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THE IMPACTS OF EDUCATION ON SELF-MANAGEMENT OF *ACUTE CORONARY SYNDROME PATIENTS* WITH TYPE 2 DIABETES MELLITUS: LITERATURE REVIEW

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ABSTRACT

Heart disease is the leading cause of death worldwide, about 32.2% of Acute Coronary Syndrome (ACS) patients reported also suffering from Diabetes Mellitus. ACS and DMT2 contribute greatly to the health status and quality of life of patients, thus requiring coordinated management and health education that can improve knowledge, self-efficacy, and self-management behaviors in ACS patients with DMT2. Research on education of ACS patients with T2DM is still limited, so the purpose of this literature review is to evaluate the benefits of education on self-management of ACS patients with T2DM. The databases used are Sciencedirect, Pubmed, Cochrane Library, and Proquest, articles published in the last 5 years. The main keyword combinations used are Acute Coronary Syndrome, Education, Self-Management, and Type 2 Diabetes Mellitus. The first search results found 451 articles, after screening and evaluation, three articles meet the criterias such as: a quasy experiment on ACS and DMT2 and published in last five years. The results of the review showed that providing education during face-to-face treatment can improve fasting blood glucose, ACS symptom management, and DMT2 self-management. Education during treatment with 1-2 phone calls and social media affects the patient's ability to manage ACS symptoms at discharge. It also found the impact of continuous education on self-management delivered during follow-up, conducted via telephone, social media applications, and home visits. Thus, health workers are expected to be able to provide education to ACS and DMT2 patients face-to-face, telephone, social media, videos, and education continuously with home visits.

***Keywords**: Acute Coronary Syndrome, Education, Self management, Type 2 Diabetes Mellitus*

INTRODUCTION

Heart disease is the leading cause of death worldwide, an estimated 17.9 million people died from heart disease in 2019 and 8.9 million deaths were due to coronary heart disease (World Health Organization, 2021). Heart disease increased by 32.2% in patients with Diabetes Mellitus. Macrovascular complications such as coronary heart disease, cerebrovascular disease, and peripheral artery disease are the leading causes of death in Diabetes Mellitus patients, where coronary heart disease causes 75% of deaths (Einarson et al., 2018).

The prevalence of coronary heart disease in Diabetes Mellitus patients in Indonesia based on the results of the 2013 Riskesdas analysis was 9.2% (Utami &; Azam, 2019). Research Elkurnia et al (2023) at the Central General Hospital Prof. Dr. I G N G Ngoerah for the 2021 period found the prevalence of coronary heart disease in T2DM patients at 31.3%. In the study, hyperglycemia (HbA1c ≥6.5%), blood pressure ≥140/90 mmHg, and obesity were significant risk factors for coronary heart disease in T2DM patients.

Diabetes Mellitus as a risk factor is a big problem as upstream of the increase in patients with coronary heart disease. When blood sugar levels are high (hyperglycemia), the endothelial lining of the coronary arteries malfunctions, which predisposes to atherosclerotic plaque formation and narrowing of blood vessels. Hyperglycemia also makes platelets (platelets) more reactive and prone to clumping and forming blockages. All these conditions combine to cause a person to suffer a heart attack (Acute Coronary Syndrome) (Ahmadi, 2021). About 25-30% of patients treated for ACS suffer from T2DM. ACS occurs earlier in people with T2DM and is associated with increased mortality and a higher risk of recurrent ischemic events (Babes et al., 2022).

The rise of these two diseases presents challenges for health systems, health professionals, and sufferers (X.-L. Liu &; Liu, 2018). The combination of ACS with T2DM increases mortality and morbidity rates in patients. Each year it causes 3 million deaths worldwide, 75% of which are over the age of 30 due to limited detection and effective management of the combination of these diseases. The combination of the two significantly results in patients having difficulty doing good self-management, increasing the incidence of readmissions, reducing quality of life, increasing the risk of death, and poor clinical outcomes after hospitalization (Tanash, 2018).

Both ACS and DMT2 have the same risk factors that contribute greatly to the health status and quality of life of patients, thus requiring coordinated management and health education (Liu et al, 2017). Previous research conducted by Wu (2017) in Australia and Taiwan showed that intervention-based education can increase knowledge, self-efficacy, and self-management behavior in T2DM patients after an ACS event.

Self-management in DMT2 management with ACS is a strategic effort in minimizing further complications. Patients are recommended to have the ability to carry out daily activities and control clinical outcomes, manage diet, physical activity, medication adherence, prevent complications, and seek health information related to the disease suffered (Sedlar et al., 2017; Vellone et al., 2017).

Health education is an important component of ACS patient management with DMT2, the content and focus are expected to be responsive to patient recovery. Learning and support strategies are needed that are appropriate for the inpatient phase, before discharge, to transition to the community (X.-L. Liu &; Liu, 2018). The lack of knowledge, especially about cardiac care after returning home from the hospital, is felt by some ACS patients. This can be anticipated by providing adequate education according to the needs of patients and families after discharge from the hospital (Khoiriyati et al., 2021).

Health education programs for ACS and T2DM patients seek to improve patient confidence and self-management skills (Wu et al., 2017). Health education has been recognized as an important component of disease management for patients with coronary heart disease and T2DM (Anderson et al., 2017). However, not many study has

been conducted in Indonesia about providing diabetes management to patients with ACS and T2DM, thus it is important to explore more about the health education program in order to develop a suitable program for ACS and DMT2 patients in Indonesia.

Research on education of ACS patients with DMT2 on self-management requires further exploration efforts so as to improve patient self-management, so the purpose of this literature review is to evaluate the benefits of education on self-management of Acute Coronary Syndrome patients with Type II Diabetes Mellitus.

METHOD

This study used the literature review method. Article synthesis is done narratively using PRISMA Flow Diagram (Moher et al., 2009).

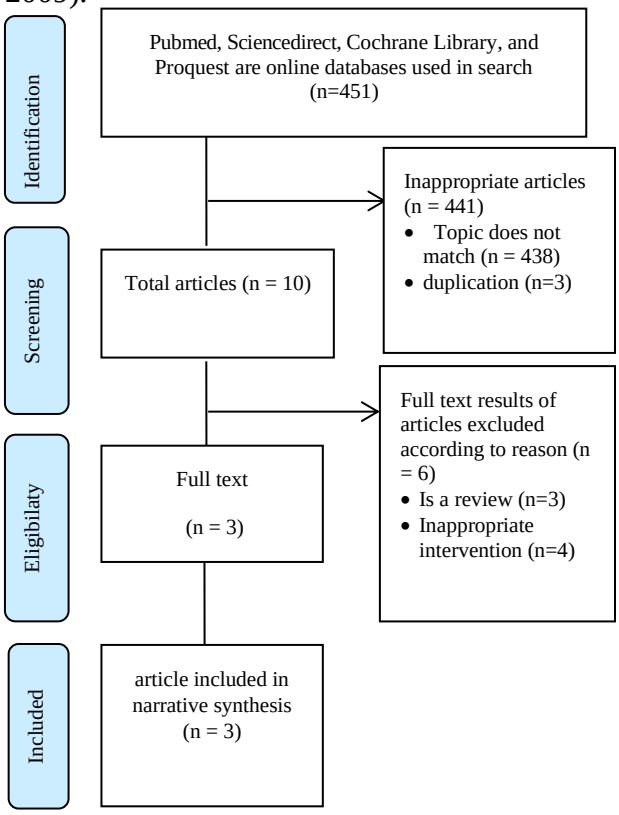

Figure 1. Prisma Flow Diagram

Researchers used references to articles that have been published on the internet using search engine tools PubMed, Siencedirect, Cochrane Library, and Proquest. The keywords used are Education, OR Cardiac Diabetes Self-Management Programme, AND Self Management AND Acute Coronary Syndrome AND Type 2 Diabetes Mellitus

The criteria in for literature are 1) article topics related to the effect of education on Self-Management of Acute Coronary syndrome patients with Type II DM 2) Randomized controlled trial (RCT) research methods; Experimental study; Cross-sectional 3) Language used English; 4) Published within the last 5 years; 5) Research subjects of Acute Coronary syndrome patients with Type II Diabetes Mellitus, 6) Original article and full text.

RESULT AND DISCUSSION

A literature review found three articles on the benefits of education in ACS patients with T2DM consist of one cross-sectional study, 1 protocol study for a randomized controlled trial, and 1 randomized blocked design study. The place of research was 1 article in Australia, 1 in China, and 1 in Australia and Taiwan.

Educational materials provided to patients include: blood glucose control, blood pressure control, digestive management, cholesterol management, knowledge of diseases related to ACS and T2DM, complications of T2DM, diet, emergency coordination when experiencing a heart attack, emotional support, exercise, lifestyle changes, medications for ACS and T2DM, education before and after surgery [percutaneous coronary intervention (PCI), intracoronary stents or coronary artery bypass grafting (CABG), psychological burden, management of ACS and DMT2 risk factors, management of ACS symptoms, control of salt intake, secondary prevention of ACS (X. Liu et al., 2018).

On research Wu (2017) The materials provided are: explanation of diagnosis, reasons for hospital admission, relationship between ACS and T2DM, and booklet containing case studies to develop skills, and practice self-reflection. While in the article in the form of the RCT protocol by Wu et al., (2017) The material provided is about: patients' knowledge of the condition, their skills and confidence in self-management, as well as digital videos of the Cardiac-Diabetes self management program "refocusing your life".

The results of the review showed that the provision of education during treatment was Given Face-to-face for 20 minutes with brochures / pamphlets and follow up 5-10 minutes with 1-2 phone calls and social media applications (WeChat) can affect the patient's ability to manage ACS symptoms at home, improve the patient's Diabetes self-management, and improve clinical outcomes such as fasting blood glucose and blood pressure (X. Liu et al., 2018). Research Wu et al., (2017) Demonstrate education with Merge phone and text messaging No significant benefit was observed in the primary outcome. Some benefits were seen in the health-related quality of life domain in Australian participants, but no similar effects were observed by those from Taiwan.

One article as a Randomized Controlled Trial protocol Wu et al (2017) Using theory-based interventions in the form of inpatient education, home visits, and telephone follow-up aim to increase self-efficacy to improve self-management behaviors and thus improve health outcomes and reduce rehospitalization. Early research results suggest that the Cardiac-diabetes transcare program is feasible and beneficial on patient self-efficacy, as well as initiating such a program for self-management in ACS patients with T2DM.

Educators on reviewed articles involve doctors, nurses, and medical students (X. Liu et al., 2018), while the other 2 articles only involve nurses (Wu, 2017 ; Wu et al., 2017).

ACS Symptom Management

Home cardiac care after an ACS event needs to be known by the patient and family to prevent recurrent attacks. Knowledge of the symptoms of ACS and how to take initial action to deal with the event must be given to patients and families so that there is no delay in handling patients. Education provided when patients are treated and follow-up either by phone calls or social media is expected to be able to overcome the lack of knowledge in patients and families in overcoming the occurrence of repeated attacks.

Health education during hospitalization can help patients overcome symptoms when an attack arises. Inpatient education is education that is practical, easy to do, and according to the patient's condition. Patients with low knowledge, attitudes, and beliefs about symptom management are at higher risk of longer treatment periods and worsening of the condition (X. Liu et al., 2018)

Self-Management in ACS Patients with T2DM

Self-management for ACS patients with T2DM is critical in efforts to reduce morbidity and mortality for both diseases. ACS patients with T2DM are expected to be able to self-manage 2 diseases. Education provided to patients during hospitalization followed by follow-up via telephone or social media is expected to increase knowledge, increase self-efficacy, and patient self-management.

Self-management is a strategic effort in the long-term management of diabetic patients that can minimize the side effects of T2DM and its complications. T2DM patients

with cardiovascular complications are recommended to be able to carry out daily activities by managing and controlling symptoms (blood sugar, blood pressure and cholesterol levels), regulating diet, physical activity, medications, prevention of complications, and information retrieval. These activities have been shown to be effective and beneficial for improving cardiovascular function (Sedlar et al., 2017; Sedlar et al., 2017).

Patients with ACS with T2DM often find it difficult to manage their condition, so they need more health information related to the two conditions. ACS patients with T2DM have poor self-management, so heart problems develop in a dangerous direction for the patient. Patients return home from treatment without fully understanding their health condition, many patients and families are worried because of their lack of knowledge and trust in the ability to manage the patient's condition (Tanash, 2018). This indicates that the information provided by the hospital may not fully answer the patient's needs and improve the patient's knowledge or ability to carry out the expected self-management behavior (X.-L. Liu &; Liu, 2018).

Clinical Outcomes of ACS Patients with T2DM

ACS patients with T2DM are expected to be able to self-manage 2 diseases. Good self-management will have an impact on clinical outcomes in the form of blood glucose, cholesterol, and blood pressure results within normal ranges. Education provided to patients during the inpatient phase followed by follow-up is expected to improve patient self-management which has an impact on the patient's clinical output value. Normal fasting blood glucose levels and lower diastolic blood pressure were found in the educated group. Patients who attend education are more likely to follow treatment recommendations, help optimize glycemic repair, reduce and manage disease complications, and improve quality of life (X. Liu et al., 2018).

Research Kurniawan et al (2020) find that patients with better clinical outcomes (blood sugar < 200 mg%, cholesterol < 200 mg%, and blood pressure < 140 mmHg) were found in those with higher self-management scores. However, significant differences were only found in blood sugar parameters at times, with patients with blood sugar at < 200mg% having significantly higher self-management scores than patients with blood sugar at > 200mg% .

Support of Health Workers in Managing Self-Management of ACS Patients with DMT2 through Health Education

The results of the literature review found that health workers have an important role in improving patient efficiency and self-management. In addition to education using media such as leaflets / pamphlets, several continuous education techniques can also be carried out follow-up via telephone, social media applications, and home visits. This method is proven to be able to increase self-efficacy which can be used as a self-management program for patients with ACS and DMT2. This is in accordance with research conducted by Kurniawan et al (2020) that one of the factors influencing self-management of DM patients with cardiovascular complications is the patient's level of knowledge. In the research of Taha et al (2016) it was also found that providing information is proven to increase patient knowledge and self-efficacy which will facilitate patients to carry out better self-management.

To achieve good self-management in ACS and DMT2 patients, intervention by health workers is needed. The results of the

literature review found that health education can increase patient knowledge and change patient behavior, so that patients are able to control their own blood sugar, regulate diet, do physical activity, and comply with treatment. Health education is also expected to be able to increase patient self-efficacy so as to facilitate patient self-management (X. Liu et al., 2018; Wu, 2017;Wu et al., 2017).

Health education programs for ACS and DM patients seek to improve patient confidence and self-management skills (Wu et al., 2017). Health education has been recognized as an important component of disease management for patients with coronary heart disease and diabetes (Anderson et al., 2017).

Health workers need to provide health education from the perspective of medical guidance and skills to help heart disease and T2DM patients develop healthier lifestyles (Shi et al., 2020). Health education interventions can effectively improve blood glucose, blood pressure, and blood lipids in heart disease and T2DM patients, promote healthy living, increase self-efficacy, and improve negative emotions and quality of life (Lu, 2023).

Table 1. Data Extraction

No.	Title and Author	Problem	Intervention	Comparison	Outcome
1.	The impact of in patient education on self-management for patients with Acute Coronary Syndrome and Type 2 diabetes mellitus Author: Liu, Wu, Willis, Shi, &; Johnson (2018)	Assessing the impact of inpatient education on knowledge about diabetes, ACS symptoms, and self-management of patients with ACS and T2DM after discharge	**Research methods:** Cross-Sectional study **Sample**: Total 160 patients **Education Methods**: Face-to-face and patients are provided with brochures or pamphlets. Phone-based education and we chat applications are also provided **Duration of education:** for 20 minutes face-to-face 5-10 minutes follow up **Educational**	-	1. Inpatient education conducted during treatment has contributed to improving fasting blood glucose. 2. Inpatient education provided during treatment improves ACS symptom management and Self-Management 3. Limited education during treatment with follow-up 1-2 phone calls affects the patient's ability to potentially manage ACS symptoms at home. 4. In diabetes education, the length of time diagnosed with T2DM has no impact on self-efficacy, self-

No.	Title and Author	Problem	Intervention	Comparison	Outcome
			Material: Blood glucose control, blood pressure control, digestive management, cholesterol management, knowledge of diseases related to ACS and T2DM, complications of diabetes, diet, emergency coordination when experiencing cardiac events, emotional support, exercise, lifestyle changes, medications for ACS and T2DM, education before and after surgery [percutaneous coronary intervention (PCI), intracoronary stent or coronary artery bypass graft grafting/CABG)], psychological burden, management of ACS and T2DM risk factors, management of ACS symptoms, control of salt intake, secondary prevention of ACS		management although proven in knowledge about diabetes. 5. It found an impact of ongoing education on self-efficacy, diabetes self-management delivered during treatment and follow-up

No.	Title and Author	Problem	Intervention	Comparison	Outcome
			Education providers: Doctors, registered nurses and medical students		
2.	Effectiveness Of The Transcare Cardiac-Diabetes Program : Protocol For A Randomized Controlled Trial **Author**: Wu, Atherton, Maclsaac, Courtney, Chang, Thompson (2017)	Evaluate the effects of the Transcare Cardiac-diabetes Program on the incidence of admission, health status, quality of life, and patient self-efficacy	**Research method:** Randomized Controlled Trial **Sample**: A total of 432 patients consisted of the Intervention group and the control group **Education Method**: face to face education **Duration of education:** Not mentioned **Educational Material :** • The patient's knowledge of the condition, their skills and confidence in self-management • Digital video of Cardiac-Diabetes' self-management program "refocusing your life" **Education providers**:	Control group: participants will receive standard care as usual including routine rehabilitation advice and be referred to a local diabetes educator, as deemed necessary by the treating clinical team	The study protocol has described a randomized trial that will evaluate intervention programs for patients with ACS and type 2 diabetes that begin in the patient's hospital and transition to a home environment. Theory-based interventions consisting of face-to-face sessions and telephone follow-up aim to improve self-efficacy to improve self-management behaviors thereby improving health outcomes and reducing hospital readmissions.

No.	Title and Author	Problem	Intervention	Comparison	Outcome
			Nurse		
3.	Cardiac-diabetes self-management program for Australian and Taiwanese: A randomized blocked design study	The study was to evaluate the short-term efficacy of a Cardiac-diabetes self-management program that combines phone and text messaging with cultural contexts in Australia and Taiwan compared to usual care	**Research methods:** A randomized blocked design study **Sample**: Total 181 patients Australia : 91persons Taiwan : 90 persons **Education Methods**: Face to face and follow up via phone **Duration of education:** 30 minutes **Educational Material :** • Explanation of the diagnosis • Reasons for hospital admission • The relationship between heart disease and diabetes • The booklet contains case studies to develop skills, and opportunities for reflection on their own practice **Education providers**: Nurse	Control Group : Australia : 45 Taiwan : 45 persons	Education by combining telephone and text messaging had no significant benefit observed in the primary results. Some benefits were seen in the health-related quality of life domain in the Australian participants, but no similar effects were observed by those from Taiwan.

CONCLUSION

Patients with ACS and T2DM both have risk factors that affect the patient's health status and health-related quality of life. For this reason, intervention from health workers in the form of health education is needed so that patient knowledge and self-efficacy increase which is able to facilitate patient self-management. The results of this literature review found that education during treatment can improve self-efficacy and patient self-management. Continuous education with follow-up via telephone, social media applications, and home visits is also proven to be able to increase self-efficacy which can be used as a self-management program for patients with ACS and T2DM.

The recommendations from this literature review are expected that health workers will be able to provide interventions in the form of education after ACS attacks to ACS patients with DMT2 so that there is an increase in knowledge and behavior changes in patients that can improve patient self-management, have self-efficacy in doing independent care at home so that patient self-management improves. However, more research is needed on appropriate educational interventions for ACS patients with T2DM.

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