# Effectivity of Health Education with Telenursing on the Self-care Ability of Coronary Artery Disease Patients: A Systematic Review

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## Abstract

**BACKGROUND:** Coronary artery disease (CAD) develops chronically and progressively, causes recurrence and premature death, so a good knowledge of changes in self-care behavior by patients is needed. Telenursing can be a medium for health education to allow patients to receive information and for nurses to follow up on health conditions without being obstructed by distance, place, time, and carried out sustainably. So far, telenursing has not been reviewed as a recent intervention to deliver education to CAD patients.

**AIM:** This systematic review aimed to determine the effectiveness of health education interventions with telenursing on the self-care of CAD patients based on the implementation media.

**METHODS:** Systematic reviews were conducted based on items found in CINAHL EBSCO, PubMed, ScienceDirect, and Google Scholar from 2008 to 2019. The combination of keywords used Indonesian and English language. All articles were assessed using the Joanna Briggs Institute critical appraisal tool for randomized controlled trial (RCT) and quasi-experiment. After that, the study found was synthesized narratively.

**RESULTS:** A total of 11.319 titles were identified, and seven studies met inclusion criteria with 3313 participants. Six studies were RCT studies, and one was a quasi-experimental study. The results of the narrative synthesis conducted on seven articles showed that health education by telenursing was effective in improving self-care ability, such as maintaining blood pressure, body mass index, hemoglobin A1c levels, fasting blood glucose, and low-density lipoprotein within normal limits. In addition, there was also an increase in physical activity, dietary compliance (consumption of fruits, vegetables and fish), control of salt intake, smoking, and alcohol cessation. The media used were phone calls and text messages.

**CONCLUSION:** This review provides evidence that health education interventions effectively improve the self-care abilities of CAD patients with the media used are text messages and telephone calls.

## Introduction

Cardiovascular disease is the leading cause of death and disability globally [1]. More people die from cardiovascular disease every year than from other conditions [2]. The World Health Organization reports that more than 17.9 million people died in 2017 due to cardiovascular disease, representing 31% of deaths globally, and 17 million deaths occurred before 70 years of age. The highest case of cardiovascular disease is coronary artery disease (CAD) [3]. In Indonesia, the prevalence of CAD increased 1.5% or 15/1000 in 2018 [4], while in West Java in 2014, the incidence of CAD was 514,597, the highest in Indonesia [5].

Atherosclerotic plaque rupture causes CAD to occur suddenly and is fatal before medical treatment can be given [6]. The dynamic nature of the CAD process results in a variety of clinical presentations, including; compression of the mid sternal or substernal, chest pain such as; cramps and burning, chest pain that can spread to the neck, jaw, shoulders, back to one or both arms, shortness of breath, or chest feels heavy, symptoms can include indigestion or belch with or without epigastric pain, nausea or vomiting, and diaphoresis [7], [8]. A typical condition of chronic artery disease is a chronic progressive, which causes patients to have a high risk of recurrence, recurrent hospitalization, and death [9].

The incidence of rehospitalization 30 days after hospitalization in CAD patients was 20% [10]. It is caused because many patients, even though they have been treated and received therapy, still do not adhere to the treatment plan and have habits that can cause recurrence [11]. So that patients after CAD attacks should receive secondary preventive interventions [10]. Some of the things mentioned above suggest that CAD involves various processes and is related to treatment and changes in the patient's life behavior that can be done through secondary preventive interventions so as not to cause fatal events.

Secondary prevention can be done as an effort to deal with CAD. The clinical benefit of secondary prevention on the prevention of relapse is more effective for CAD patients with a success rate of more

than 75% [12]. One of the secondary prevention efforts that can be done is the management of risk factors and lifestyle modification, such as reducing the risk of atherosclerosis and adopting behavior [12], [13].

Efforts to control and modify risk factors can be made by providing health counseling and education about lifestyle changes [14].

Providing specific education about CAD to patients can affect the patient's self-care ability and can directly reduce the recurrence of CAD and improve the patient's quality of life [15].

Technological developments in the modern era can be used to facilitate nurses in providing education for patients to improve the self-care abilities of CAD patients. Telenursing is a powerful health promotion method and knowledge to enhance patient cognitive skills, increasing patient self-care abilities [16].

Several studies have shown the effectiveness of telenursing in various countries [17], [18], [19], [20], [21].

This systematic review aimed to determine the effectiveness of health education interventions with telenursing on the self-care of CAD patients based on the implementation media. The literature clearly shows that health education by telenursing is an appropriate intervention for CAD patients to develop a healthy lifestyle in the process of healing and restoring their physical condition after being hospitalized in a hospital. Telenursing health education interventions are recommended for nurses to use in clinical areas to control and educate patients on an ongoing basis. The findings of this systematic review will inform nurses about the effectiveness of health education interventions by telenursing on the self-care abilities of CAD patients.

## Methods

The design of this study was a systematic review and conducted based on items found in CINAHL EBSCO, PubMed, ScienceDirect, and Google Scholar from 2008 to 2019.

### *Article search*

Reviewers minimize the potential for publication bias by conducting a systematic search by browsing electronic databases, including; ScienceDirect, PubMed, and CINAHL EBSCO, between 2008 and 2019. The combination of keywords uses English, namely, "Telenursing" OR "Text Messaging" OR "Phone calls" OR "m-health" OR "Teleconferences" OR "Telemonitoring" AND "Self-Care" OR "Self-care monitoring" OR "Self-care Maintenance" OR "Self-Care Management" AND "CAD" OR "Coronary Heart Disease" AND "Randomized Controlled Trial" OR "Experimental Study" OR "Quasi-Experiment" NOT "Literature review" NOT "Review literature" NOT "Overview" NOT "Systematic Review" NOT "Meta-analysis."

### *Article selection*

The selection of articles in the systematic review refers to the Preferred Reporting Items for Systematic Reviews and Meta-Analyzes (PRISMA) flowchart.

Reviewers independently select articles from each selected database and then further determine which studies are worth assessing. Reviewers sort duplicated articles through titles found in the database. After that, due diligence is conducted on the full-text article by the criteria of inclusion and exclusion. Eligible research articles are included in articles that are then assessed and synthesized. Research articles that meet inclusion criteria are entry at bibliographic software (Mendeley).

The eligibility criteria used in a systematic review using the PICOS framework are as follows;

Population; Studies that focus on problems involving chronic and acute coronary artery disease patients, who have undergone hospitalization, aged ≥ 18 years, can read and write with proper cognitive function, have a stable physical condition, patients and families have and can operate personal cell phones and able to manage the applications used to communicate.

Intervention; Telenursing health education interventions include; text messages, phone calls, m-health, teleconferences, telemonitoring.

Comparison; Outcomes; Self-care abilities include; self-care maintenance, self-care monitoring, self-care

Study Design; RCT and quasi-experiment

Publication years; 2008-2019

Language; English and Indonesian

### *Extraction data*

Extraction data included researcher citation, country, year of publication, intervention and control groups, sample and population, mean age (SD), outcome measure, time of measurement, and intervention effects.

### *Quality appraisal*

The methodological quality of eligible studies was assessed independently by reviewers using the

Joanna Briggs Institute (JBI) 2020 critical assessment checklist for randomized controlled studies and quasi-experiments. The JBI critical appraisal tools checklist for the randomized controlled trial was given a minimum score of 10 (75%) of the total score of 13. Meanwhile, articles with a quasi-experimental study used the JBI critical appraisal tools checklist for a randomized controlled trial and were given a minimum score of 6 (75%) of the total score of 9. Each assessment will be read and corrected by the supervisor.

### Synthesis data

Synthesis of data in a systematic review using a narrative summary (narrative synthesis).

# Results

### Study selection results

The study selection process in a systematic review uses the PRISMA flowchart. The study identification process on four databases; PubMed, CINAHL EBSCO, ScienceDirect, and Google Scholar, which use keywords; reviewers get 304 articles that match these keywords. The search results that had been obtained were then checked for duplications and found 108 of the same articles and issued so that 196 articles were left. Then, the reviewers conducted a screening based on the title adjusted to the systematic review topic, and as many as, 123 items were excluded, leaving 73 articles.

Furthermore, the articles were selected based on the availability of full text and the eligibility criteria. Seven relevant articles were obtained and used as the material in a systematic review. Seven articles that meet the inclusion criteria are divided into; six articles are RCT studies and one is a quasi-experimental study. All included studies are Level II in evidence-based practice [22]. Study selection in a systematic review is shown in Figure 1.

### Study quality and risk of bias

The quality of the study of each article that was the source of a systematic review referred to the quality analysis of the JBI critical appraisal tools; articles with the type of RCT study were then subjected to critical assessment using the JBI critical appraisal tools checklist for randomized controlled trial independently by reviewers given a minimum score of 10 (75%) of the total score 13 (Table 1). Meanwhile, articles with quasi-experimental studies or other clinical trials use
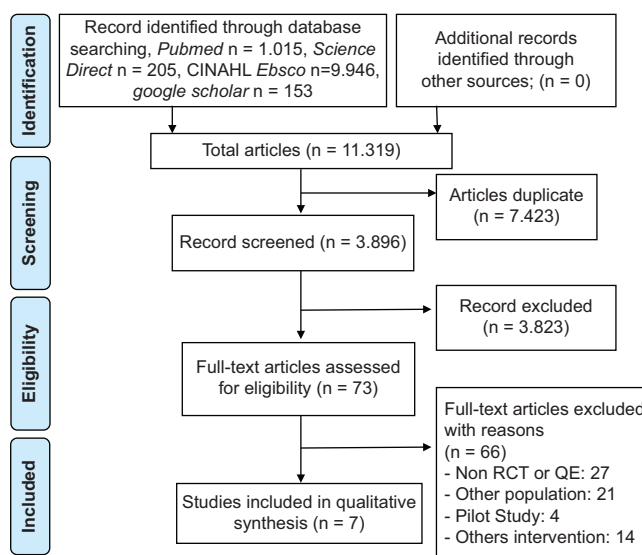


*Figure 1: Selection flowchart*

**Table 1: Assessment results of a systematic review study using the JBI critical appraisal tools checklist for a randomized controlled trial**

| Author and year | Criteria | | | | | | | | | | | | | SUM |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | |
| Holmes-Rovner *et al.* [20], 2019 | Y | Y | T | Y | Y | N | Y | Y | Y | Y | Y | Y | Y | 12/13 |
| Haider *et al.* [23], 2019 | Y | Y | T | Y | Y | U | N | Y | Y | Y | Y | Y | Y | 10/13 |
| Santo *et al.* [24], 2018 | Y | Y | T | Y | Y | U | N | Y | Y | Y | Y | Y | Y | 10/13 |
| Hawkes *et al.* [25], 2013 | Y | Y | Y | Y | Y | Y | U | Y | Y | Y | Y | Y | Y | 12/13 |
| Zheng *et al.* [26], 2019 | Y | Y | Y | U | Y | Y | Y | Y | Y | Y | Y | Y | Y | 12/13 |
| Holmes-Rovner *et al.* [20], 2008 | Y | Y | Y | U | U | U | Y | Y | Y | Y | Y | Y | Y | 10/13 |

N: No; U: Unclear; Y: Yes.

the JBI critical appraisal tools checklist. They are given a minimum score of 6 (75%) out of the total score of 9 (Table 2).

**Table 2: Results of systematic review studies using the JBI critical appraisal tools checklist for quasi-experimental studies**

| Author | Criteria | | | | | | | | | SUM |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| Tang *et al.* [18], 2018 | Y | Y | Y | Y | Y | Y | Y | Y | Y | 9/9 |

Y: Yes.

1. Was true randomization used for assignment of participants to treatment groups?
2. Was allocation to treatment groups concealed?
3. Were treatment groups similar at the baseline?
4. Were participants blind to treatment assignment?
5. Were those delivering treatment blind to treatment assignment?
6. Were outcomes assessors blind to treatment assignment?
7. Were treatment groups treated identically other than the intervention of interest?
8. Was follow-up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?
9. Were participants analyzed in the groups to which they were randomized?
10. Were outcomes measured in the same way for treatment groups?

11. Were outcomes measured in a reliable way?
12. Was appropriate statistical analysis used?
13. Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?

Based on Table 1, it can be seen that the average score of the total articles included is 11. These six articles show a low risk of selection bias because the entire article is a randomized control trial using probability sampling techniques, clear research protocols such as the CONSORT diagram with the presentation of statistical data, both significant and insignificant. In addition, selection bias is also low because the entire study uses instruments that have been tested for reliability and validity.

1. Is it clear in the study what is the "cause" and what is the "effect?" (i.e., there is no confusion about which variable comes first)?
2. Were the participants included in any comparisons similar?
3. Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?
4. Was there a control group?
5. Were there multiple measurements of the outcome both pre and post the intervention/exposure?
6. Was follow-up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?
7. Were the outcomes of participants included in any comparisons measured in the same way?
8. Were outcomes measured in a reliable way?
9. Was appropriate statistical analysis used?

Table 2 shows the score of the included research articles is 9, which indicates that the quality of the research article reporting is very good. However, the included study had a moderate risk of selection bias because it did not use a randomized procedure for sampling in both the intervention and control groups. However, regarding the reporting of the overall results, the study shows statistically significant or insignificant data. All studies suggest that further research is carried out, hoping that the number of samples will be enlarged by random selection procedures or probability sampling techniques.

## Study characteristics

The characteristics of the studies included in this systematic review were scattered across countries with different types of telenursing. The distribution of study sites from articles included in the systematic review is shown in Table 3.

**Table 3: Distribution of study sites from articles included in the systematic review**

| Place of study | Number of articles |
|---|---|
| Asia | |
|   China | 2 |
|   Malaysia | 1 |
| America | |
|   Michigan-USA | 1 |
| Australia | |
|   Brisbane, Australia | 1 |
|   Sydney, Australia | 2 |
| Total | 7 |

Table 3 shows that the included studies were conducted in Asia [18], [26], [27], Holmes-Rovner *et al*. in America [20], and in Australia [23], [24], [25]. All articles included in the systematic review used English, while none of the articles in Indonesian were included because they did not meet the eligibility criteria in the selection process. The study timeframe included was 2008–2019. A total of 3313 participants were included (average age 58.88); the largest number of samples was 822 participants [26] and the least in the study as many as 95 participants [18]. The study characteristics are summarized in Table 4, which consists of authors, country, intervention group, control group, population, and sample, mean age (SD), time of measurement, and intervention effects.

## Description of the health education intervention by telenursing

### Text messages

Five studies (n = 2358) used text message media, including WhatsApp text message, to provide health education about the components of self-care for CAD patients, including; general information regarding CAD, risk factors for PAC, a healthy lifestyle (smoking, diet, and physical activity), secondary prevention of chest pain, and medication adherence reminders [18], [23], [24], [27], one study discussed risk factor monitoring [27] and one study on secondary preventive management of chest pain, as well as two studies of medication adherence. Overall, studies reported health education by telenursing using text message media as a simple intervention and feasible to improve the management of CAD and reduce risk factors.

### Effects of text message media on self-care abilities

Studies that discuss text message media as a whole assess the components of self-care in the form of patient compliance in maintaining a healthy lifestyle that has a good effect based on the results of statistical tests in each study, including; maintaining blood pressure [23], [26]; body mass index [24], [26], [27]; hemoglobin A1c (HbA1c) levels [23], [27]; fasting blood glucose [27]; systolic and diastolic blood pressure [23], [26], [27]; low-density lipoprotein cholesterol (LDL-c) [24], [27]; physical

**Table 4: Study summary included in the systematic review**

| Author (year) and country | Intervention group | Control group | Population and sample | Mean age (SD) | Outcome measure of self-care ability | Measurement time point | Effect of the intervention |
|---|---|---|---|---|---|---|---|
| Tang *et al*. [18], Malaysia | Text messages through the WhatsApp application about CAD risk factor education and a healthy lifestyle | Without WhatsApp text messages and only receiving standard care by the hospital | 95 CAD patients, intervention group n=47 control group n=47 | 59.9±12.39 | Knowledge and a healthy lifestyle | Baseline and after 3 months | The results of the split plot ANOVA analysis showed that the mobile application had a significant and positive effect on patient knowledge (p<0.001). Mobile messaging also significantly improved the healthy lifestyle setting of CAD patients P<0.001 |
| Huo *et al*. [27], China | Secondary prevention text messages 6 times a week for 6 months | Text message thanks at 2 times/ month for 6 months | 502 patients with CAD and DM (intervention n=251 and control n=251) | 59.5±9.3 | HbA1C levels, fasting blood glucose, systolic blood pressure, LDL cholesterol (low-density lipoprotein), body mass index, and physical activity from baseline to 6 months | Baseline and after 6 months | There was a more significant decrease in the HbA1C value of the intervention group before and after 6 months of treatment when compared to the control group. Secondary results were a change in the proportion of patients who achieved HbA1C<7%, fasting blood glucose, systolic blood pressure, LDL cholesterol (low-density lipoprotein), body mass index, and physical activity from baseline to 6 months. Text message intervention resulted in better glycemic control in patients with diabetes mellitus and CAD. Although this benefits mechanism remains to be investigated, the results suggest that a simple and culturally sensitive mobile text messaging program can provide valuable and feasible benefits to improve disease self-management |
| Haider *et al*. [23], Sydney | Text messages contain smoking, diet, physical activity, and general information about cardiovascular disease, including secondary prevention such as chest pain and medication adherence | Without text messages | 229 DM and CAD patients (intervention n=111 and control n=118) | 59.3±9.0 | Cholesterol, blood pressure, body mass index, HbA1C, waist/ hip circumference, and smoking status | Baseline and after the 6-month intervention | The main results of the study using the analysis of covariance (ANCOVA) test after 6 months of treatment showed that the mean difference in SBP was 7.6 mmHg (95% CI 11.8, 3.37, *P*=0.0003) and a DBP of 3.7 mmHg (95% CI 6.12, 1.24, *P*=0.003). The mean difference in LDLc in the intervention group, compared to the control group, was 0.05 mmol/L (95% CI 0.27, 0.18, *P*=0.813) and in triglycerides 0.29 mmol/L (95% CI 0.59.01, *P*=0.035). The difference in mean body mass index was 0.89 kg/m$^2$ (95% CI 2.74, 0.95, *P*<0.0001) in the intervention group, waist circumference 3.98 cm (95% CI 8.57, 0.61, *P*<0.0001) and hip circumference 3.26 cm (95% CI-7.67, 1.16, *P*=0.0006), compared to the control group. The mean difference in HbA1c between the control and intervention groups was 0.39% (95% CI 0.88, 0.11, *P*=0.126). More participants in the intervention at 6 months quit smoking than the control group (RR 1.27, 95% CI 1.06, 1.51, *P*=0.0041). In CAD patients with type 2 DM, lifestyle-focused text message interventions resulted in a significant reduction in risk factors |
| Santo *et al*. [24], Sydney | Text messages 4 times a week for 6 months, where one text message per week contains a reminder of the patient's diet. Besides, the intervention group received semi-personal text messages containing suggestions, motivation, and support for changing lifestyle behaviors. Text message content is based on secondary prevention guidelines by the Australian Heart Foundation | Without text messages (standard care) | 710 coronary heart patients, intervention n=338 control n=351 | 57.6±9.18 | Diet compliance | Baseline and after 6 months of intervention | The results were analyzed using log-binomial regression for categorical variables and covariance analysis for numerical variables. Of a total of 710 patients, 54% followed≥4 dietary guideline recommendations (53% intervention vs. 56% control, *P*=0.376) at baseline. After 6 months, the intervention group had a significantly higher proportion of patients adhering to≥4 recommendations (314, 93%) compared to the control group (264, 75%, RR 1.23, 95% CI 1.15–1.31, *P*<0.001). Besides, patients in the intervention group reported consuming more vegetables, fruit, and fish per week; less takeaway food consumption per week; and better control of salt intake. Furthermore, there was a significant mediational effect of increased adherence to the recommended association between the intervention and LDL cholesterol levels (p<0.001) and body mass index at 6 months follow-up (p=0.005). Text message interventions that focus on lifestyle changes effectively increase adherence to recommended dietary guidelines, specifically increasing the consumption of vegetables, fruit, fish, food, and salt intake reported directly by participants. This simple and measurable text message intervention could be used to improve diet in coronary heart patients |

*(Contd...)*

**Table 4:** _(Continued)_

| Author (year) and country | Intervention group | Control group | Population and sample | Mean age (SD) | Outcome measure of self-care ability | Measurement time point | Effect of the intervention |
|---|---|---|---|---|---|---|---|
| Zheng et al. [26], China | Receive six text messages per week for 6 months sent directly by the computer system. Text messages contain educational and motivational information related to CAD-specific information, control of risk factors, physical activity, and medication adherence | Usual care and two thank you text messages per month | 822 CAD patients, intervention n=411 controls n=411 | 56.4±9.5 | Secondary prevention increases risk factor control in patients with CAD | Baseline and after 6 months of intervention | The main results of the study used covariance analysis. It was found that after 6 months of intervention, systolic blood pressure was not significantly lower in the intervention group compared to the control group (SD) of 3.2 (14.3) mmHg and 2.0 (15.0) mmHg (p>0.05). There were no significant differences between the two groups in LDL-C levels, physical activity, body mass index, and smoking status. Nearly, all the patients in the intervention group reported text messages that were useful (96.1%), easy to understand (98.8%), appropriate frequency (93.8%), and reported being willing to accept future text messages (94.8%). Text messages supporting the secondary prevention of CAD patients did not lead to a more significant reduction in blood pressure at 6 months. Still, cell phone text messages for secondary prevention were feasible and acceptable to patients |
| Hawkes et al. [25], Brisbane | Education was given through 10 phone calls with 30 min for 6 months regarding CAD risk factor management | Without phone calls (standard care) | 430 patients with myocardial infarction | 60.6±11.8 | Quality of life and healthy behavior | Baseline and after 6 months of intervention | The results of statistical analysis showed that the intervention group achieved a significantly higher quality of life score than the control group, with a _P_ value for mental components (p=0.02), social function (p=0.04), and emotional roles (p=0.03). In addition, the intervention group also better met the recommended level of physical activity (p=0.02) body mass index (p=0.05), vegetable intake (p=0.04), and alcohol consumption (p=0.05). Secondary prevention programs implemented over the telephone can significantly improve health outcomes and fill treatment gaps for myocardial infarction |
| Holmes-Rovner et al. [20], Michigan | The telephone-based counseling intervention consisted of six sessions over 8 months on guidelines for improving adherence to | Standard care | 525 acute coronary syndrome (ACS) patients (n=268 intervention group and n=257 control group | - | Secondary prevention; behavior and treatment | Baseline and after 8 months | There were no statistically significant differences in the treatment used between the intervention and control groups; beta-blockers, aspirin, angiotensin (enzyme inhibitor), angiotensin receptor blockers, and lipid-lowering drugs before the intervention, 3 months, and 8 months. Whereas in the intervention group, there was an increase in physical activity at 3 and 8 months (OR=1.53, _P_<0.02). There were no significant differences in participants' smoking cessation efforts and weight loss and no differences in functional status or quality of life with intention to treat. Post-hospitalized telephone counseling for ACS patients effectively improves short-term secondary prevention but does not affect long-term lifestyle changes |

SD: Standard deviation; n: Sample; HbA1C: Hemoglobin A1c; LDLc: Low-density lipoprotein cholesterol; SBP: Systolic blood pressure; DBP: Diastolic blood pressure; RR: Relative risk; OD: Odds ratio.

activity, dietary adherence (consumption of fruits, vegetables, and fish) [18], [24]; and control of salt intake and smoking cessation [24], [26].

### Phone call

Two studies (n = 955) used telephone calls to provide health education with a duration of 30 min of administration 10 times for 6 months [25] and six sessions for 8 months [20]. The education provided is a component of self-care, including; healthy behavior to control risk factors and secondary prevention (medication, smoking cessation, and risk factor management). The study as a whole explains that secondary prevention by providing education through phone calls can improve health outcomes in the form of short-term behavior changes, filling treatment gaps but not affecting long-term lifestyle changes.

### Effects of telephone call media on self-care abilities

The telephone call media used to provide health education by telenursing were carried out in two studies assessing the self-care component as the main outcome including; physical activity recommended better in the intervention group (p = 0.02; odds ratio [OR] = 1.53), body mass index (p = 0.05), vegetable intake (p = 0.04), and alcohol consumption (p = 0.05) [20], [25]. However, there was no significant difference between intervention and control in the self-care component of treatment adherence, and it had no statistical effect on the intervention group [20].

# Discussion

This systematic review identified, assessed, and synthesized seven published articles evaluating health education by telenursing as a secondary prevention program for the self-care ability of patients with CAD. The quality of the reviews was good (mean study scores of RCT 11 and quasi-experiment nine were assessed independently by three reviewers [VL, YT, and N] using the JBI critical appraisal, using the JBI critical appraisal tool).

There is heterogeneity in the components of self-care assessed, educational materials, and the intensity of provision, measurement results, and implementation media. The power of systematic review includes a systematic approach to the data collection process. The data extraction model used allows the reviewer to capture all relevant information regarding the included study.

The implementation of healthy self-care behavior reduces the risk of disease incidence, and the mechanism underlying the effect can be said to be protective against heart health, mainly related to self-care maintenance components such as smoking cessation, maintaining a normal BMI, routine physical activity, reducing dietary sodium intake, reducing alcohol use. And keep a healthy diet, low cholesterol, standard BP control, and average fasting plasma glucose.

The health education provided focuses on providing general information regarding CAD, risk factors for CAD, a healthy lifestyle (smoking, diet, and physical activity), secondary prevention of chest pain, and medication adherence reminders. The results in this review are in line with those of Riegel *et al*. In the case of CAD, the focus of intervention on lifestyle modification will produce better clinical outcomes.

The most often used medium for implementing education is text messages using the WhatsApp application or text messages available on cell phones. Five studies explain this, while two studies are related to the media of telephone calls.

All included studies did not use a combination of text messages and telephone calls but were carried out separately. In fact, according to Boroumand and Moeini [29], in their research, giving short messages (SMS) and phone calls effectively increase the self-efficacy of patients with CAD. Likewise, a previous systematic review [30] states that web-based technology is most often used and helps provide health education so that the utilization of technological developments is better to use.

The results of this review reveal that the use of text message media is more frequently used when compared to telephone calls. That is in line with the evaluation results presented by Zheng *et al*. [26] that the provision of health education with text message media is applicable (96.1%), easy to understand (98.8%), according to frequency (93.8%). And willing to receive future text messages (94.8%). The results obtained on changes in the self-care component based on a review of the five included studies also stated that it had a statistical effect, including maintaining blood pressure, body mass index, HbA1c levels, fasting blood glucose, systolic and diastolic blood pressure, LDL cholesterol, physical activity, and maintaining compliance.

The media calls discussed in the included study affected only changes in physical activity, body mass index, vegetable, and alcohol consumption but did not affect treatment adherence. If analyzed based on the studies' findings, the duration and time of administration were too long with a low frequency of education (10 times for 6 months and 6 times for 8 months).

In line with the theory of cognitive decline, which is a factor that influences self-care behavior by Riegel *et al*. [31], it is stated that CAD patients have cognitive abilities that are decreasing day by day concerning age and the effect of heart disease experienced. Participants included in the systematic review had an average age of 58.88, which indicates that age affects their cognitive abilities in understanding the educational material provided. In comparison, the use of technological devices in implementing telenursing, such as telephone calls, can increase good results for patients with different diagnoses, however. The implementation of education through telephone calls is essential using the proper protocol; it is significant because it has clear objectives using communication principles in interacting with patients and carrying out assessment and education [32].

The use of technology in providing education by nurses provides younger access for patients.

However, providing education is also essential to consider that the patient's health literacy ability will affect the increase in knowledge and decision-making to achieve better self-care abilities. Overall, the included studies were studies conducted in other countries and were proven to influence the self-care component based on the results of statistical tests performed by each study with p-value (<0.05). However, if applied in Indonesia, it is important to consider people's literacy skills because studies conducted in 34 provinces in Indonesia are still low [32]. Literacy in the use of health education media by telenursing will be beneficial in encouraging patients to change their self-care behavior so that it can become an essential component that is considered in providing health education such as text messages and telephone calls.

## *Limitations of systematic review studies*

Limitations in the systematic review during the literature identification process, analysis to the

compilation, and summary process are as follows: (1) This systematic review is limited empirically because it only identifies studies in Indonesian and English, although studies in Indonesian are not included. After all, the research is related to the disease population, coronary arteries have not been done or have been missed in the thesis, thesis, and seminar proceedings that are not published in the online database. (2) The included studies only cover countries in Asia, America, and Australia, thereby reducing the generalizability of the results to the CAD patient population. (3) The expected results of assessing self-care are generally not found in the included studies so that the reviewers identify the results based on the components of self-care. This makes it difficult for reviewers to perform statistical data analysis (meta-analysis) so that reviewers only carry out the narrative analysis.

## Conclusion and Recommendation

This study showed that health education with telenursing is very effective in improving the self-care abilities of CAD patients. Health education media through telenursing that can be done to CHD patients to improve self-care abilities include text messages and phone calls. Furthermore, the most effective media to provide education based on reviewer analysis is text message media. This systematic review has decent implications for nursing science, so nurses can provide ongoing education and directly find out the progress of CAD patients without being hindered by distance and time. Thus, nurses can determine the clinical condition of CAD patients to prevent recurrence or repeated attacks. For further researchers, it is crucial to develop a protocol for implementing the provision of education properly, compiling specific materials about the needs of patients in the process of recovering their physical condition. In addition to educational materials, the availability of patients in receiving education must be considered so that the implementation time runs effectively.

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