Patient Education Strategies among Patients with Acute Myocardial Infarction: A Systematic Review

Emil Huriani1,2*, Izza Wahid3, Rizanda Machmud4, Khatijah Lim Abdullah5

1Doctoral Program of Public Health, Faculty of Medicine, Universitas Andalas, Padang, West Sumatera, Indonesia; 2Department of Medical Surgical and Emergency Nursing, Faculty of Nursing, Universitas Andalas, Padang, Indonesia; 3Department of Internal Medicine, Subdivision of Hematology-Oncology, Medical Faculty, Universitas Andalas, Dr. M. Djamil Hospital, Padang, Indonesia; 4Department of Public Health and Community Medicine, Faculty of Medicine, Universitas Andalas, Padang, Indonesia; 5Department of Nursing, School of Medical and Life Sciences, Sunway University, Bandar Sunway, Malaysia

Abstract

BACKGROUND: There is a need to summarize the effect of existing research-based education strategy on patients’ physical condition, health behavior change, as well as psychosocial well-being in patients with acute myocardial infarction.

AIM: The aim of this study was to review and synthesis relevant studies on patient educational strategy and its effect on patients’ physical condition, health behavior change, as well as psychosocial well-being in patients with acute myocardial infarction.

METHODS: A literature search was conducted on MEDLINE, Academic Search Ultimate, CINAHL-EBSCO, and PubMed. Articles were selected by predefined inclusion and exclusion criteria. Assessment of methodological quality of each study was executed using the Downs and Black scale.

RESULTS: Nineteen studies (3588 patients with myocardial infarction) were included in the study. Educational intervention methods ranged from face-to-face method only, face-to-face method in combination with telephone call(s), the combination of both face-to-face method, and telephone call(s) with one other method. Outcome measured on each study varied and the effectiveness of the intervention in at least one of their outcome measures demonstrated in 17 studies.

CONCLUSIONS: Findings support the pivotal role of patient education on the management of myocardial infarction patient.

Introduction

Cardiovascular diseases (CVDs) caused a great number of death globally [1], although there has been a decrease in the prevalence and mortality compared to the previous decade [2]. In Indonesia, the three leading causes of disability-adjusted life-years (DALYs) in 2016 were ischemic heart disease, cerebrovascular disease, and diabetes [3]. A study showed an incredible prevalence of CVD risk factors with the prevalence of smoking, physical activity, obesity, and hypertension which posed the top of the list [4].

Myocardial infarction is a terminology that to be used when there are clinical evidence of acute myocardial ischemia, detection of a rise and/or fall of Cardiac troponin (cTn) values, and supported with at least one item stated by ESC/ACC/AHA/WHF [5]. For those who survive the initial event of myocardial infarction, the incidence of a subsequent heart attack increased [6], [7]. Therefore, the implementation of heart healthy behaviors such as physical exercise, dietary management, smoking cessation, and adherence to treatment program is vigorous to decrease the risk of recurrence [2]. For those reasons, the provision of education is essential to promote patient understanding of the disease management as well as to assist adaptation to a new life.

The education process, which is composed of factual information, effective delivery, and motivational impact, is the core of education in the context of health area [8]. Research testing various patient educational interventions have been employed and evaluated for myocardial infarction. However, findings on the adoption and maintenance of disease management and risk-reducing behaviors on cardiac patients showed positive effects, but in diverted levels [9], [10], [11], [12], [13]. As a matter of fact, several studies found no effect on outcomes measured [9], [10], [11], [12]. Although these reviews have been carried out following a high standard for a systematic review process, they included a large number of trials and measured various outcomes, they did not describe the interventions in depth especially
on distributing the education materials within each education session and on explaining the impact of such the theoretical or principal basis for development of the intervention on outcomes. The emphasis on using of theory or middle-range theory as a basis for intervention development is important, but the focus of developing interventions that prioritize meeting the patient’s learning needs is the pinnacle. As far as the authors could establish, no literature review has been conducted that summarized the effect of existing research-based education strategy on patients’ physical condition, health behavior change, as well as psychosocial well-being in patients with acute myocardial infarction.

The aim of this systematic review was to review and synthesis relevant studies on patient educational strategy and its effect on patients’ physical condition, health behavior change, as well as psychosocial well-being in patients with acute myocardial infarction.

Methods

A systematic literature review following Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [14] was conducted by the first author under the supervision of the third and fourth authors for studies published between July 2011 and June 2021 in the English Language.

The steps applied to conduct the review are explained in the following sections. The review question was formulated as follows: “What are the effects of patient educational strategy on patients’ physical condition, health behavior, as well as psychosocial well-being in patients with acute myocardial infarction?”

Search strategy

A comprehensive literature search was performed on four electronic databases MEDLINE (EBSCO), Academic Search Ultimate (EBSCO), Cumulative Index to Nursing and Allied Health Literature complete (CINAHL-EBSCO), and PubMed. In addition, manual search of grey literature and citations of relevant articles was also conducted. We used a combination of key words of condition (such as “hospitalization” and “hospitalized”), the population (such as “myocardial infarction” and “acute coronary syndrome”), and the intervention (such as “education,” “education intervention,” and “patient education”).

Inclusion and exclusion criteria

Studies were eligible for inclusion if they met the following inclusion criteria: (i) Design: Randomized-controlled trials (RCTs), clinical controlled trials, and pre-post intervention studies; (ii) population: adult patients with acute myocardial infarction or other form of ACS; (iii) intervention: Contain individual patient education or consultation that started during hospital stay; and (iv) outcome: Any physical, psychological, and behavioral outcomes of AMI. Studies are excluded based on following criteria: (i) Preliminary study, pilot study, and community-based education, (ii) education started after hospital discharge, and (iii) group-based education.

Selection of studies

Second and third authors were involved in the screening process, where they either had experience in the domain of coronary care or had practical experience with respect to conducting systematic reviews due to previous research work. Duplicates were removed after the titles and abstracts were screened according to the inclusion criteria. Studies that may meet the inclusion criteria were then downloaded in full and checked for the second time to ensure that they met the inclusion criteria.

Then, the assessment of methodological quality of each study was executed. The downs and black scale [15] used to assess the methodological quality of included studies. The 27 items in this scale address four methodological components: Reporting, external validity, internal validity (bias and confounding), and power. Options for 26 items were either as yes (=1) or no/unable to determine (=0), whereas one item was rated on a 3-point scale (yes = 2, partial = 1, and no = 0). The total scores range from 0 to 28, which means the higher scores, the better methodological quality of the study. The study was categorized based on following cutoff points: Excellent (26–28), good (20–25), fair (15–19), and poor (≤14) based on the United States Preventive Services Task Force approach [16].

Data extraction

Data were extracted from the articles for synthesis using a predefined standardized data extraction tool on the following information: (i) Citation details (e.g., publication year); (ii) study characteristics (e.g., methodology, setting, educational methods, quality assessment classification, and baseline characteristics); and (iii) intervention (e.g., theoretical background for the development, type, duration, and dose, medium); and (iv) outcome (e.g., primary outcome and research instruments, frequency, and length of follow-up and results).

Ethical considerations

This study was approved by the ethics committee of the M Djamil Hospital Padang, Indonesia (No. 342/KEPK/202). In this systematic review, the
collected data were only used for scientific purposes, and intellectual property of the authors in the use of the content has been observed.

Results

The systematic review of 1037 articles resulted in 32 possible eligible full-text publications, of which 19 article were finally included. The included article consists of 10 RCTs, four random clinical trials, and five pre-post studies. Figure 1 shows the PRISMA flow chart of the study selection process, depicting the search results, reasons for exclusion, and study selection.

![Flow diagram of study selection process](image)

**Characteristics of included studies**

Nineteen studies were conducted across 11 countries, they were 13 in Asia (Iran: 6, Saudi Arabia: 1, Thailand: 1, Hong Kong: 1, China: 2, Korea: 1, and Jordan: 1), 5 in Europe (Ireland: 1, Czech Republic: 1, and Turkey: 3) and Australia (1). Among them, 12 studies were conducted as randomized controlled trial [17], [18], [20], [21], [22], [23], [24], [25], [26], [27]. The patient populations included adults hospitalized for first-time myocardial infarction, either with ST-segment elevation or with no ST-segment elevation and either had or not had percutaneous coronary intervention. In total, 3588 MI patients were included in this analysis.

Table 1 shows the quality assessment classification of included studies. There were thirteen (68.42%) studies considered “good” and there were six (31.58%) studies considered “fair” quality.

**Primary outcomes measured**

Primary outcomes measured in reviewed studies included sexual quality of life [17], need for rehospitalizations [29], quality of life [18], [20], [30], adherence to medication [19], [25], [33], control of cardiac risk factors [29], [30], [31], self-efficacy [20], [27], coping [20], anxiety [21], eating behavior [22], lifestyle behaviors [23], [28], [31], [35], knowledge [24], [25], [26], [29], [35], attitudes [24], beliefs [24], [26], physical activity [33], angina level [33], functional status [27], and illness perception [28]. All of the studies, except two studies [20], [29] employed validated and reliable research tool(s) for measurement of the outcome(s) in their studies (Table 1).

Four of the patient educational intervention used face-to-face method only [17], [18], [21], [35] with four studies used face-to-face method in combination with telephone call(s) [24], [27], [28], [31] five studies [20], [22], [30], [32], [34] used combination of both face-to-face method and telephone call(s) with one other method such as the use of either consultation, workbook, or group meeting. Four studies used face-to-face method followed by the provision of written materials as medium for education such as leaflet, book, or brochure [19], [26], [29], [33]. Another study used combination of face-to-face method, consultation, and provision of educational compact disk and book [23]. Finally, there was one study used booklet and three educational resources in its educational session [25] (Table 1).

**The characteristic of the educational intervention**

Table 2 summarizes the characteristics of the patient educational interventions. Nurse was the most frequent provider of patient education (n = 13, 68.42%), whilst in three out of 19 (15.79%) studies, trained peers were the provider of education, [17], [18], [21] in one (5.26%) study, and in the other one (5.26%) study, cardiac nurse specialist was the provider of education [30]. All (100%) of the studies started patient education during hospitalization, however, only 12 (63.16%) trials had some aspects of education delivered after discharge, whereas six (31.58%) studies did not execute follow-up intervention [17], [18], [19], [25], [26], [35] and one study did not indicate follow-up intervention [21]. The duration of education intervention ranged from 1 day to 12 months. Educational medium included visual material [33], leaflet [19], [25], brochures [3], booklet [20], [23], [26], [27], [32], [34], workbook [22], compact disk [23], digital video disk [27], wallet card [24], refrigerator magnet [25], printed materials [30], and handbook [28]. Somehow,
six (31.58%) studies [17], [18], [21], [29], [31], [35] did not state the use of medium in education.

Of the studies reviewed, only nine studies reported the presence of the theoretical or principal basis that guided the intervention development. Guiding framework comprised standard nursing care and the dynamic standard setting system [29], the UK Medical Research Council [30], Roy Adaptation Model [20], recommendation from American Heart Association [22], Leventhal’s self-regulatory model if illness behavior [24], [28], King’s goal attainment theory [31], the continuous care model [23], [32], and Bandura’s social cognitive theory [27].

Almost all of the studies reported significant differences on outcomes measured after educational session. However, some of them whose outcomes measured more than one variable found that there was no significant difference on quite a few outcomes observed. Only one study examined medication adherence reported no significant differences on outcome measured 12 months after educational intervention [19].

Discussion

Nineteen randomized controlled trials or non-randomized trials that investigated an educational intervention provided for myocardial infarction patients were included in this review. Almost all of the studies in this review used multimodal approaches such as face-to-face training session, peer education, counseling, telephone follow-up, written material, and electronic...
Table 2: Characteristics of the educational intervention (n = 19)

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Intervention</th>
<th>Medium</th>
<th>Theoretical basis for development of the intervention</th>
<th>Educational material</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbasi (2020)[17] Iran</td>
<td>Peer education lasted for 90 to 120 min was provided by nurse, lasted for 30–60 min, on day 3, 1, 6, and 12 months after hospitalization.</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Sexual QoL increased significantly. Higher rates of rehospitalization for coronary artery disease, better knowledge about their condition, regular medication used, lower systolic blood pressure, lower body mass index values, higher reduction on total cholesterol levels, higher increase of physical activity, regular eating, and shifting to a healthier diet.</td>
</tr>
<tr>
<td>Dolezel (2019)[29] Czech Republic</td>
<td>The education of post-MI patients provided by nurse, lasted for 30–60 min, on day 3, 1, 6, and 12 months after hospitalization.</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td></td>
</tr>
<tr>
<td>Ebrahimi (2021)[18] Iran</td>
<td>Two 1-h peer education sessions (at intervals of 1 h) performed by peers on the 3rd day after MI.</td>
<td>Not stated</td>
<td>Not stated</td>
<td>The concepts and benefits of the peer education, the educational needs of the patients with MI.</td>
<td>The QoL and self-care behaviors increased significantly.</td>
</tr>
<tr>
<td>El-Toukhy (2017)[19] Saudi Arabia</td>
<td>A face-to-face education provided by physician, consisted of several aspects of CAD disease and lifestyle changes.</td>
<td>Leaflet</td>
<td>Not stated</td>
<td>Athorothrombosis, thrombus formation, and thrombus formation prevention</td>
<td>Increased adherence to prescribed DAPT.</td>
</tr>
<tr>
<td>Jiang (2020)[30] China</td>
<td>Nurse-led individualized self-management program, provided by cardiac nurse specialist on the day before discharge, and telephone follow-up for 12 months thereafter.</td>
<td>Printed education materials</td>
<td>The UK Medical Research Council framework for the development of complex interventions.</td>
<td>Healthy living with acute MI and PCI.</td>
<td></td>
</tr>
<tr>
<td>Kavradim (2020)[20] Turkey</td>
<td>Two sessions of face-to-face education provided by nurse with an education booklet, and follow-up telephone calls.</td>
<td>Educational booklet</td>
<td>An evidence-based treatment guidelines and Roy Adaptation Model</td>
<td>Cardiovascular risk factors and management.</td>
<td></td>
</tr>
<tr>
<td>Mohammadpourhodki (2019)[21] Iran</td>
<td>Two sessions of peer-based education based on Parent and Fortin research, started 72 h after the MI.</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td></td>
</tr>
<tr>
<td>Molazem (2013)[23] Iran</td>
<td>The continuous care model, provided by nurse, followed by consultation, as needed</td>
<td>Compact disk and booklets</td>
<td>The continuous care model</td>
<td>The Benson’s relaxation training</td>
<td>Lifestyle improved significantly</td>
</tr>
<tr>
<td>O’Brien (2014)[24] Ireland</td>
<td>A one-to-one individualized educational session, provided by nurse within 24 days of hospital admission, followed by telephone calls.</td>
<td>Action plan and wallet card</td>
<td>Leventhal’s self-regulatory model of illness behavior</td>
<td>Information on ACS.</td>
<td>Knowledge, attitude, and belief scores increased significantly over time.</td>
</tr>
<tr>
<td>Park, Song (2017)[31] Korea</td>
<td>The goal-attainment-theory-based education program by nurse educator, and provision of telephone calls counseling.</td>
<td>Not stated</td>
<td>King’s goal attainment theory</td>
<td>Cardiovascular risk factors and the behavioral modification strategies</td>
<td>Cardiovascular risks, health behaviors, and QoL changed positively and significantly.</td>
</tr>
<tr>
<td>Saravi (2017)[32] Iran</td>
<td>The four stages continuous care model, provided by nurse.</td>
<td>Educational booklet</td>
<td>The continuous care model</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stolic (2019)[25] Australia</td>
<td>Education provided by nurse on the symptom management patient, using visual, auditory, and kinesthetic resources.</td>
<td>Leaflet, refrigerator magnet, and digital video disk</td>
<td>Not stated</td>
<td>Administration of sublingual nitroglycerine</td>
<td>Knowledge of sublingual nitroglycerine improved significantly.</td>
</tr>
<tr>
<td>Tawalbeh (2014)[35] Jordan</td>
<td>A 2 h cardiac educational session using open discussion between nurse and the participants.</td>
<td>Not stated</td>
<td></td>
<td>Information on CAD: pathophysiology and management.</td>
<td>Knowledge and adherence improved statistically.</td>
</tr>
<tr>
<td>Tuna (2021)[26] Turkey</td>
<td>One session of the planned discharge education program provided by nurse.</td>
<td>Informational booklet</td>
<td>Not stated</td>
<td>Information on heart attack symptoms and the importance of exercise and nutrition</td>
<td></td>
</tr>
<tr>
<td>Uysal (2015)[33] Turkey</td>
<td>An individual, nurse provided, education between the fifth and 7th days before discharge for an hour and telephone counseling programs.</td>
<td>Visual materials, brochures</td>
<td>Not stated</td>
<td>Information on MI management.</td>
<td>Compliance with drug treatment improved significantly.</td>
</tr>
<tr>
<td>Vardanjani (2013)[34] Iran</td>
<td>A 20 min individual education and group education provided by nurse followed by giving educational aid tools to patients.</td>
<td>Educational booklet</td>
<td>Not stated</td>
<td>Information on myocardial infarction symptoms, causes, and management.</td>
<td>Anxiety, systolic blood pressure, and cholesterol level decreased significantly.</td>
</tr>
<tr>
<td>Vibulchai (2016)[27] Thailand</td>
<td>Three in-hospital nurse education sessions, followed by CR monitoring using an exercise and daily activity diary and telephone counseling sessions.</td>
<td>Digital video disk, and a booklet</td>
<td>Bandura’s social cognitive theory</td>
<td>Motivation-building activities to increase the practices of CR, skill training: Walking exercise, heart rate checks, and energy conservation.</td>
<td>Self-efficacy and functional status increased significantly.</td>
</tr>
<tr>
<td>Yan (2014)[28] China</td>
<td>A pre-discharge education provided by nurse, focused on introduction to a handbook, and telephone follow-up instructions.</td>
<td>Handbook</td>
<td>The Leventhal’s self-regulation theory</td>
<td>Perceptions of the symptoms and causes of MI, dimensions of illness perception</td>
<td>Perceptions about symptoms of MI, beliefs about the controllability, and beliefs about the causes of MI changed positively and significantly. Nutrition and physical activity improved significantly.</td>
</tr>
</tbody>
</table>
Material. Educational interventions comprised either brief single session or multiple sessions up to nine sessions and importantly are the fact that more than half studies had more than one educational session. Medium used for patient educational ranged from single printed material to multiple resources and notably is the fact that 12 studies provided printed and non-printed educational materials to the patients. Multisession education, incorporate scheduled follow-up sessions, and supported with multiple resources as a core component are generally more effective in achieving desired outcomes compared to a single session without provision of educational resources [36].

Nurse was the most widely used personnel to deliver out patient education in studies reviewed. Interestingly, there were three studies that deployed a trained person who has already passed myocardial infarction to deliver education to hospitalized patients due to myocardial infarction. The mobilization of peers as educator could bring beneficial impacts, such as reduction on nurses’ workload, generating an experience-based education, and facilitating social communication to support patients to cope with their illness [18], [21], [37]. Nevertheless, the use of peers as educator could bring a potential of inappropriate learning materials due to various experiences and also additional cost related to peers’ expenses.

Most of the studies tested the effectiveness of education that had a follow-up session after hospitalization, either by face-to-face meeting and/or by telephone call. Follow-up session after in hospital education ensures continuation of intervention and supports sustainability. Structured telephone follow-up session delivers education, and motivational and emotional processes that are thought to be an important intervention. It contributed to information exchange and the provision of solutions on symptoms and problems faced by patients after discharge from hospital [20], [38]. It would be even better, for the purpose of effectiveness and efficiency, if follow-up education session to be incorporated during regular visits to the clinic or established service. If the provision of education is outside of regular services, it means that additional officers and additional funding are needed. And, both additions are not included in the health insurance coverage.

In terms of materials given during education, there were variations across studies. Some studies provided materials on the wide range of educational needs of the patients with myocardial infarction such as definition, pathophysiology, symptoms, and risk factors of myocardial infarction, treatment, and management [18], [20], [28], [29], [30], [32], [33], [34], [35]. Moreover, there were also studies provide materials focusing on several aspects of management of myocardial infarction, such as atherothrombosis and its clinical features and the use of antiplatelet therapy [19], diet habit and management [22], relaxation techniques [23], risk factors and behavioral modifications [31], symptom management and behavioral responses including the administration of sublingual nitroglycerin [25], and skill training including exercise practice and energy conservation [27]. Among those studies, there were two studies regulate the placement of the materials in each education session based on theoretical principle basis for the development of the intervention [23], [32]. There is no doubt that patient education should be targeted to address patient needs. However, the study showed that effective management and rehabilitation after a cardiac event reinforced by suitable provision of information helped to enforce patients to adopt necessary behavior [39]. In addition, patients who were hospitalized had different priority of learning needs from patients who were at outpatient unit and nurses could have different perception of priority of learning needs to patients have [40], [41]. Hence, it is important to provide patient education based on their learning assessment. A patient-centered assessment of learning needs is one key elements of effective educational session [42].

In general, studies showed that patient education for patients hospitalized with myocardial infarction had significant effects on knowledge, beliefs, physical, psychosocial, behavioral, clinical, and quality of life outcomes, but at various levels. Studies also showed that education had significant effect on self-efficacy, functional status, and illness perception. Due to the wide variety of educational strategies and outcome parameters, it was impossible to compare the effect of intervention on specific outcomes.

Conclusions

Findings support the pivotal role of patient education on the management of myocardial infarction patient. It has been clearly stated from resources that patient education is vital for the management of myocardial infarction patient, both during hospitalization and after hospitalization. However, research is needed to clearly identify the patient education strategies that integrated to established service and contributed to the achievement the best outcomes for acute myocardial infarction patients.

References

PMid:33501848

PMid:29961639

PMid:32586296


PMid:26673558

PMid:24748875


PMid:24529720

PMid:22210417

PMid:21076308

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