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Effectiveness of an Instructional Program on Patients' Readiness for Hospital Discharge after Coronary Artery Disease

Haider Jassim Hamid[1], Serwan Jafer Bakey[2]

1 University of Baghdad, University Healt Center, Baghdad, Iraq
2 Department of Adult Nursing, College of Nursing, University of Baghdad, Baghdad, Iraq

Corresponding Author: Haider Jassim Hamid; ***University of Baghdad, University Healt Center, Baghdad, Iraq***
Email: haider.j@uobaghdad.edu.iq

Quantitative Study

Abstract

Background: Coronary artery disease (CAD) is the greatest cause of death worldwide; education before hospital discharge about this disease and risk factor management is an essential strategy for improving patients getting ready for hospital discharge and plays an important role in both prevention and treatment and reduces the risk of mortality. This study aims to determine the effectiveness of instruction program on patients' readiness for hospital discharge (RHD) score.

Methods: A quasi-experimental study [nonequivalent control group (CG) post-test only] carried out on 80 patients with CAD seeking medical care at Iraqi Center for Heart Diseases in Baghdad, Iraq, was conducted from 1th June to 5th July, 2023. Study utilized a non-probability sampling (purposive sampling). All participants were randomly assigned to the intervention group (IG) (n = 40) and CG (n = 40). The following instruments were used to collect data: demographic, clinical data, and the Readiness for Hospital Discharge after Myocardial Infarction Scale (RHD-MIS). SPSS software was used; descriptive statistics and analysis of covariance (ANCOVA) test were used to compare the means between two related groups.

Results: After the planned discharge education, RHD score was significantly increased in IG compared with the CG ($F = 81.215$, $P < 0.01$).

Conclusion: The instruction program is effectively beneficial in preparing the patients to discharge from hospital. Researchers recommended that this interventional program should be implemented as curriculum uses in cardiac ward.

Keywords: Patient education as topic; Hospital to home transition; Coronary artery disease

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Introduction

The increasing incidence of chronic diseases has emerged as one of the most critical global health challenges of the twenty-first century. Cardiovascular disease (CVD), a chronic condition, is the leading cause of mortality worldwide [World Health Organization (WHO), 2022]. Coronary artery disease (CAD) is characterized by the accumulation of atherosclerotic plaque in the arteries of the heart. This causes a cessation or reduction in blood flow to the heart muscle, and can range from unstable angina to myocardial infarction (MI) (Wells, Quintero, & Southmayd, 2020).

The global prevalence of CAD was estimated to be 244.1 million people in 2020; the Middle East, North Africa, Central and South Asia, and Eastern Europe had the highest prevalence rates of CAD in the world (Tsao et al., 2022). According to the most recent WHO data published in 2020, CAD deaths in Iraq were 36594, which represent 24.98% of total deaths. Iraq ranks 23rd in the world in terms of age-adjusted death rate (227.26 per 100000 populations) (World Health Rankings., 2023). The development of thrombolytic medications and procedures such as percutaneous coronary intervention (PCI) and endovascular therapy has substantially improved the health of patients with CAD (Cho, Sim, & Hwang, 2014). However, most significantly, more than 40% of patients have had recurrent CAD events in their later lifetimes, with an approximately 75% of these events preventable if patients participate in secondary prevention programs (Lindh et al., 2018; Spertus et al., 2018; WHO, 2017). In Iraq, one year after PCI, there was a significant rate of recurrence of symptoms in more than half of the patients, the majority of which were caused by the formation of new lesions (Aboud, Kadum, Ali, & Al-Najjar, 2021). As a result, optimal medical management is required to treat CAD, which includes patient education; the importance of patient education in enhancing self-management behaviors, health-related quality of life (HRQOL), and potentially diminishing healthcare expenditures is indeed supported by the findings of systematic reviews (Aldcroft, Taylor, Blackstock, & O'Halloran, 2011; Brown, Clark, Dalal, Welch, & Taylor, 2013; Ghisi, Abdallah, Grace, Thomas, & Oh, 2014; Dusseldorp, van Elderen, Maes, Meulman, & Kraaij, 1999). Nurses, because of their continuous interaction with patients, are in a better position to suggest appropriate lifestyle modifications (Bredie, Fouwels, Wollersheim, & Schippers, 2011). Therefore, patient education is a critical component of continuity of care and a nursing responsibility (Bahr & Weiss, 2019; Dobber et al., 2019).

Secondary prevention measures can be effectively implemented while the patient is hospitalized although they have a limited period of time. The patient should make an effort to modify their lifestyle and reduce risk factors that could contribute to subsequent MI. In view of this perspective, an evaluation of the patients' knowledge about the disease from their own viewpoint would provide a comprehensive understanding of the patient's post-MI medical care system (Ibanez et al., 2018). In 1976, Fenwick established the concept of *hospital discharge readiness*, which related to a patient's sense of ready to face reality (Carroll & Dowling, 2007; Galvin, Wills, & Coffey, 2017). Discharge readiness involves the patient's physical stability, as well as whether they have the necessary support, psychological capacity, information, and knowledge before being sent home (Galvin et al., 2017). Higher risks of complications and more frequent re-hospitalizations are linked to lower levels of patients' readiness for hospital discharge (RHD) (Weiss, Costa, Yakusheva, & Bobay, 2014; Weiss, Yakusheva, & Bobay, 2011). The significance of patients' readiness for discharge has grown in importance in ensuring a safe transfer from the hospital to their homes, while also contributing to their satisfaction and favorable outcomes (Meng, Liu,

Wong, Liao, Feng, & Li, 2020). However, in a large-sample research, just 47.8% of inpatients reported feeling ready for discharge (Mabire, Bachnick, Ausserhofer, & Simon, 2019). Patients who are not ready for discharge may struggle to cope with challenges in their home, resulting in a heightened likelihood of negative outcomes, such as disease recurrence or exacerbation, unplanned hospital readmission, and suboptimal medication adherence (Xiong, Liu, Chen, Tian, & Yang, 2021). Planning the program for CAD education in a clinical context may emphasize on teaching those who have CAD how to manage risk factors that can be modified. These actions are intended to prevent unfavorable consequences like recurrent MI, restenosis, and death.

Methods

Study design and participants: A quasi-experimental study [nonequivalent control group (CG) post-test only] design has been used to examine the effect of instruction program on the patients' RHD after CAD. This study was carried out in in-patient medical ward at Iraqi Center for Heart Disease in Baghdad, Iraq. The study population consisted of all ages (aged 18+) involved in in-patient setting, those who had diagnosed with a stable CAD, and referred for elective angiography or PCI. Data were collected was conducted from. 1 June to 5 July 2023. Non-probability sampling (purposive sampling) was used in this study. The sample of 80 patients has been divided into two groups: intervention group (IG) and CG of 40 patients each. The IG was exposed to instruction program by the researchers. Patients in CG received education by nurses, physicians, or other staff in the unit.

Sample size: To estimate the sample size for this study, Krejcie and Morgan formula was used (Krejcie & Morgan, 1970). A sample size of 77 was computed. However, the researchers determined a target sample size of 80 participants to account for attrition.

Instruments: Three instruments were used to conduct this study including demographics form, clinical characteristics, and the Readiness for Hospital Discharge after Myocardial Infraction Scale (RHD-MIS) (Buszko et al., 2017). Basic sociodemographic data comprised 5 items including gender, age, education level, occupation, and marital status. Clinical characteristics comprise 6 items which include past medical history [hypertension (HTN) and diabetes], family history of CAD, duration of chest pain, smoking, and number of cigarettes/day. RHD-MIS was used to assess RHD; it consists of 23 questions included in three subscales: subjective assessment of patient knowledge about the disease (7 questions), objective assessment of patient knowledge about the disease (7 questions), and patient expectations (9 questions). Each response is assigned a score ranging from 0 to 3 points; the total possible score is 69 points. Patients who obtain a score over 57 points are considered to have a high level of readiness. Conversely, patients who score below 44 points are classified as having a low level of readiness. Scores within the range of 44 to 57 points indicate an intermediate level of readiness for the patient. The RHD-MIS is widely regarded as a dependable and useful instrument for evaluating the readiness of patients for discharge. The questionnaire's high level of reliability and homogeneity was demonstrated by a Cronbach's alpha coefficient of 0.789. The translation and cultural adaptation were conducted initially. The procedure adhered to rigorous standards that were approved by the authors and was established upon the protocol recommended by Guillemin et al. (1993) (Guillemin, Bombardier, & Beaton, 1993). The content validity of the instruments is established through a panel of 13 experts.

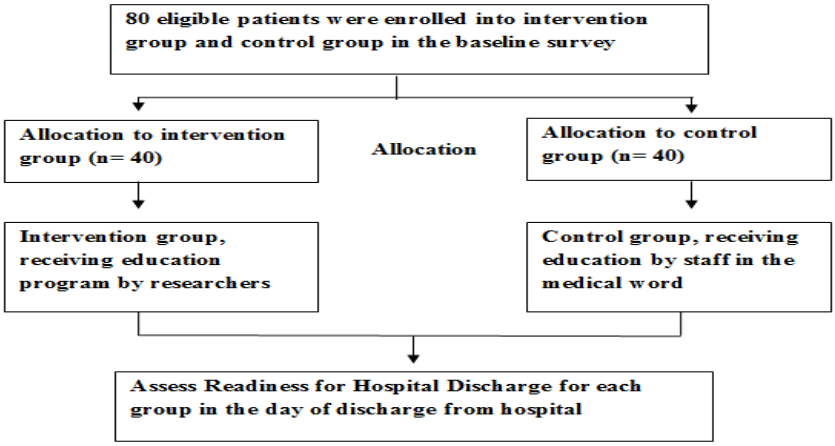

Figure 1. Flow diagram of participants through each step of the study

Intervention: Patients in IG were given comprehensive details, regarding CAD symptoms, how the disease develops, what pharmaceutical, percutaneous, and surgical therapy approaches are available, and the importance of implementing lifestyle changes to avoid complications (Figure 1).

Interventions with a lifestyle and/or behavior change focus designed for the secondary prevention of CAD are categorized as follows: dietary, exercise, psychological, and educational.

The instruction program design has been based on European Heart Journal guideline (Visseren et al., 2021), American College of Cardiology/American Heart Association (ACC/AHA) guideline (Grundy et al., 2019), and previous studies in Iraq (Abdul-hussain & Hassan, 2020; Isam & Hassan, 2023; Khasal, Atiyah, & Oleiwi, 2019; Mousa & Mansour, 2020) (Table 1).

Table 1. Description of the education program protocol

Sessions	Description
1	Getting to know the members, introducing the treatment plan and goals. The participant viewed an educational presentation, which was a voiced-over PowerPoint on CAD (21 minutes). In addition to viewing the video, each participant was given a written copy of the educational presentation. The presentation was adapted from European Heart Journal guideline and American Heart Association guideline.
2	The medical session was focused on the anatomy of the arteries of the heart, how the heart works, the nature and prevalence of the disease, symptoms of the disease such as angina, and medications such as aspirin, Plavix, and statins.
3	Third session discussed risk factors with a strong emphasis on modifiable risk factors with viable solutions such as a heart healthy diet.
4	Exercise or physical activity was the fourth session. This discussion zoned in on the important aspects of cardiovascular exercise: how long to exercise, intensity, and how often. There was a section on the importance and benefit of resistance exercise. The warning signs of a heart attack and the use of nitroglycerin were mentioned.
5	Session five focused on nutrition. A food pyramid was introduced along with the food groups. Omegs-3 fats and trans fats were explained. Fiber and salt, fruits and vegetables, and their impact on heart health were explained. The importance of reading food labels, especially serving size, was discussed.
6	This session introduced psychosocial risks such as stress and depression.
7	The final session in day 2 marked the final day of their participation with the completion of the RHD questionnaire at hospital discharge appointments.

CAD: Coronary artery disease; RHD: Readiness for hospital discharge

The teaching materials used during these sessions included pamphlet, verbal dialogue, and video watching.

Ethical considerations: Study approval has been requested through the College of Nursing, University of Baghdad, and then through the Ministry of Health (Department of Health Baghdad/Medical City). Patients' consent to participate in the research was obtained after explaining the purpose of the study, type of intervention, privacy, emphasis on voluntary participation without force as well as the right of refusal or withdrawal. The planned discharge education and information booklet was not given to the patients in the CG; however, patients in the CG were not prevented from obtaining an education by healthcare provider in medical ward.

Data analysis: SPSS software (version 22, IBM Corporation, Armonk, NY, USA) was used, and the level of significance was set at 0.05 for all tests. Descriptive statistics and analysis of covariance (ANCOVA) test were used to compare the means between two related groups, and Shapiro-Wilk test of normality was used to assess the normality of data.

Results

Characteristics of participants: Results of table 2 showed that there were 25 (62.5%) men in IG and 30 (75%) men in CG. The mean age of patients in this study was 58.70 and 55.95 years in IG and CG, respectively. Concerning age group, the majority in IG [17 (42.5%)] were equal and below age 55 and 19 (47.5%) were equal and below age 55 in CG. The most common educational level was primary school graduate in the IG [13 (32.5%)] and 16 (40%) in the CG. In relation to marital status, 35 (87.5%) in the IG and 38 (95%) in the CG were married. Concerning occupation, most participants were employee [12 (30%)] in the IG, while most participants in the CG [14 (35%)] were self-employed. Based on the results in table 2, the values of skewness and kurtosis of the research variables in the sample group were in the range of -1 to 1, indicating that the variables have a normal distribution.

Results of table 3 showed the clinical characteristic variables; most patients had HTN [29 (72.5%) in the IG and 33 (82.5%) in the CG].

Table 2. Demographic characteristic of patients with coronary artery disease (CAD)

Variables	Groups	Intervention (n = 40)	Control (n = 40)
Gender	Men	25 (62.5)	30 (75.0)
	Women	15 (37.5)	10 (25.0)
Age group	≤ 55	17 (42.5)	19 (47.5)
	56-65	12 (30.0)	15 (37.5)
	> 65	11 (27.5)	6 (15.0)
		58.025 ± 11.614	55.950 ± 8.649
Education level	Read and write	7 (17.5)	0 (0)
	Primary school	13 (32.5)	16 (40.0)
	Intermediate school	3 (7.5)	4 (10.0)
	Secondary school	10 (25.0)	13 (32.5)
	Institute graduate	5 (12.5)	3 (7.5)
	University graduate	2 (5.0)	4 (10.0)
	Higher education	0 (0)	0 (0)
Marital status	Married	35 (87.5)	38 (95.0)
	Widowed	3 (7.5)	2 (5.0)
	Divorced	2 (5.0)	0 (0)
Occupation	Housewife	11 (27.5)	10 (25.0)
	Retired	8 (20.0)	9 (22.5)
	Self-employed	9 (22.5)	14 (35.0)
	Employee	12 (30.0)	7 (17.5)

Data are presented as mean ± standard deviation (SD) or number and percentage

Nearly half of the participants in IG had diabetes, 19 (47.5%) in IG and 11 (27.5%) in CG. Forty percent had family history of CAD in the IG and 32.5% in CG. Regarding duration of symptoms, most patients in IG (42.5%) and 65% in CG had symptoms within the period from 1 to 6 months.

Concerning smoking, most of them were non-smokers which were 26 (65%) in the IG and 22 (55%) in the CG.Regarding the number of cigarettes per/day in the IG, 6 (15%) were smoking less than 21 cigarettes in a day while in the CG, 15 (37.5%) smoked less than 21 cigarettes in a day.

Change in patients' RHD level: Table 4 indicated that overall RHD mean score in IG was 54.950 ± 5.935 while the RHD mean score in CG was 34.125 ± 13.355 [$t(78) = 9.012$, $P < 0.01$], showing that there were highly significant differences between IG and CG when analyzed by independent samples t-test.

Regarding the RHD-MIS subscales, we observed statistically significant differences between IG and CG ($P < 0.05$); except "knowledge-the subjective assessment" subscale, there were no significant differences between both groups [$t(78) = 3.928$, $P = 0.091$].

Discussion

The present study aims to investigate the impact of education on patients' RHD. Assessment of the patient's RHD might be beneficial in identifying individuals who might need additional care from healthcare providers in order to continue their therapy at home. In our study, after the planned discharge education, in the IG, a significant differences was determined in the total score of the RHD compared with the CG (score in the IG was higher than in the CG); moreover, a significant difference was determined between the scores obtained from "knowledge-objective assessment" subscale and "expectations" subscale. On the contrary, there was no significant differences in the score of the "knowledge-subjective assessment" subscale in the IG compared with the CG (Figure 2).

Accordingly, we concluded that better knowledge of disease had the greatest impact on the overall assessment of readiness for discharge. Undoubtedly, knowledge of the disease makes it easier for the patient to make decisions adequate to the clinical situation and can positively influence the prognosis in the post-hospital phase.

Table 3. Clinical characteristics of patients with coronary artery disease (CAD)

Variables	Groups	Intervention (n = 40)	Control (n = 40)
Hypertension	Yes	29 (72.5)	33 (82.5)
	No	11 (27.5)	7 (17.5)
Diabetes	Yes	19 (47.5)	11 (27.5)
	No	21 (52.5)	29 (72.5)
Family history of CAD	Yes	16 (40.0)	13 (32.5)
	No	24 (60.0)	27 (67.5)
Duration of symptoms before procedure (month)	≤ 6	17 (42.5)	26 (65.0)
	7-12	6 (15.0)	11 (27.5)
	> 12	14 (35.0)	3 (7.5)
	Asymptomatic	3 (7.5)	0 (0)
Smoking	Yes	14 (35.0)	22 (55.0)
	No	26 (65.0)	18 (45.0)
Number of cigarettes (per day)	≤ 20	6 (15.0)	15 (37.5)
	21-30	5 (12.5)	1 (2.5)
	> 30	3 (7.5)	6 (15.0)
	Total	14 (35.0)	22 (55.0)

Data are presented as number and percentage
CAD: Coronary artery disease

Table 4. Comparison of patients' readiness for hospital discharge (RHD) score between the intervention and control groups

Domain	Maximum mean score	RHD scores for IG (mean ± SD)	RHD scores for CG (mean ± SD)	t	P-value
Knowledge-subjective assessment	21	18.425 ± 2.500	17.200 ± 3.770	1.713	0.091
Knowledge-objective assessment	21	15.625 ± 2.705	10.775 ± 7.325	3.928	< 0.001
Expectations	27	20.900 ± 3.621	6.150 ± 7.644	11.028	< 0.001
Overall RHD	69	54.950 ± 5.935	34.125 ± 13.355	9.012	< 0.001

IG: Intervention group; CG: Control group; RHD: Readiness for hospital discharge; SD: Standard deviation

Accordingly, planned discharge education may be recommended for increasing the knowledge level of patients with CAD about CVD.

RHD is an important predictor for patients' rehabilitation. Studies about the importance of planned discharge education on RHD level after CAD are very few. The importance of planned discharge education in RHD level has been emphasized in the literature. According to the findings of the study by Michalski et al. (2020), the educational booklet serves as an effective tool in enhancing patient understanding (Michalski, Kasprzak, Siedlaczek, & Kubica, 2020). Better knowledge of the symptoms of CAD and MI is positively correlated with a heightened level of RHD. The current standard of care requires adequate preparation for discharge, which includes providing information on secondary prevention after MI. Furthermore, other study found that patients who reported a poor RHD also had difficulties carrying out therapy recommendations in their own homes (Weiss et al., 2011).

The readiness of surgical patients for hospital discharge may be weakened due to their perception of lacking quality in discharge education (Nurhayati, Songwathana, & Vachprasit, 2019).

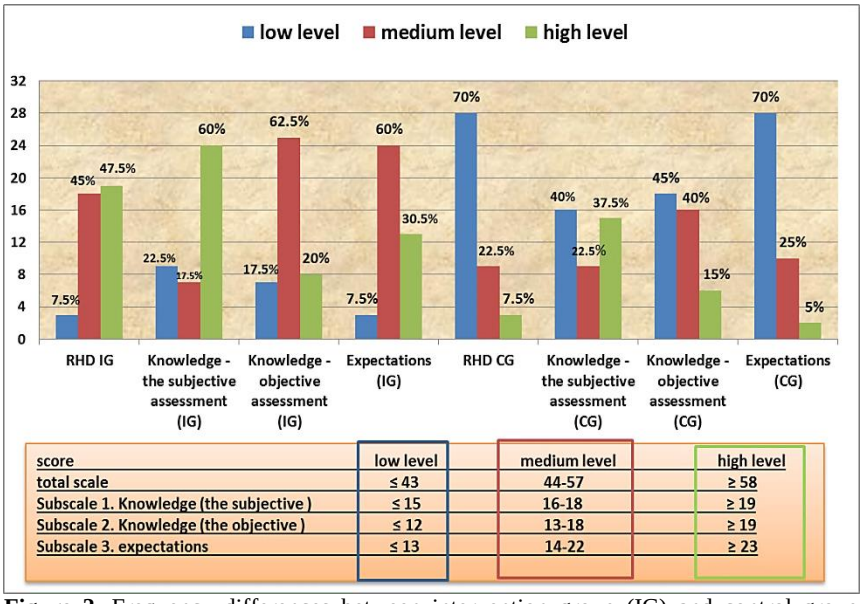

Figure 2. Frequency differences between intervention group (IG) and control group (CG) related to patient's readiness for hospital discharge (RHD) score

Other studies in Iraq revealed that the nurses had poor practices and knowledge in all aspects regarding patients' discharge planning in surgical cardiac wards and recommended that an educational program be conducted regarding discharge planning in order to improve nurses' practices (Abdulrdha & Mansour, 2018; Al-Fatlawi & Ahmed, 2016; Fadhil & Bakey, 2023; Khudur, Atiyah, & Al-Fayyadh, 2016; Saeed, Al-Alreda, & Majeed, 2023). Paying attention to patients' social support networks and giving them accessibility to education can help them have a better RHD after they leave the emergency medicine unit (Ibrahim & Bakey, 2023; Siow, Lo, Yeung, Yeung, Choi, & Chair, 2019). Further, instructional or educational program can assist participants in improving their competencies and compliances toward the targeted objective (Ibrahim & Bakey, 2023). This study confirms that these results are consistent with the previous literature that showed the importance of planned discharge education in increasing the level of RHD after CAD. A high level of readiness gives healthcare provider a clear picture of the patient understanding of the nature of their illness, risk factors, and how to self-care at home with regard to nutrition, exercise, and psychological state.

Several limitations were present in the this study. To start with, this sample was not randomized. Second, this research was carried out in a solitary medical ward at an Iraqi heart disease center in Baghdad. The study recommended that this interventional program should be implemented as curriculum uses in cardiac ward. Nurses should play a role to provide education to patients with CAD and assess RHD and patients' knowledge. Further research is needed to determine the relationship between hospital readiness and patient adherence to a healthy lifestyle. Post-hospitalization outcomes should be researched to determine the impact of patients' getting ready for hospital discharge on their adherence to a healthy lifestyle after they have returned home.

Conclusion

Based on the results of this research, instruction program is beneficial in preparing the patients to discharge from hospital after CAD. The results of this study can be used to enhance hospital discharge education. During the transition period, these results also supplied baseline data on the patients' preparation for hospital discharge.

Conflict of Interests

Authors have no conflict of interests.

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