediction in the Cardiac Intensive Care Unit. *JACC Cardiovasc Imaging*. 2021;14(2):321-332. doi:10.1016/j.jcmg.2020.05.038
16. Schrage B, Dabboura S, Yan I, et al. Application of the SCAI classification in a cohort of patients with cardiogenic shock. *Catheter Cardiovasc Interv*. 2020;96(3):E213-E219. doi:10.1002/ccd.28707
17. Thayer KL, Zweck E, Ayouty M, et al. Invasive Hemodynamic Assessment and Classification of In-Hospital Mortality Risk Among Patients With Cardiogenic Shock. *Circ Heart Fail*. 2020;13(9):e007099. doi:10.1161/CIRCHEARTFAILURE.120.007099
18. Jentzer JC, van Diepen S, Barsness GW, et al. Cardiogenic Shock Classification to Predict Mortality in the Cardiac Intensive Care Unit. *J Am Coll Cardiol*. 2019;74(17):2117-2128. doi:10.1016/j.jacc.2019.07.077
19. Morici N, Frea S, Bertaina M, et al. SCAI stage reclassification at 24 h predicts outcome of cardiogenic shock: Insights from the Altshock-2 registry. *Catheter Cardiovasc Interv*. 2023;101(1):22-32. doi:10.1002/ccd.30484
20. Baran DA, Long A, Badiye AP, et al. Prospective validation of the SCAI shock classification: Single center analysis. *Catheter Cardiovasc Interv*. 2020;96(7):1339-1347. doi:10.1002/ccd.29319
21. Hanson ID, Tagami T, Mando R, et al. SCAI shock classification in acute myocardial infarction: Insights from the National Cardiogenic Shock Initiative. *Catheter Cardiovasc Interv*. 2020;96(6):1137-1142. doi:10.1002/ccd.29139

Wellens syndrome: A warning sign of an impending "catastrophe"

Martínez Benítez Piter ✉, Vu Huy Son, Nguyen Viet Anh
Chipi Rodríguez Yanitsy, Luu Thanh Hung, Nguyen Van Phuong Nhat
Hung Vuong General Hospital

▶ **Correspondence to**
Dr. Martínez Benítez Piter
Cardiology Department,
Hung Vuong General Hospital,
Phu Tho Province, Vietnam
Email: martinezbcard@gmail.com

▶ Received 24 April 2023
Accepted 25 June 2023
Published online 30 November 2024

To cite: Martínez BP, Vu HS, Nguyen VA, et al. *J Vietnam Cardiol* 2024;**112E**:87-91

ABSTRACT

The term acute coronary syndrome includes a set of symptoms and signs attributable to acute myocardial ischemia that is generally due to the rupture or erosion of an atherosclerotic plaque with the consequent formation of a thrombus that totally or partially obstructs the involved coronary artery. It has a wide range of clinical presentations. The electrocardiogram plays an important role in the diagnosis and treatment of acute coronary syndrome, the spectrum includes a normal electrocardiogram, T-wave abnormalities, ST-segment depression, or ST-segment elevation. It is also useful for acute coronary syndrome presentations that are not so typical and can sometimes go unnoticed, such as right or left bundle branch block, posterior wall myocardial infarction, de Winter T wave pattern, and Wellens syndrome. A case of Wellens syndrome was identified in an outpatient cardiology consultation, the patient was immediately referred for urgent invasive coronary angiography, and as a result, a stent was successfully implanted from the ostium of the anterior descending coronary artery. The early identification of these variants is valuable so that the patient receives optimal drug treatment and is referred on time to invasive coronary angiography. The role of the echocardiogram with strain imaging and its contribution to the diagnosis is highlighted.

Keywords: Acute coronary syndrome, Wellens syndrome, Pseudo-normalized T-waves, Echocardiogram.

INTRODUCTION:

Wellens syndrome was first described in 1982 by Wellens and colleagues. It is suggestive of anterior wall ischemia classically. Wellens syndrome describes a pattern of electrocardiographic (ECG) changes, particularly deeply inverted or biphasic T waves in leads V2-V3, that is highly specific for critical proximal stenosis of the left anterior descending (LAD) coronary artery. Typically, when patients present to the hospital, they are pain-free, and usually, cardiac enzymes are normal or slightly elevated. Patients with these features who are not brought to invasive coronary angiography (ICA) will develop an extensive anterior wall myocardial infarction. The treatment typically involves cardiac catheterization with percutaneous coronary intervention (PCI) to relieve the occlusion.[1]

As a whole, the patients are admitted to the hospital with the diagnosis of unstable angina (UA) with the typical ST-T segment changes suggestive of critical stenosis in the proximal LAD, de Zwaan and et al., evaluated 1260 patients consecutively admitted to the hospital because of UA, 180 of them had the ST-T changes suggestive of critical stenosis in the proximal LAD, most of them the abnormalities were present at the time of admission. The result of invasive coronary angiography showed 50% or more narrowing in the proximal LAD in all patients.[2]

The mechanism for this ECG pattern remains unclear. The ECG pattern is maintained for the following days even after revascularization, first the T wave normalizes, and then the ST segment. Some consider that the Wellens syndrome pseudo-normalized T-waves likely reflect the development of unstable angina pectoris into the hyperacute phase of ST-segment elevation myocardial infarction.[3,4]

The echocardiogram is a non-invasive test of undoubted value in the context of acute coronary syndrome (ACS), useful in the diagnosis and prognosis. Most patients with the Wellens pattern are free of symptoms at the time of consultation and myocardial damage markers are within normal or slightly increased parameters. Therefore, detecting regional wall motion abnormalities leads to a correct diagnosis and immediate referral to invasive coronary angiography.[5] If global longitudinal strain (GLS) by speckle tracking echocardiography is available seems to be an important additive method for the evaluation of left ventricular function with improved reproducibility compared with left ventricular ejection fraction (LVEF).[6]

Wellens patterns are not exceptional to ACS. In recent years, cases with electrocardiographic changes like Wellens pattern (pseudo-Wellens syndrome) have been identified in conditions such as persistent juvenile T wave, bundle branch blocks, cerebral hemorrhage, pulmonary edema, pulmonary embolism, pheochromocytoma, Takotsubo syndrome, digitalis, cocaine-consumption, and sepsis induce-cardiomyopathy.[7,8,9]

CASE REPORT

A 60-year-old male patient, smoking for 40 years, previous medical history of arterial hypertension for 5 years, and dyslipidemia, came to the cardiology consultation complaining of chest pain in the last week and several daily episodes unrelated to the effort. ECG showed sinus rhythm, normal heart axis, deeply biphasic T waves in leads V2-V3, and T waves negative in V4-V5 (Figure 1). Lab tests showed: Hemoglobin 146 g/l, Creatinine Clearance 67 mL/min, Total cholesterol 6.22 mmol/L, LDL cholesterol 4.38 mmol/L, glycate hemoglobin 5.9%, first Troponin 25.3 ng/L and second troponin 15.06 ng/L.

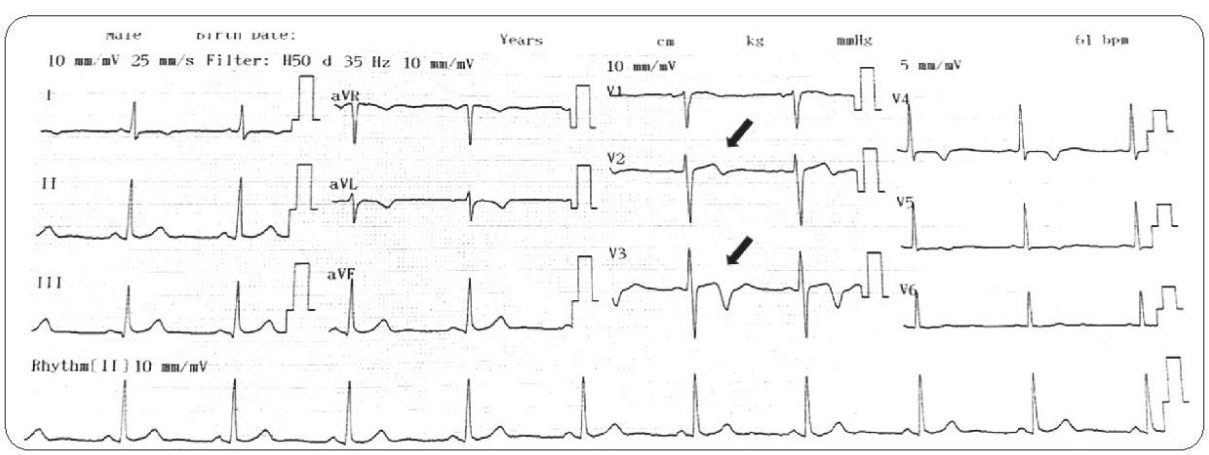

***Figure 1**. ECG shows sinus rhythm, normal heart axis, negative T wave in DI, AVL, V4, and V5, and biphasic T waves in leads V2-V3.*

Invasive coronary angiography was performed which showed critical stenosis in the proximal segment of the LAD artery (Figure 2-A). A successful Percutaneous Coronary Intervention was performed implanting a 3.0x18 mm drug-eluting stent from the LAD ostium (Figure 2-B).

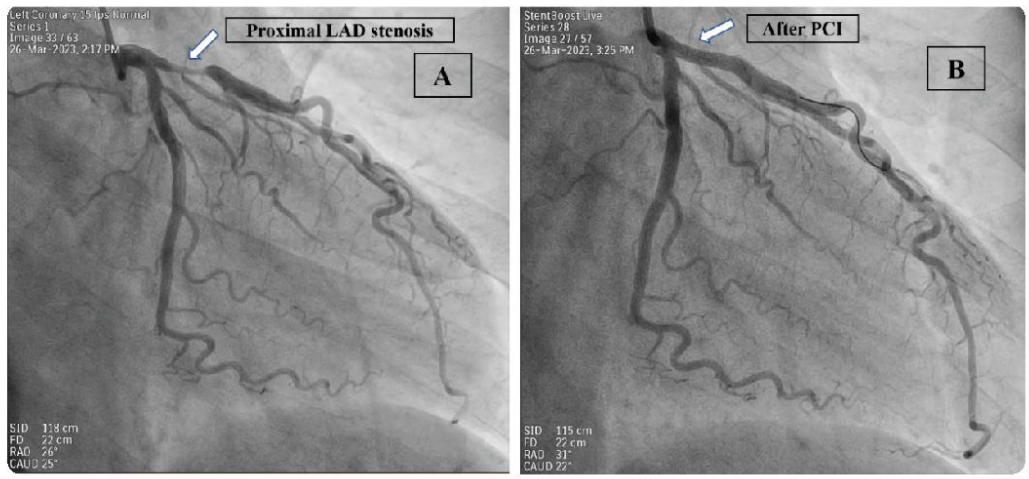

***Figure 2**. (A) Invasive coronary angiography shows severe stenosis in the proximal segment of the left anterior descending artery. (B) Successfully percutaneous coronary intervention (PCI) on the left anterior descending artery (LAD)*

The transthoracic echocardiogram reported normal left ventricle geometry, normal global left ventricle systolic function, and hypokinesis of the anterior wall (mid-apical segment). Using the Teicholz and Simpson methods LVEF was assessed with values of 62% and 58 % respectively, mitral annular plane systolic excursion (MAPSE) 10.9 mm, GLS Endo Peak Avg -16.5% with decreased strain in anterior wall (basal-mid-apical segment) and basal septum (Figure 3-A). Normal right ventricle systolic function, tricuspid annular plane systolic excursion (TAPSE) 19 mm. Left ventricle diastolic dysfunction grade I, left atrium Reservoir strain 40.2 %. Low probability of pulmonary hypertension.

The echocardiogram performed seven days after the PCI highlighted the following: No regional wall motion abnormalities, Teicholz and Simpson LVEF 68% and 65% respectively, MAPSE 14,3 mm, GLS Endo Peak Avg -24.2% (Figure 3-B).

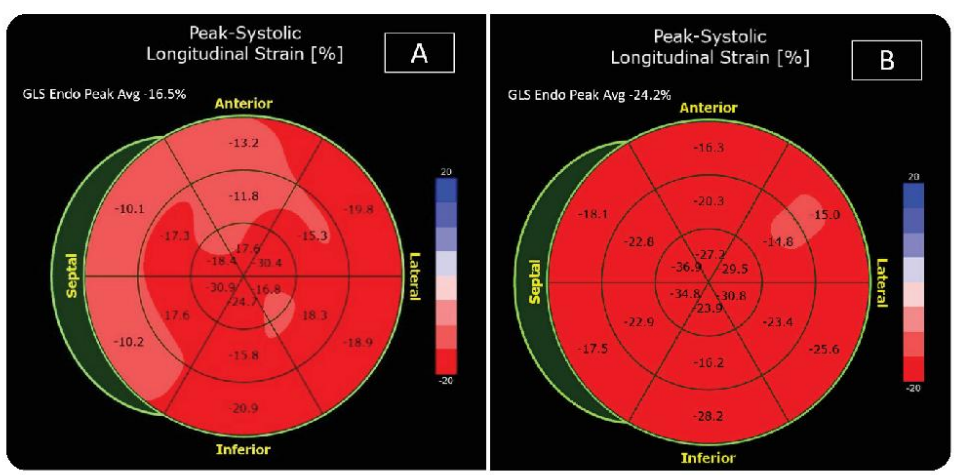

***Figure 3**. (A) Global Longitudinal Strain Endo Peak Avg -16.5%. (B) Global longitudinal Strain Endo Peak Avg -24.2%*

The patient presented a satisfactory evolution after seven days of medical treatment in the Coronary Intensive Care Unit and subsequently in the hospitalization room until discharge.

DISCUSSION

Wellens syndrome can be divided into two types according to the precordial T wave pattern seen during the pain-free period. In type A, there are biphasic T waves typically observed in V2 and V3. In Type B, which is the most common form, there are deep, negative T waves in leads V2 and V3.[10,11,12] This patient presented a Type A pattern and maintained the same pattern after seven days. Most of the cases reported in the literature normalize the ECG in days to a few weeks. Recognizing this pattern on the ECG is particularly important in emergency-related professionals, as missing this high-risk group of patients could have catastrophic consequences.

There are a few data on patients with Wellens syndrome, Zhou L, et al., evaluated a total of 2127 patients with ACS who underwent angioplasty on LAD, according to electrocardiographic criteria, they identified 200 with Wellens patterns. Wellens syndrome was often manifested as non-ST-elevation myocardial infarction (NSTEMI) and at a median follow-up of 24 months, Wellens syndrome was not associated with an increased risk of MACE or cardiac death.[13] The troponin test had not been established in the early 1980s when Wellens syndrome was described, so it was classically described in patients with unstable angina. Logically, nowadays many of these patients are diagnosed with NSTEMI.

Transthoracic echocardiography assessment of systolic and diastolic function, and regional wall motion abnormalities, increase the diagnostic efficacy, especially in early ACS presentations when the patient presents asymptomatic and/or with normal troponins.[14] In this patient, the initial echocardiogram reported hypokinesis in the anterior wall, which supported the diagnosis and contributed to the urgent invasive strategy.

Is well known the physiologic, technical, and clinical limitation of the conventional echocardiogram in the left ventricle function assessment. Strain imaging echocardiography has expanded in the diagnosis and prognosis of patients with ACS. GLS is very useful to identify early subclinical left ventricular dysfunction in the setting of preserved or mildly impaired systolic functional parameters. Regional deformation and strain curve morphology can help differentiate between normal, ischemic, and infarcted myocardium. GLS also predicts myocardial viability and assesses recovery of segmental and global left ventricular function.[15,16,17] The GLS in this patient was reduced in the acute phase in contrast to the normal LVEF. At seven days GLS improved greatly as well as the regional deformation, which brings good prognostic indicators.

CONCLUSION

It is to be expected that a proximal LAD stenosis or acute occlusion involves a large area of the myocardium. Rapidly identifying patients with Wellens syndrome is crucial to immediate intervention. The echocardiogram plays a valuable role in both diagnosis and follow-up.

REFERENCES

1. de Zwaan C, Bär FW, Wellens HJ. Characteristic electrocardiographic pattern indicating a critical stenosis high in left anterior descending coronary artery in patients admitted because of impending myocardial infarction. *Am Heart J*. 1982;103(4 Pt 2):730-736. doi:10.1016/0002-8703(82)90480-x
2. de Zwaan C, Bär FW, Janssen JH, et al. Angiographic and clinical characteristics of patients with unstable angina showing an ECG pattern indicating critical narrowing of the proximal LAD coronary artery. *Am Heart J*. 1989;117(3):657-665. doi:10.1016/0002-8703(89)90742-4
3. Tang N, Li YH, Kang L, et al. Entire process of electrocardiogram recording of Wellens syndrome: A case report. *World J Clin Cases*. 2022;10(19):6672-6678. doi:10.12998/wjcc.v10.i19.6672
4. Wang X, Sun J, Feng Z, et al. Two case reports of Wellens'

syndrome. *J Int Med Res*. 2018;46(11):4845-4851. doi:10.1177/0300060518800857

5. Bergmann I, Büttner B, Teut E, et al. Pre-hospital transthoracic echocardiography for early identification of non-ST-elevation myocardial infarction in patients with acute coronary syndrome. *Crit Care*. 2018;22(1):29. doi:10.1186/s13054-017-1929-1
6. Karlsen S, Dahlslett T, Grenne B, et al. Global longitudinal strain is a more reproducible measure of left ventricular function than ejection fraction regardless of echocardiographic training. *Cardiovasc Ultrasound*. 2019;17(1):18. doi:10.1186/s12947-019-0168-9
7. Lin AN, Lin S, Gokhroo R, et al. Cocaine-induced pseudo-Wellens' syndrome: a Wellens' phenocopy. *BMJ Case Rep*. 2017;2017:bcr2017222835. doi:10.1136/bcr-2017-222835
8. Inayat F, Riaz I, Ali NS, et al. Pseudo-Wellens' syndrome secondary to concurrent cannabis and phencyclidine intoxication. *BMJ Case Rep*. 2018;2018:bcr2018225755. doi:10.1136/bcr-2018-225755
9. Ju TR, Yeo I, Pontone G, et al. Pseudo-Wellens syndrome from sepsis-induced cardiomyopathy: a case report and review of the literature. *J Med Case Rep*. 2021;15(1):151. doi:10.1186/s13256-021-02756-y
10. Win Htut Oo SZ, Khalighi K, Kodali A, et al. Omnious T-wave inversions: Wellens' syndrome revisited. *J Community Hosp Intern Med Perspect*. 2016;6(4):32011. doi:10.3402/jchimp.v6.32011
11. Rhinehardt J, Brady WJ, Perron AD, et al. Electrocardiographic manifestations of Wellens' syndrome. *Am J Emerg Med*. 2002;20(7):638-643. doi:10.1053/ajem.2002.34800
12. Tandy TK, Bottomy DP, Lewis JG. Wellens' syndrome. *Ann Emerg Med*. 1999;33(3):347-351. doi:10.1016/s0196-0644(99)70373-2
13. Zhou L, Gong X, Dong T, et al. Wellens' syndrome: incidence, characteristics, and long-term clinical outcomes. *BMC Cardiovasc Disord*. 2022;22(1):176. doi:10.1186/s12872-022-02560-6
14. Kylmälä MM, Antila M, Kivistö SM, et al. Can strain rate imaging predict recovery of contraction after acute myocardial infarction?. *Eur J Echocardiogr*. 2011;12(5):364-371. doi:10.1093/ejechocard/jer026
15. Martínez P, Thanh DB, Pérez RT, et al. El ecocardiograma en el diagnóstico de la disfunción miocárdica por sepsis. Revista Cubana de Cardiología y Cirugía Cardiovascular. 2022;28(3).
16. Mghaieth Zghal F, Boudiche S, Haboubi S, et al. Diagnostic accuracy of strain imaging in predicting myocardial viability after an ST-elevation myocardial infarction. *Medicine (Baltimore)*. 2020;99(19):e19528. doi:10.1097/MD.0000000000019528

Introduction to authors

Journal of Vietnamese Cardiology, publishing license number: 528/GP-BVHTT; ISNN code: 1859-2848, is the official scientific publication of Vietnam National Heart Association. The Journal is published quarterly and there is a yearly issue published in English

The Journal of Vietnamese Cardiology will publish articles that cover relevant Cardiology and related fields. The purpose of the Journal is to bring its readers important researchs, insightful articles, clinical cases and new perspectives in the current practice of Cardiology.

The content of the articles belongs to the author themselves and not to the Editorial Board or the publisher. The Editorial Board and the publisher are not responsible for the legal or ethical nature of the articles. When submitting articles, the authors must confirm in the manuscript sent to the editor: "I agree to transfer all copyrights to publish this article [article title] to the Vietnam National Heart Association and declare that the article is original, does not infringe any third party publishing or proprietary rights, has not been submitted to another journal, and has never been published."

Authors of articles submitted to the Journal of Vietnamese Cardiology must clearly state the sources of funding for the research (if any). The editorial board must be made aware of other organizations that may have copyright disputes (such as co-ownership, consulting, etc.).

Articles will be reviewed by two or more editors. Articles are accepted based on content, creativity and validity. If accepted for publication, editors can make edits to make the article clearer and easier to understand without changing the essence of the article.

The Journal will consist of the following categories:

- Review
- Original Article
- Case Report
- Viewpoint
- Editorial

GENERAL REQUIREMENTS FOR MANUSCRIPT

The manuscript is written in Vietnamese or English (if submitted for the annual English issue), in Arial font (Unicode system), size 13, 1.5 lines spacing. Each article must not exceed 7 A4 pages, including tables, illustrations and references, references are cited in square brackets. Manuscripts must be clearly paginated.

The terms used in the article must be consistent with the Vietnamese Encyclopedia and the Vietnamese Nomenclature of Cardiovascular Disease published by the Vietnam National Heart Association (2003). Terms that are not included in the Nomenclature, if translated from a foreign language, must be accompanied by the original word. Abbreviations must be captioned.

The contact info must be displayed in the footer of the first page of the article, with the name of the main author of the article along with the contact address (mailing and email address).

RESEARCH ETHICS REQUIREMENT FOR MANUSCRIPTS

A manuscript is only accepted if its main author fulfills all the following:

a) The contents of the manuscript have not been published in whole or in parts in other journals;

(b) The manuscript has not been published in another journal;

(c) All authors have contributed significantly to the research or preparation of the manuscript and are jointly responsible for the contents of the manuscript;

(d) Adhere to research ethics safeguards (e.g., consent to participate in research) and the research must be approved by a reputable biomedical research ethics review board.

The authors also specify in the manuscript (Acknowledgements) the research funding agencies, the role of pharmaceutical companies, medical device companies, and other companies in supporting the research and commitment. conclusions about possible conflicts of interest related to the study.

SPECIFIC REQUIREMENTS FOR EACH ARTICLE TYPE

REVIEW

ARTICLE TITLE

(Short, concise but able to reflect the topic that is being reviewed, avoid abbreviations)

Author A, Author B, Author C **(order by contribution, from most to least)**

Organization Y, Organization X, Organization Z

Abstract: outlines the review topic, the objective of the article and references gathering, processing methods, research prospects and conclusion. The abstract must be written in one paragraph and should not exceed 200 words.

Keywords: illustrate the main problem that the research covers, maximum of 6 words or phrases.

INTRODUCTION

Clearly state the general problem and reason for the analysis, the meaning of the topic review, author's point of view and approach.

CONTENT

This can be divided into sub-sections depending on the author's point of view and approach,

there should be statements regarding future research prospects of the reviewed topic. The author should prioritize papers published near the time of writing the review.

CONCLUSIONS

Clearly state what information the review accomplished in providing, whether the review's objectives were achieved and research prospects for further research on the topic.

REFERENCES

Each review article should have no more than 15 references according to the guidelines.

ABSTRACT (written in English)

English title, abstract (does not exceed 200 words), keyword translated from the original Vietnamese version.

ORIGINAL ARTICLE

ARTICLE TITLE

(Short, concise but able to reflect the topic that is being reviewed, avoid abbreviations)

Author A, Author B, Author C (**order by contribution, from most to least**)

Organization Y, Organization X, Organization Z

ABSTRACT: illustrates the main findings and conclusion of the research. The abstract must be written in one paragraph and should not exceed 200 words.

Keywords: illustrate the main problem that the research covers, maximum of 6 words or phrases.

INTRODUCTION

Introduce research objectives in relation to other studies in the field, 1 A4-page long (about 500 words) and cite at least 5 references.

MATERIALS AND METHODS

Short, concise while still have adequate information so that the reader can comprehend the research process. New processes that have never been done before need to be described in detail and have reference citations. Clearly state that the IRB has approved the ethics of the research (if required).

RESULTS

Figures and tables are clearly presented with brief captions. Results that are not presented in tables can be described in paragraphs. The total number of tables and figures should not exceed 5. The scanned image must be in the correct position for illustration and accompanied by the original image.

DISCUSSIONS

Should not be longer than 2 typed pages, only contain discussion and explanations related to the obtained results.

CONCLUSIONS

Brief, concise. Do not relist the results of the research.

REFERENCES

- References are cited by number, not by author and publish year.
- References are collected and sorted by order of appearance in the article.
- References in foreign languages must be kept untranslated and untransliterated.
- Refrain from using theses, dissertations, textbooks and websites as references.
- Each article should have no more than 10 references.
- A reference must be presented as follows: full names of authors (if the author is a foreigner, in order: full surname, middle name and initials.) Journal name, year of publication, volume (number): page If the article has more than one author, write only the names of the first three authors and associates.

ABSTRACT (written in English)

English title, abstract (does not exceed 200 words), keyword translated from the original Vietnamese version.

CASE REPORT ARTICLE

ARTICLE TITLE

(Short, concise but able to reflect the topic that is being reviewed, avoid abbreviations)

Author A, Author B, Author C (**order by contribution, from most to least**)

Organization Y, Organization X, Organization Z

ABSTRACT: depicts the context of case detection, briefly introduce the process of detection, diagnosis, treatment and results. The abstract must be written in one paragraph and does not exceed 200 words.

Keywords: illustrate the main problem that the research covers, maximum of 6 words or phrases.

INTRODUCTION

Introduce the social and historical context of the case for the readers to understand the benefits of knowing the case information.

CASE INTRODUCTION

Describe the circumstances in which the case was discovered, plans, management and treatment procedures and treatment results.

DISCUSSIONS

Should not be longer than 2 typed pages, explain in detail the circumstances of the case and the obtained results.

CONCLUSIONS

Brief, concise. Do not relist the results of the research.

REFERENCES

In accordance with the guidelines for presenting research paper results.

ABSTRACT (written in English)

English title, abstract (does not exceed 200 words), keyword translated from the original Vietnamese version.

Thank you for your collaboration.

Editorial Board – Journal of Vietnamese Cardiology