







# Medication Self-efficacy and Its Related Factors: A Cross-sectional Study on Patients with Coronary Artery Disease in North East of Iran

Fahimeh Nikraftar <sup>1</sup>, Seyed Reza Mazloun <sup>2</sup>, Mostafa Dastani <sup>3</sup> and Fatemeh Heshmati Nabavi <sup>4,\*</sup>

<sup>1</sup>MSc in Medical Surgical Nursing, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>2</sup>Instructor, Nursing and Midwifery Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>3</sup>Associate Professor, Department of Cardiovascular Disease, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

<sup>4</sup>Associate Professor, Nursing and Midwifery Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

\*Corresponding author: Associate Professor, Nursing and Midwifery Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran. Email: heshmatinf@mums.ac.ir

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## Abstract

**Background:** Patients with coronary artery diseases (CAD) use a wide spectrum of medications; hence, strategies are needed to increase their adherence. In this line, identifying factors associated with medication self-efficacy can be useful.

**Objectives:** The current study aimed to investigate medication self-efficacy and its related factors in patients with CAD in the north-east of Iran.

**Methods:** In this cross-sectional study, 104 patients with CAD hospitalized in one of the largest teaching hospitals in the north-east of Iran are studied. Participants were selected by convenience sampling method. Data were collected using Demographic and clinical information form, Information Satisfaction questionnaire (ISQ), and Self-Efficacy for Appropriate Medication Use scales (SEAMS). Data were analyzed by SPSS version 22 using descriptive statistics and multiple regression test.

**Results:** The mean age of patients was  $52.3 \pm 8.8$  years. The mean medication self-efficacy score was  $24.9 \pm 9.5$  (out of 39). Multiple regression showed a linear and significant association between information satisfaction, income, medications used in the last month, information about the nature of the disease, doctors as a preferred source of information, nurses, family members, internet and social networks as the most information sources used by patients, with medication self-efficacy ( $R = 0.907$ ,  $P < 0.001$ ). These variables could explain 82.2% of the self-efficacy variance.

**Conclusions:** Based on the result, it can be argued that in designing and implementing educational interventions aimed to promote medication self-efficacy in patients with CAD, individuals with lower income and under long-term medication treatment should receive more support. Educational programs should emphasize more on explaining the nature of the disease to the patients, and physicians should be more involved in educating patients.

**Keywords:** Self-efficacy, Medication Adherence, Coronary Artery Disease, Patient Satisfaction, Patient Preference

## 1. Background

Cardiovascular diseases (CVDs) are the most important cause of death worldwide and are expected to be the main cause of mortality and disability all around the world by 2020 (1). The most common type of CVDs is coronary artery disease (CAD) (2). Globally, in 2012, CVDs claimed 17.5 lives, of which 7.4 million are attributed to CADs (3). Similar to some Middle East countries, the prevalence of CAD and coronary risk factors in Iran is higher than the Western countries (4).

Despite the availability of advanced therapies and percutaneous coronary intervention, medications are still widely used in secondary prevention and treatment of

CAD. However, a significant proportion of cardiovascular patients do not adhere to their medication regimen. For example, one in every two patients in developed countries do not adhere to long-term treatments, and 33% - 69% of hospitalizations in the USA are due to poor medication adherence, with an annual cost of \$100 billion (5).

Besides, studies conducted in Iran reported low medication adherence (6). Dehghan et al. (7) reported that more than 90% of hypertensive patients aged 55 to 65 years had low medication adherence. Therefore, nonadherence to medication instructions, such as stopping early and changing doses without a doctor's advice, is associated with an increased risk of cardiovascular events, hospital admissions, and mortality (8).

As most of the CVD patients begin consuming medications since hospital admission and medicines usually should be used for a long time after discharge, patients should be able to take their medications according to their physician prescriptions. Therefore, patients are required to learn this behavior. Several behavioral change theories have been applied to change the behavior of medication adherence and improving patients' adherence to treatment. The concept of self-efficacy in the social cognitive theory of Bandura has provided a practical framework for this issue (9). Based on Bandura's theory, self-efficacy is defined as a primary factor that affects behavior change and self-judgments about the ability to perform a particular behavior in a special situation (10). Self-efficacy is considered an important predictor of adherence to treatment and in cardiac patients is a criterion for cardiovascular management as well as social, psychological, and physical functions. Therefore, it can be argued that higher self-efficacy scores are associated with significantly better predicted cardiac function and higher physical and mental health, as well as a lower probability of hospitalization for CAD patients (11).

Mitchell et al. (12) mentioned the promotion of self-efficacy enhancement strategies (12), including educating and informing patients to increase their information about the disease, which in turn increases patients' effective participation in treatment (13). Baljani et al. (14) reported the positive effect of nurses' educational interventions on promoting self-efficacy and controlling cardiovascular risk factors in patients with CVDs. However, there are educational interventions that did not significantly change the self-efficacy of patients (15, 16). All of these factors indicate the important role of determinants of learning, such as readiness to learn, learning styles, and preferences, as well as individual factors in increasing the effectiveness of education (13). Mosleh et al. (17) studied 365 cardiac patients under coronary artery intervention and reported a disparity between the perceptions of patients and nurses concerning the essential contents that should be learned. Other studies have also emphasized the differences between patients and providers concerning perceptions of patients towards learning needs (18). Gender, socioeconomic level, and cultural backgrounds also have a significant influence on the willingness and ability to use teaching-learning situations, interpret experiences, react to health and illness, and formulating patients expectations from nurses (13). Therefore, educating patients based on previous assessments not only can improve their outcomes, but also is useful for their satisfaction with education (19). Patient satisfaction is an important criterion for assessing the quality of provided services. Patient satisfaction is a criterion for determining the gap between

patient's expectations regarding services; in fact, the care won't be considered as high quality unless the patient is satisfied with that care or service (20). Failure to provide correct information to patients and their families causes fear, anxiety, misunderstandings, and reduced satisfaction (21).

As several medications are available for treating patients with CAD, it's necessary to develop strategies to increase their adherence to medication. Identifying the association between learning determinants and information satisfaction with self-efficacy can increase the perception of healthcare providers regarding factors that influence medication adherence. Besides, it will provide information to find solutions to improve the self-efficacy of CAD patients.

## 2. Objectives

The current study aimed to investigate medication self-efficacy and its related factors in patients with CAD in the north-east of Iran.

## 3. Methods

In this cross-sectional study, 104 patients with CAD hospitalized in the coronary care unit (CCU) and those referring to the health education clinic of Ghaem Hospital in Mashhad (Iran) from February 2018 to April 2019 are studied, one of the largest teaching hospitals in the north-east of Iran. Based on our pilot study on 30 patients, and with regard to the correlation between information satisfaction and medication self-efficacy ( $r = 0.75$ ), a type I error of 5%, and a test power of 90%, the sample size was determined as 104.

Participants were selected using the convenience sampling method according to the inclusion criteria among patients with CAD who were hospitalized in the CCU and those referring to the health education clinic of the Hospital. The inclusion criteria were being aged 18 to 60 years, having verbal, auditory, visual, and cognitive health to receive education, having stable hemodynamic status (no history of cardiopulmonary monitoring indication due to unstable hemodynamic status), ability to read and write or having someone to help in and the patient's primary caregiver should be with him/her for at least 12 hours a day. The exclusion criterion was a change in the hemodynamic status during the study.

Data were collected using demographic and clinical information form, Information Satisfaction questionnaire (ISQ) (22), and Self-Efficacy for Appropriate Medication Use scales (SEAMS). According to the review of the literature,

the factors that were possibly related to medication self-efficacy were identified and included in the information questionnaire. The ISQ is designed to measure satisfaction about the explanation of disease as well as its complications and treatments, advise on lifestyle, practical day-day issues, and overall information provided to the patients. This questionnaire is scored on a five-point Likert scale ranging from “strongly satisfied” (4) to “strongly unsatisfied” (0). The total score ranges from zero to 24. A score of 24 indicates the highest level of information satisfaction, while a score of zero indicates the lowest level of information satisfaction (22). This questionnaire is used in various studies (e.g. Davies et al. (2008) and Pollock et al. (2011)) to measure the information satisfaction of patients with cancer diagnosis. After taking the permission, this instrument was translated into Persian by the research team, and the translation was given to English language experts. A panel of 10 experts was formed to assess the content validity of the instrument, which yielded a content validity index (CVI) of 0.81. The CVI for all items of the questionnaire ranged from 0.79 to 0.83. The reliability of the instrument was also confirmed using the internal consistency method (by calculating the Cronbach’s alpha coefficient) with the participation of 10 patients in the pilot study ( $\alpha = 0.976$ ).

Self-Efficacy for Appropriate Medication Use scales (23) contains 13 items scored on a three-point Likert scale (i.e. not confident, somewhat confident, and strongly confident). The total score ranges from 13 to 39, with a higher score indicates a higher level of medication self-efficacy. The validity of the scale was evaluated using a pilot study on 436 patients with CAD. The reliability was confirmed using the test-retest approach, Spearman’s correlation coefficient ( $r = 0.75$ ), and Cronbach’s alpha ( $\alpha = 0.81$ ) (23). Also, Sanchooli et al. (24) confirmed the validity and reliability of its Persian version. In the present study, the reliability was confirmed by Cronbach’s alpha coefficient ( $\alpha = 0.804$ ).

Informed written consent was obtained from all participants. Also, the objectives of the study were explained to them through face-to-face conversations in the CCU and health education clinic. Then the Personal information questionnaire was filled by a researcher by interviewing the patients. Complementary information were extracted from patients’ records. The ISQ and SEAMS questionnaire were also filled in the CCU and health education clinics by patients. Patients unable to fill the questionnaire were interviewed verbally and their responses were noted. The interviews lasted for 10 minutes, on average.

The research protocol was approved by the Ethics Committee of the Mashhad University of Medical Sciences, Mashhad, Iran (code: IR.MUMS.NURSE.REC.1397.045). To describe the characteristics of subjects, descriptive statistics (frequency distribution for qualitative variables, mean and

standard deviation for quantitative variables) were used. The Kolmogorov-Smirnov test was applied to test for a normal distribution. The association between demographic and disease variables and information satisfaction with medication self-efficacy was investigated using the multiple regression test. Data were analyzed using SPSS version 21.0 (SPSS Inc, Chicago IL). Statistical significance was considered when  $P$ -value  $< 0.05$ .

#### 4. Results

In this research, 104 patients hospitalized at CCU (84 patients) or referred to the health education clinic (20 patients) were studied. The mean age of participants was  $52.3 \pm 8.8$  years. Also, 71 (68.3%) participants were female. Moreover, 91 (87.5%) patients presented their willingness to participate in healthcare decisions by receiving all information about their illness. Other demographic and disease characteristics are presented in Table 1.

The mean score of information satisfaction was moderate ( $9.6 \pm 3.5$ ), and the mean score of medication self-efficacy was  $24.9 \pm 9.5$  (out of 39) (Table 2). The multiple regression test showed a linear and significant association between information satisfaction, income, medications used in the last month, information about the nature of the disease, doctors as a preferred source of information, nurses, family members, internet and social networks, as the most information sources used by patients, with medication self-efficacy ( $R = 0.907$ ,  $P < 0.001$ ). These variables could explain 82.2% of the self-efficacy variance in patients with CAD ( $R$ -square = 82.2%) (Table 3).

**Table 2.** Information Satisfaction and Medication Self-Efficacy of Patients with CAD

Variable	Mean $\pm$ SD	Minimum	Maximum
Information satisfaction	9.6 $\pm$ 3.5	0	20
Medication self-efficacy	24.9 $\pm$ 9.5	13	39

#### 5. Discussion

According to the results, the mean self-efficacy score was 63.8%. Son et al. (25), in a study on the role of depression and self-efficacy on medication adherence in Korean patients after a successful coronary intervention, reported an adherent rate of 39.7%. This difference can be attributed to different questionnaires used to examine the self-efficacy as well as the age structure of participants of these two studies; It worth noting that age is negatively associated with the level of physical and psychological abilities, which are important to prevent chronic diseases,

**Table 3.** Correlation Between Information Satisfaction and Demographic and Disease Variables with Medication Self-Efficacy in Patients with CAD

Variable	Multiple Regression Test			
	Beta Coefficient	P-Value	CI 95%	
			Lower	Upper
Taking anti-hypertensive and anti-diabetic drugs and statins in the last month	39.295	0.002	15.143	63.448
Taking anti-hypertensive and anti-diabetic in the last month	39.092	0.003	14.628	63.557
Taking anti-hypertensive drugs, vitamins and statins in the last month	35.087	0.022	5.438	64.737
Taking anti-hypertensive drugs in the last month	27.275	0.006	8.484	46.065
Taking anti-diabetes medications in the last month	25.622	0.023	3.797	47.446
Taking anti-hypertensive drugs and statins in the last month	24.837	0.006	7.455	42.219
Information satisfaction	17.560	<0.001	1.418	33.703
Required Information (nature of disease)	11.241	0.034	1.874	20.608
Patient income	0.913	0.025	0.468	1.359
preferred information sources (doctors)	0.579	0.030	-4.053	5.212
Information resources used (nurses)	-7.757	0.023	-1.125	-14.388
Information resources used (internet and social networks)	-10.463	0.017	-1.962	-18.963
Information resources used (family members)	-13.348	0.034	-1.044	-25.652

therefore, by getting older, the person's ability to achieve optimal self-efficacy decreases (26).

In the present study, the mean score of patients' information satisfaction was moderate. Joolaei et al. (27) also reported that patients were moderately satisfied with nursing care in hospitals affiliated to the Iran University of Medical Sciences in each dimension of trust, patient education, and technical and professional care. Liu and Wang (28), in a study intended to assess the satisfaction of hospitalized patients with nursing care and its effective factors in a hospital in China, showed that patients had a high level of satisfaction with nursing care, including patient education. It can be argued that patient satisfaction is influenced by individual, cultural, social, socioeconomic, and health-related factors as well as previous experiences of receiving services and education methods. Hence, some experts believe that due to differences in attitudes, the patients' satisfaction index alone is not a reliable measure to assess the quality of healthcare services (29).

This study demonstrated that the number and type of medications used in the last month has a direct and significant association with medication self-efficacy. A systematic review on factors related to medication adherence in the elderly population by Yap et al. (30) reported that medication factors, such as the number and type of medications, also affect medication adherence. A study by Kulkarni et al. (31), which intended to describe the adherence to cardiovascular medication prescribed at hospital discharge,

showed that self-efficacy and medication adherence were high at the beginning of treatment, but most patients discontinued taking medications within one year of prescription. It can be attributed to the fact that positive outcomes resulting from behavioral change are not often immediate. Therefore, individuals become frustrated with health plans that offer mainly long-term benefits, which in turn causes reduced medication treatments over time (13).

The current study also demonstrated that information satisfaction and increasing the patient's information about the nature of their disease have a direct and significant association with medication self-efficacy. Villegas et al. (32) found that information about HIV was the most important predictor of self-efficacy for HIV prevention. Kang and Yang (33) also found that increased knowledge of patients about CAD was associated with their enhanced cardiac self-efficacy in promoting health behaviors. Aflakseir (34) also showed that perception of disease, including the chronic nature of the disease, could predict high medication adherence. In this line, it can be argued that the perceived risk of disease is an important determinant of patient health behaviors (35). Besides, it worth noting that self-efficacy is also a predictor of such behaviors. Hofer et al. (36) also found that increased medication information satisfaction in diabetic patients was associated with enhanced medication adherence. However, there was no association between increasing medication information and enhanced medication adherence. Hence, educational in-

terventions may be needed to focus on increasing patients' satisfaction with the information provided, not just improving medication information (36). It can be argued that trusting healthcare providers as well as satisfaction with communication and provided information can improve important health behaviors such as adherence to medications (37).

The findings also showed that people with a higher monthly income had higher medication self-efficacy. In this respect, Ejebe et al. (38) showed that low-income individuals had the lowest probability of self-efficacy compared to those with high-income. Meilstrup et al. (39) also reported a direct and strong association between low-income levels and self-efficacy. In this line, Bastable (13) argued that the patient may understand the importance of taking prescribed medication, be aware of how to administer it, and be willing to follow the regimen, but the medications may not be affordable. Therefore, in such cases, the patient does not need education but rather requires financial support to buy medications (13).

This study showed that most patients (60.6%) preferred to receive their information from physicians, and there is a direct and significant association between the preferred information source to receive information and the score of medication self-efficacy. Popoola et al. (40) indicated that most patients with venous thromboembolism (65.6%) preferred to receive education from physicians. They also reported that the patient's perception of the role of physicians, whether real or imagined, influences their health behavior (40). Fan and Sidani (41) also found that healthcare providers, to increase the effectiveness of self-care education interventions in diabetic patients, should evaluate patient preferences on how to provide information and develop educational interventions based on their preferences. On the other hand, some researchers reported that people sometimes are not familiar with the educational role of the nurses (42). Hence, in order to improve patients' outcomes as well as enhancing nurses understanding about their roles and positions, nurses should collaborate with other healthcare professionals in designing and developing educational programs. Therefore, educating healthcare principles requires interdisciplinary collaboration and teamwork, and physicians should be more involved in educating the patient.

In our study, no association was found between age, gender, marital status, educational level, occupation, BMI, admission reason, medical history, family and social history, and information needs with medication self-efficacy. Mathes et al. (43), in a review of English and German-language articles on adult patients with chronic physical conditions, found that education levels, employment status, marital status, age, and gender were correlated with

the self-efficacy of patients. Yap et al. (44) reported that BMI, age, gender, marital status, educational level, social and medical history were the causes of nonadherence to treatment in the elderly population. Salari et al. (45), in a study on determining medication adherence and its related factors in patients undergoing coronary angioplasty, reported that only the education level of the spouse and the family history of CAD were predictors of medication adherence. A study that intended to evaluate the association between information needs and medication self-efficacy reported that such association was not found in the literature.

The possible cause of achieving different results in the studies is considering a wide range of variables in relation to each other and the medication self-efficacy in the present study. Also, in the present study, most of the participants were female, and this issue probably has affected the findings, that is, no correlation between gender and self-efficacy.

In the present study, we investigated the association between a wide range of variables and medication self-efficacy of patients hospitalized in one of the largest teaching hospitals in the north-east of Iran. However, it has limitations, including using a convenient sampling technique, not controlling differences in the individual characteristics of participants, and using a self-reporting approach or filling the questionnaires by patients' primary caregivers.

### 5.1. Conclusions

According to the result of this study and compared to the results of previous studies on medication self-efficacy and its related factors in patients with CAD, it can be argued that recent medication history (type and number), information satisfaction, receiving information about the nature of the disease, patient income, and the preferred source of information are associated with high medication self-efficacy. Therefore, it can be suggested that in designing and implementing educational interventions aimed to promote medication self-efficacy in patients with CAD, individuals with lower income and under long-term medication treatment should receive more support. Besides, educational programs should emphasize more on explaining the nature of the disease to patients. Moreover, physicians' involvement in such programs should be promoted.

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## Footnotes

**Authors' Contribution:** Study conception and design: FN, SRM, MD, and FHN. Analysis and interpretation of data: FN and SRM. Drafting of the article and revising it critically for important intellectual content: FN, SRM, MD, and FHN. Final approval of the version to be published: FN and FHN.

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**Table 1.** Demographic and Disease Characteristics of Patients with CAD<sup>a</sup>

Variable	Values
Agea, y	52.3 ± 8.8
BMI, kg/m <sup>2</sup>	27.0 ± 6.0
Number of admission or referral	1.1 ± 0.4
<b>Gender</b>	
Male	33 (31.7)
Female	71 (68.3)
<b>Marital status</b>	
Single	5 (4.8)
Married	82 (78.8)
Deceased spouse	17 (16.4)
<b>Level of education</b>	
Under diploma	56 (53.8)
Diploma	31 (29.9)
University degree	17 (16.3)
<b>Occupational status</b>	
Unemployed	2 (1.9)
Housewife	65 (62.6)
Self-employed	20 (19.2)
Employee	5 (4.8)
Worker	10 (9.6)
Retired	2 (1.9)
<b>Patient income</b>	
Less than enough	54 (55.7)
Enough	43 (44.3)
<b>Reason for admission</b>	
Diagnostic angiography	78 (75.0)
Angina	6 (5.8)
Myocardial infarction	20 (19.2)
<b>Smoking history</b>	
Yes	9 (8.7)
No	95 (91.3)
<b>Hookah history</b>	
Yes	17 (16.3)
No	87 (83.7)
<b>Addiction history</b>	
Yes	17 (16.3)
No	87 (83.7)
<b>Diabetes</b>	
Yes	34 (32.7)
No	70 (67.3)
<b>Renal disease</b>	
Yes	7 (6.7)
No	97 (93.3)
<b>Hypertension</b>	
Yes	68 (65.4)
No	36 (34.6)
<b>Hyperlipidemia</b>	
Yes	60 (57.7)
No	44 (42.3)
<b>Medications used in the last month</b>	



Antihypertensive	11 (14.5)
Anti diabetic	4 (5.3)
Statin	4 (5.3)
Anti-hypertensive + antidiabetic	5 (6.6)
Anti-hypertensive + statin	27 (35.5)
Antidiabetic + statin	3 (3.9)
Antihypertensive + vitamin + statin	1 (1.3)
Antidiabetic + anti-hypertensive + statin	20 (26.3)
Vitamin + antidiabetic + statin	1 (1.3)
<b>Family history of cardiovascular disease</b>	
Yes	52 (50.0)
No	52 (50.0)
<b>History of other diseases</b>	
Gastritis	2 (13.3)
Hypothyroidism	5 (33.4)
Fatty Liver	3 (20.0)
Hyperthyroidism	3 (20.0)
Asthma	2 (13.3)
<b>Required information about disease</b>	
The nature of the disease	3 (2.9)
Types of available treatments (drugs-surgery)	33 (31.8)
Complications	17 (16.3)
Lifestyle (diet, activity, etc.)	51 (49.0)
<b>preferred information sources to receive</b>	
Nurses	33 (31.7)
Physicians	63 (60.6)
Family members	3 (2.9)
<b>Information</b>	
Internet and social networks	5 (4.8)
<b>Information sources used to receive information</b>	
Nurses	58 (55.8)
Physicians	24 (23.1)
Family members	4 (3.8)
Internet and social networks	17 (16.3)
Pamphlet and brochure	1 (1.0)
<b>Information needs</b>	
Receiving all the information and participate in decision making	91 (87.5)
Receiving positive information	11 (10.6)
Receiving limited information and make the decision by the doctor	2 (1.9)
<b>Need for better provision of information</b>	
Yes	97 (93.3)
No	7 (6.7)

<sup>a</sup>Values are expressed as mean  $\pm$  SD or No. (%).