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Early detection of heart attack after cardiac catheterization in health promotion perspective: a case study

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ABSTRACT

Heart attack cases among cardiovascular disease continue increasing every year and ranking as the highest cause of death in Indonesia. The objective of this research was to provide a framework for health promotion nurses to prevent heart attack after cardiac catheterization. This research used case study with Case Management Society of America (CMSA) model. The case was selected from a patient with Coronary ArteryDisease (CAD), 58 years old, retired of civil servant, ex-chronic smoker, controlled hypertention and family history of CAD. The stages of CMSA data processing include Assessment, Preparation Pre-Catheterization, Recovery Phase, Planning and Intervention, and Evaluation. Objective data was taken from the physical examination results. Subjective data were obtained from interviews according to the CMSA standard, reputed journals and other official documents. Analysis of the case study was conducted by coding, categorizing, comparing and organizing. This case study revealed that health promotion nurses need to know the potential complications of post heart catheterization i.e. shortness of breath, chest pain, lack of activity that is not known by family members, assumptions about uncontrolled nutrition, irregular medication, and heart attacks. The research recommended to prevent heart attacks to post catheterization, health promotion nurses have to provide daily notes as patient's progress reports and set a regular follow up.

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INTRODUCTION

Heart attack among cardiovascular disease patients pose high risk and is the number one cause of death in the world (Aminde et al., 2017; Thabet et al., 2019). This disease has killed as many as 17.3 million people every year (Seo & Cho, 2021). The prevalence of cardiovascular disease continues to increase every year and ranks as the highest cause of death in Indonesia, especially in productive ages (Maharani et al., 2019). Riskesdas data shows the prevalence of cardiovascular diseases such as hypertension increased from 25.8% (2013) to 34.1% (2018), stroke 12.1 per mile (2013) to 10.9 per mile (2018), coronary heart disease remains 1 ,5% (Kemenkes, 2018). Riskesdas 2018 data also reports that

the prevalence of heart disease based on medical diagnoses in Indonesia reaches 1.5%, with the highest prevalence in North Kalimantan 2.2%, DIY 2%, and Gorontalo 2%. The eight provinces with a higher prevalence compared to the national prevalence are Aceh (1.6%), West Sumatra (1.6%), DKI Jakarta (1.9%), West Java (1.6%), Java Central (1.6%), East Kalimantan (1.9%), North Sulawesi (1.8%) and Central Sulawesi (1.9%) (Kemenkes, 2018).

Coronary heart disease is a heart disease that occurs due to decreased blood supply to the heart muscle caused by narrowed or blocked coronary arteries (atherosclerosis) so that the heart can experience ischemia and myocardial infarction can occur (Rizk & Blankstein, 2021). Everyone basically has a risk of CAD (Darmayanti, 2022). CAD risk factors are divided into two major groups, namely: non-preventable or non-modifiable risk factors and modifiable or preventable risk factors. men do have higher risk factors than women, this can happen because in men the morbidity rate due to CAD is twice as large as women and occurs almost 10 years earlier than women, because women have the hormone estrogen which is protective but when it has experienced menopausal men and women have the same risk (Khan et al., 2020). The Framingham study also determined that one of the predictors of cardiovascular causes was gender (Rospleszcz et al., 2022). Risk factors in CAD patients are very multi-factorial, namely smoking, family history, alcohol, and obesity (Naomi et al., 2021). Patients with this type of risk factor for smoking are the most and occupy the portion of 30.4% (Maharani et al., 2019). Smokers have a 2-3 times higher risk of dying from CAD than nonsmokers (Azzopardi et al., 2019).

Many studies focused on medical and curative approaches. Cardiac catheterization in coronary heart disease patients is mostly PAC (Percutaneous Coronary Angiography) as an initial diagnostic step (Ali & Ali, 2019). PAC or coronary angiography is performed if the results of non-invasive examination are less informative or because there are contraindications (Avdikos et al., 2017). PAC is the most accurate and standardized examination to identify narrowing of blood vessels associated with atherosclerosis in the coronary arteries of the heart (Rusli et al., 2021). In addition, PAC or coronary angiography is the most reliable examination to provide information on coronary anatomy in patients with coronary heart disease after medical treatment or revascularization, such as Percutaneous Coronary Intervention (PCI), or Coronary Artery Bypass Graft (CABG) (Kis & Soydan, 2020). Based on the comorbidities of coronary heart disease (CAD) patients with cardiac catheterization at Dr. RSUP. Kariadi Semarang is mostly hypertensive, namely 80 respondents (29.6%) (Rosaria, 2020). High blood pressure can cause CAD because the increase in blood pressure causes increased pressure on the artery walls and causes endothelial damage that can lead to atherosclerosis (Jebari-Benslaiman et al., 2022). Atherosclerosis changes in blood vessel walls cause an increase in blood vessels so that there is a synergy between blood pressure and atherosclerosis (Marcone et al., 2017). The result of hard heart work due to hypertension is thickening of the left heart muscle and this condition will reduce the heart cavity to pump so that the workload of the heart increases (Amisi et al., 2018). In the nursing perspective, studies show preventive measures play very important roles to avoid heart attack among heart disease patients (Hasballah et al., 2019), particularly in health promotion view point (Hickey et al., 2018).

This case study sought to reveal the provide a framework for health promotion nurses to prevent heart attack after cardiac catheterization and further complications. The implication is that a systematic prevention framework of health promotion for can be obtained. It is hoped that this framework can be used as a guide for community nursing in helping to treat patients after cardiac catheterization in terms of emotions, nutrition, mobilization and monitoring the consumption of their medication.

RESEARCH METHOD

This case study used the Case Management Society of America (CMSA) model. It focused on the coordination of patient care, efficient use of resources, improving the quality of care, data and outcomes analysis, and patient advocacy. This model encourages psychological and emotional

empowerment through coordination in care by reframing internal narratives and social empowerment by changing environmental factors that can hold clients back. The primary data collected from the case that was selected from a Coronary Artery Disease (CAD) patient, 58 years old, retired registered nurse, with a history of smoking, hyertention and family history of CAD. The stages of data collection carried out with this CMSA model include Assessment, Preparation Pre-Catheterization, Recovery Phase, Planning and Intervention, and Evaluation. The objective data were the results of physical examination. Subjective data were obtained from interviews according to the CMSA standard. Analysis of the case study by coding, categorizing, comparing and organizing. The secondary data were from reputable journals taken from the last five years (2017-2022) and other official documents such as the Ministry of Health or WHO using the keywords concerning the topic i.e. catheterization, health promotion nurses, heart attack.

RESULTS AND DISCUSSIONS

Results

This case study exposed three major results, firstly the results of interviews which are related to the history of the disease, collection of results of physical examinations, laboratories, ECG and X-rays before being diagnosed with CAD and it was decided to carry out cardiac catheterization procedures. Examination results before and after catheterization include vital signs, complete urine and blood laboratory, kidney function, heart rhythm problems (arrhythmias), infections, blood pressure, allergy to contrast dye, history of stroke, iron deficiency/lack of blood, electrolyte disturbances, digestive tract problems, emotional readiness and family support. Secondly, identified potential complications due to pain, emotional instability, lack of patient mobilization, irregular drug consumption, inadequate nutritional intake, uncontrolled vital signs and general symptoms of uncontrolled patients. Thirdly, a health promotion framework for nurses to prevent heart attack after cardiac catheterization and further complications.

Assessment

The subjective data were obtained from the results of interviews in which Mr. H explained that his main complaint was shortness of breath, sometimes accompanied by chest pain. Mr. H was a chronic smoker, for 27 years before quitting smoking in 2020. Married and had three children and one grandchild. Raised in 12 siblings, as the 11th child, and all of his siblings had a history of hypertension. His late father, apart from hypertension, also had a stroke. Two of his brothers had a catheterization procedure over the age of 60. The diet favors vegetables, fruit and sometimes fish and meat. He liked sports, especially cycling, badminton and jogging. Complaints began around March 2020 during the Covid-19 pandemic. At first he thought he was exposed to the Corona virus, so when he visited the doctor he was swabbed and PCR done. But the result was negative. The PCR technician said that Mr. H has been exposed to Corona. He received treatment as a Covid-19 patient. His complaints never subsided. He changed several specialists for two years. Herbal treatment was also taken, but there was no change. In early 2022 he met a Cardiologist. From there, an ECG and CT scan were performed. According to him, the results of those two examinations were not clear, then an echocardiogram was done. The diagnosis established was CAD.

From the objective data, information was obtained in March 2020, weight and height were 168 cm/76 kgs. Blood pressure 140/90 mmHg. Hemoglobin, PCR were negative. ECG was at grade 2 diastolic disturbance, concentric hypertrophy, and segmentation hypokinetics. Thorax results: Cord and Pulmo showed no abnormalities, there was no congestion/consolidation process in both lungs. PCR specimen type Nasopharygeal Swab negative. Activated Clotting Time test: 150.0 (High). Laboratory: hemoglobin 12.9, Leucocyt 7.45, Thrombocyt 218, erythrocyte sedimentation rate 21 (H) and Serum Creatinine 1.53.

Angiography

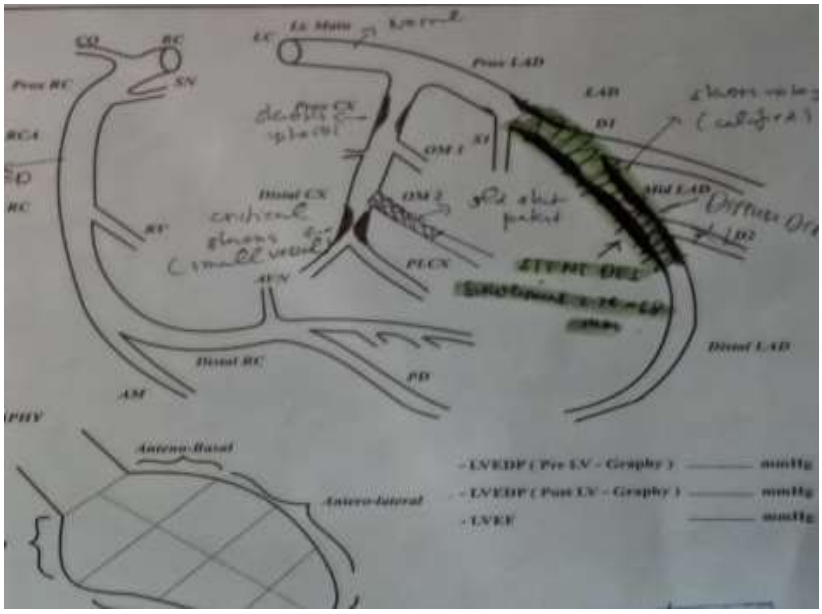

Figure 1. Angiography Coroner Test of Mr. H.

Source: Angiography Coroner Test of Mr. H.

The picture shows that at least four vessels were blocked. The first catheter was inserted last year (2021) (right vessel).

Mr. H condition at Pre-Catheterization

During the procedure, the patient claimed to be fully conscious and mentally prepared. When the first catheterization procedure took place, the patient did not feel any pain. According to him the pain scale was less than one. However, during the second catheterization procedure, the patient claimed to be very painful, even reaching a pain scale of 9-10, until he struggled to stopped. However, the procedure continues until it finished.

Mr. H condition at Recovery Phase

After the catheterization, Mr. H was transferred to the Recovery Room. Approximately 12 hours under supervision, especially the location of the needle in the thigh, the patient's response to pain, level of consciousness, vital signs, and ECG. The patient was strictly advised to rest with the right leg straight and not bent for 8 hours. As a pain reliever, Mr. H admitted that he was given the 5mg ISDN drug which he said was very effective.

Post Catheterization and Medical Intervention

The drugs consumed for antihypertensive and pain relief include Adalatu Oros 30 mg, Bisoprolol 5 mg, Valsartan 160 mg, Miniaspi 80 mg, Isosorbide Dinitrate (ISDN) 5 mg. Everything is drunk in the morning. While in the afternoon Clopidrogel 75 mg and ISDN 5 mg. Evening and Ator Vastatin 20 mg and ISDN 5 mg. In addition to taking drugs regularly, Mr. H. was advised to reduce fatty foods, red meat, food portions so as not to gain weight, moderate exercise for minutes per day, and avoid excessive mental stress.

Health Promotion Framework for Nurses

Health promotion nursing is a professional nursing service aimed at the community with an approach to high-risk groups, in an effort to achieve optimal health degrees through disease prevention and health promotion by ensuring the affordability of the health services needed. In this case the Tones Health Promotion model was used to identify educational, preventative empowerment and radical approaches to promoting public health and acknowledge that each has its merits. The model addressed social and environmental inequalities, which influence individuals and communities (Borisch, 2019). Mr. H was a nurse by profession who had knowledge about his heart problem, lived among health care professionals that able to promote his health. He had full support, socially and psychologically in the community. His colleagues at work were mostly community health professionals carried out through health promotion (promotive) and disease prevention at all levels of prevention in a public health center. The community nursing involvement in this case means applying nursing practice in an effort to improve his health status through promotive and preventive programs in the community.

Case Study Analysis

Analysis of the case study was conducted by coding, categorizing, comparing and organizing. Coding was done through the identified problem. The second step was categorizing, namely anxiety, potential lack of nutritional intake, lack of activity, ineffective monitoring, potential for inappropriate medical check-ups, inadequate family support due to lack of knowledge about cases and the possibility of shock du to the problem taking place during the Covid-19 pandemic. The third step was comparing with other CAD cases in general where there was discomfort in the chest that radiates to the neck, jaw, shoulder, and left hand, back, left side of the abdomen (often considered an ulcer). Cold sweats, nausea, vomiting, or easily tired but not often found in Mr. H. The last step of organizing was prioritizing the problem by placing the most important problem, very dangerous to the client's safety. Researchers took the main priority, namely the possibility of recurrence of shortness of breath, chest pain and heart attack. In short, the problems faced by Mr. H from the perspective of health promotion nursing with Tones model were the potential for shortness of breath, chest pain, lack of activity and unknown to family members, uncontrolled nutrition assumptions, taking medication irregularly and heart attacks.

Study Limitations

The results of this study cannot be used to generalize all cases with the same diagnosis because only one patient was analyzed and discussed. However, it can contribute to the management of how to treat patients after cardiac catheterization in the view of health promotion nursing. Many related studies have been carried out with a focus on the causes of catheterization procedures, factors that need to be considered in general catheterization therapy and general cardiovascular nursing, with quantitative and qualitative research methods. While this study focused on preventing heart attack as the complication from the point of view of health promotion nursing. In the future, it is recommended the need for similar research involving more respondents, with more varied backgrounds such as gender, social culture, locations and different comorbidities.

Discussions

This study has identified five main problems in CAD case of Mr. H., namely the potential for shortness of breath, chest pain, lack of activity and unknown to family members, assumptions about uncontrolled nutrition, taking medication irregularly and heart attacks. The research focus was on preventing complications of possible heart attack by using Tones Health Promotion Model. From the subjective data obtained chest pain was the main problem and from the objective data shortness of breath. Those two symptoms and signs of aging frequently occur in CAD patients

(Purbasari et al., n.d.). Those two symptoms if not addressed will worsen the patient's condition. While the lack of activity that is not known to the family, the assumption of inadequate nutrition, taking medication irregularly are activities that can be planned by the client by involving cooperation with the family are other factors that can support aggravating when complications occur. Heart attacks can occur due to one or a combination of various factors, both of which are being experienced by Mr. H or other precipitating factors were not identified in this case but could appear later in life, as a complication (Septianingrum & Damawiyah, 2021). Heart attack is the worst result of all the complications that exist (Marcone et al., 2017). Therefore, to prevent complications, a structured nursing plan is needed by involving all parties, both patients, families and health workers (nurses, treating doctors and other medical technicians such as lab technicians, nutritionists, and ECG technicians). Those steps are the common principles in health promotion program (Mohebi et al., 2018; Washington et al., 2018).

The main task of Community Health Nurses (CHN) in the community is to improve the level of health, maintain the health of individuals, families and communities and prevent disease or complications if they have contracted the disease (Afzal et al., 2021). In the case of Mr. H, health promotion nurses who are part of community nurses in public health services are expected to be involved in overcoming those problems in two ways. The first is the government route through the Public Health Center (PHC) or the independent private route. The PHC route is taken when the patient comes to the PHC and is recorded. With this procedure, CHN can do direct monitoring when patients come to PHC, evaluate by contacting by telephone or home visit. The private route is taken if the patient contacts CHN independently. In this case, because Mr. H is a retired civil servant and an ex-PHC nurse, so CHN has no difficulties because of the patient's potentials as a nurse. The patient understands his physical condition and is easy to work with in discussing how to solve his health problem.

However, recording and reporting aspects are very important in handling those cases so that problem solving can be carried out in a systematic and structured manner. Problems that have been identified are to be discussed with the patient one by one and it is necessary to ensure that the patient understands them. For example, the worst complication is a heart attack needs to be well understood. This is in line with the main principle of Tone Health Promotion model putting the most important aspect to be the first priority (Aqtam & Darawwad, 2018). Therefore, patient must always be vigilant, take ISDN drugs with him, avoid tiring activities and reduce the intake of fatty foods or those that use cooking oil. Patients should also be ensured to understand the importance of discipline in light exercise, 30 minutes of jogging every day (Perry et al., 2018). Patient should be advised to have a diary as a record of progress reports. The goal is to know the progress of the condition and note when complications occur, both minor and major. Family members (patient's wife) can be involved if necessary. This health diary can be shown to CHN or the treating doctor when the patient visits him. Thus the evaluation of the patient's health after cardiac catheterization can be measured. This is the main purpose of health promotion nursing in the community for patients who have undergone post catheterization procedures at the hospital. By doing the health life style, routine taking medicines, and regular monitoring, nnnecessary visits to the hospital and the possibility of complications (nosocomial infection) can be avoided. Besides, the effectiveness and efficiency of public health services can be increased.

CONCLUSION

This case study has tried to describe how to prevent heart attack as the worst complication in patients after cardiac catheterization. Two biggest problems that may occur that were previously often experienced by the patient are shortness of breath and data pain. The worst result of this case is the occurrence of a heart attack. After analyzing using Tones Health Promotion model, this study recommends providing a health promotion framework, through a daily diary that is filled out by patients regularly as an evaluation material or progress report on their health condition. With a note

that all problems and possible complications that occur in patients have been discussed beforehand. Interestingly, in this case, the patient is a retired PHC nurse, thus facilitating cooperation, both in terms of treatment, nursing and how to handle it in the event of an emergency. The weakness of this study is that it does not involve several cases which can be used to provide a broader picture of health promotion framework by nurses. Therefore, it is recommended that future research, with quantitative methods, involving more CAD patients with more varied backgrounds would be beneficial.

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References

Afzal, R., Hardy, S., Tukayo, I. J. H., & Sasmita, T. Y. (2021). Improving Public Awareness on Peritoneal Dialysis Through Public Health Nurses: a Document Review. *Jurnal Mitra Kesehatan*, *4*(IAHSC), 25–32. https://doi.org/10.47522/jmk.v1iiahsc.109

Ali, H. A. E., & Ali, M. M. (2019). Effect of Designed Teaching Protocol Regarding Patients' Safety after Cardiac Catheterization on Nurses' Performance and Patients' Incidence of Vascular Complications. *International Journal of Studies in Nursing*, *4*(1), 107. https://doi.org/10.20849/ijsn.v4i1.555

Aminde, L. N., Takah, N., Ngwasiri, C., Noubiap, J. J., Tindong, M., Dzudie, A., & Veerman, J. L. (2017). Population awareness of cardiovascular disease and its risk factors in Buea, Cameroon. *BMC Public Health*, *17*(1), 1–10. https://doi.org/10.1186/s12889-017-4477-3

Amisi, W. G., Nelwan, J. E., & Kolibu, F. K. (2018). The relationship between hypertension and the incidence of coronary heart disease in patients treated at the Central General Hospital Prof. Dr. R.D. Kandou Manado. *Kesmas*, *7*(4), 1–7.

Aqtam, I., & Darawwad, M. (2018). Health Promotion Model: An Integrative Literature Review. *Open Journal of Nursing*, *08*(07), 485–503. https://doi.org/10.4236/ojn.2018.87037

Avdikos, G., Karatasakis, A., Tsoumeleas, A., Lazaris, E., Ziakas, A., & Koutouzis, M. (2017). Radial artery occlusion after transradial coronary catheterization. *Cardiovascular Diagnosis and Therapy*, *7*(3), 305–316. https://doi.org/10.21037/cdt.2017.03.14

Azzopardi, P. S., Hearps, S. J. C., Francis, K. L., Kennedy, E. C., Mokdad, A. H., Kassebaum, N. J., Lim, S., Irvine, C. M. S., Vos, T., Brown, A. D., Dogra, S., Kinner, S. A., Kaoma, N. S., Naguib, M., Reavley, N. J., Requejo, J., Santelli, J. S., Sawyer, S. M., Skirbekk, V., … Patton, G. C. (2019). Progress in adolescent health and wellbeing: tracking 12 headline indicators for 195 countries and territories, 1990–2016. *The Lancet*, *393*(10176), 1101–1118. https://doi.org/10.1016/S0140-6736(18)32427-9

Borisch, B. (2019). *Health Promotion Strategies An Overview* (Issue July, pp. 1–28). https://easo.org/wp-content/uploads/2019/08/Bettina-Borisch-Health-Promotion-Strategies.pdf

Darmayanti, R. (2022). Description Of Anxiety Level Of Cad Patients Before Heart Caterization In The Intermediate Room. *Jurnal Keperawatan BSI*, *10*(1), 130–137.

Hasballah, S., Shaor, O., Mohamed, M., & Mohamed, A. (2019). Assess Nurses' Knowledge and Attitude for Patient Safety in Cardiac Catheterization Unit. *Assiut Scientific Nursing Journal*, *7*(19), 151–159. https://doi.org/10.21608/asnj.2019.74145

Hickey, A., Mellon, L., Williams, D., Shelley, E., & Conroy, R. M. (2018). Does stroke health promotion increase awareness of appropriate behavioural response? Impact of the face, arm, speech and time (FAST) campaign on population knowledge of stroke risk factors, warning signs and emergency response. *European Stroke Journal*, *3*(2), 117–125. https://doi.org/10.1177/2396987317753453

Jebari-Benslaiman, S., Galicia-García, U., Larrea-Sebal, A., Olaetxea, J. R., Alloza, I., Vandenbroeck, K., Benito-Vicente, A., & Martín, C. (2022). Pathophysiology of Atherosclerosis. *International Journal of Molecular Sciences*, *23*(6), 1–38. https://doi.org/10.3390/ijms23063346

Kemenkes. (2018). *HASIL UTAMA RISKESDAS*.

Khan, M. A., Hashim, M. J., Mustafa, H., Baniyas, M. Y., Al Suwaidi, S. K. B. M., AlKatheeri, R., Alblooshi, F. M. K., Almatrooshi, M. E. A. H., Alzaabi, M. E. H., Al Darmaki, R. S., & Lootah, S. N. A. H. (2020). Global Epidemiology of Ischemic Heart Disease: Results from the Global Burden of Disease Study. *Cureus*, *July*.

https://doi.org/10.7759/cureus.9349
Kis, M., & Soydan, E. (2020). Preservation of Radial Vasomotor Functions through the Anatomic Snuffbox: A Prospective Comparison with other Radial Accesses during Coronary Angiography. *Journal of the College of Physicians and Surgeons Pakistan*, *30*(11), 1121–1125. https://doi.org/10.29271/jcpsp.2020.11.1121
Maharani, A., Sujarwoto, Praveen, D., Oceandy, D., Tampubolon, G., & Patel, A. (2019). Cardiovascular disease risk factor prevalence and estimated 10-year cardiovascular risk scores in Indonesia: The SMARThealth Extend study. *PLoS ONE*, *14*(4), 1–13. https://doi.org/10.1371/journal.pone.0215219
Marcone, S., Belton, O., & Fitzgerald, D. J. (2017). Milk-derived bioactive peptides and their health promoting effects: a potential role in atherosclerosis. *British Journal of Clinical Pharmacology*, *83*(1), 152–162. https://doi.org/10.1111/bcp.13002
Mohebi, S., Parham, M., Sharifirad, G., & Gharlipour, Z. (2018). *Social Support and Self‐Care Behavior Study*. *January*, 1–6. https://doi.org/10.4103/jehp.jehp
Naomi, W. S., Picauly, I., & Toy, S. M. (2021). Risk Factors for Coronary Heart Disease (Case Study at Prof. Dr. W. Z. Johannes Kupang Hospital). *Media Kesehatan Masyarakat*, *3*(1), 99–107.
Perry, L., Xu, X., Gallagher, R., Nicholls, R., Sibbritt, D., & Duffield, C. (2018). Lifestyle health behaviors of nurses and midwives: The 'fit for the future' study. *International Journal of Environmental Research and Public Health*, *15*(5). https://doi.org/10.3390/ijerph15050945
Purbasari, D., Yunita, N., Wahyuni, U., Studi Keperawatan dan Profesi Ners STIKes Mahardika Cirebon, P., & Author, C. (n.d.). *Correlation Administration of Informed Consent with Self Efficacy of Pre Heart Catheterization at RS jantung Hasna Medika*. www.jurnal.stikesmahardika.ac.id
Rizk, T., & Blankstein, R. (2021). Not All Heart Attacks are Created Equal: Thinking Differently About Acute Myocardial Infarction in the Young. *Methodist DeBakey Cardiovascular Journal*, *17*(4), 60–67. https://doi.org/10.14797/mdcvj.345
Rosaria, I. (2020). Perbandingan Kadar CD4 dan Total Lymphocyte Count dengan Kombinasi Highly Active Antiretroviral Therapy pada pasien HIV/AIDS di RSUP Dr.Kariadi Semarang. *Jurnal Kesehatan Andalas*, *9*(1), 59. https://doi.org/10.25077/jka.v9i1.1223
Rospleszcz, S., Starnecker, F., Linkohr, B., Scheidt, M. von, Gieger, C., Schunkert, H., & Peters, A. (2022). Validation of the 30-Year Framingham Risk Score in a German Population-Based Cohort. *Diagnostics*, *12*(4), 1–11. https://doi.org/10.3390/diagnostics12040965
Rusli, R. A., Darliana, D., & Kamal, A. (2021). Coping Mechanisms in Heart Failure Patients. *JIM FKep*, *V*(1), 42–47.
Seo, Y. H., & Cho, K. A. (2021). Effect of Korean advanced life support education on non-technical and technical skills of nursing students: A pilot study. *Healthcare (Switzerland)*, *9*(10). https://doi.org/10.3390/healthcare9101253
Septianingrum, Y., & Damawiyah, S. (2021). Raising Awareness of Heart Attacks on Lansia in the Wonokromo Village Area. *Community Service Journal of Indonesia*, *2*(2), 24–27. https://doi.org/10.36720/csji.v2i2.252
Thabet, O. F., Ghanem, H. M., Ahmed², A. A., & Abd-Elmouhsen, S. A. (2019). *Effect of Developing and Implementing Nursing Care Standards on outcome of Patients Undergoing Cardiac Catheterization*. *8*(1), 42–54. https://doi.org/10.9790/1959-0801054254
Washington, T. R., Hilliard, T. S., Mingo, C. A., Hall, R. K., Smith, M. L., & Lea, J. I. (2018). Organizational readiness to implement the chronic disease self-management program in dialysis facilities. *Geriatrics (Switzerland)*, *3*(2). https://doi.org/10.3390/geriatrics3020031