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Effectiveness of a health educational program on quality life and nutrition of coronary artery bypass graft patients

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ABSTRACT

Background and Objective: The healing and quality of life of CABG patients might be impacted by changes in lifestyle. Therefore, this study aims to the impact of a health-related education program on the nutritional needs and quality of life following coronary artery bypass surgery at Surgical Specialty Hospital-Erbil Cardiac Center.

Patients and Methods: This study is a quesi-experimental conducted between 2021 and 2023. The samples were divided into two groups by random allocation, each group of 100 people. Data collection was based on a researcher-made questionnaire including demographic section and SF-36 questionnaire. The intervention consisted of 6 sessions, which included 2 sessions of general training for patients, and 4 sessions of training including physiological aspects, self-concept, Reciprocal relations and the fulfillment of obligations.

Results: When the intervention program was implemented, the health-related quality of life in the intervention group improved in comparison to the control group in terms of vitality, pain, overall health, physical role function, emotional role functioning, and mental health ($P<0.05$). The educational program's impact on participants' nutritional status revealed a shift in the intake of unhealthy meals and an increase in the consumption of nutritious foods ($P<0.05$).

Conclusions: This study demonstrated the beneficial effects of the health education program on patients who had had coronary artery bypass grafts (CABG) in terms of quality of life and diet quality.

Keywords: *Coronary Artery Bypass Grafting, Educational program, Quality of life, Diagnosis, Management, SF 36 Questionnaire, Nutrition*

INTRODUCTION

A common surgery used to treat coronary artery disorders (CAD) is coronary artery bypass grafting (CABG). The patients will undoubtedly experience significant challenges with their quality of life (QOL), recuperation, and return to regular life following this major surgery (1). The statistics indicate that post-CABG patients have low awareness of the new lifestyle, the amount of activity and the type of nutrition after surgery (2). Therefore, it can be seen that many complications and problems arise for patients after this operation. In the limited studies that have been done, diet and lifestyle changes have been found to possibly significantly improve post-CABG results (3). Based on studies conducted by Garrett N et al. (2014),

to get the most out of their rehabilitation and avoid developing atherosclerosis, patients need to start a customized, doable exercise program after CABG surgery (3). It is generally established that lifestyle changes, like as diet and activity changes, can help patients with CABG decrease their cholesterol in the short term (4). NMMC has been providing CABG patients with booklets containing information about post-operative risk factors like diet, cigarettes, physical exercise, stress, and lifestyle changes since 2005 (5).

Undoubtedly, the duty of healthcare systems and their specialist staff, especially nurses, is to conduct educational needs assessment for different CABG patients and formulate and implement care plans based on their needs. Of course, training for post-discharge care should also be provided after discharge from the hospital, and this also requires planning and designing an educational plan based on the educational needs of patients (6). The important point is that the follow-up of the implementation of these programs is not less valuable than its design and training (7). Kalogianni et al. (2016), discovered that preoperative education provided by nurses decreased postoperative problems of patients undergoing heart surgery, but it was ineffective in lowering readmissions or duration of stay (8). According to Hossein Mohsenipouya et al.'s (2018) research, it is demonstrated that educational interventions based on a model of health promotion were successful in enhancing self-care practices in cardiac surgery patients. These strategies may be useful in persuading patients to make behavioral changes and follow prescribed dietary and medical regimens (9).

Post-CABG discharge education and counseling ease recovery issues, lower rehospitalization rates and medical expenses enhance patient satisfaction and quality of life (QOL), promote functional independence, and allow patients to do self-care tasks and take care of their own requirements (10, 11).

In general, a variety of elements, such as economic, cultural, and social factors, have an impact on patients' nutritional requirements and life quality. Considering that these parameters are not fixed and differ from one region to another from person to person, because no study of this extent has been conducted and these tow influencing variables (patients' quality of life and nutritional status) together have not been investigated, therefore, the necessity of conducting this study is that it should be investigated in Iraq as well. Therefore, the purpose of this quasi-experimental study is to ascertain how a health education program affects the nutritional status and life quality of patients after coronary artery bypass surgery at the Cardiac Center in Erbil City.

SUBJECTS AND METHODS

This study uses a pre-test and post-test methodology and has a quantitative design (quasi-experimental study). The research was carried out between 2021 and 2023. Patients who were hospitalized in the surgical ward at the Cardiac Center Hospital in Erbil city make up the research sample size. The samples were divided into two groups. As the intervention group, 100 patients received the training program; the control group, 100 patients, did not get the training program. Through the convenience sampling technique, a targeted sample of participating patients was chosen.

The sample size were determined Sample size= Z2pq/d2 (Charan and Biswas Araoya, 2013). (Z score =1.96, P = Prevalence (prevalence of coronary artery diseases) = 0.2, q= (1-p) = 0.8, d=Sampling error equal to 0.05. The sample size which is calculated by using the formula was 200 sample. 200 samples were split into two groups, each with 100 participants. 100 samples each from the intervention group and the control group.

Inclusion criteria of the study

Age above 30, Ability to participate in the project, Lack of prior training experience, Individuals' personal interest in participating in the study, an adult patient who performs CABG and Patients with stable condition.

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Exclusion criteria of the study

Patients who refuse to complete the post-test, Patients with mental retardation, and mental illnesses, Patients with sensory problems such as blindness and deafness, Patients with Alzheimer's, People who changed their opinion about participating in the study or missed two consecutive educational intervention sessions for any reason.

After several literature review and previous studies, the investigator construct the questionnaire and applied it before the application of the actual educational program it consists of three parts, which is: Socio-demographic, Medical data of patients with CABG, health status related to CABG patients and nutrition status.

The information was gathered using a two-section questionnaire. The participants' demographic and clinical features, which were gathered by asking patients and others who were with their questions and consulting their medical records, were presented in the first section. The second portion made use of the SF-36 QOL questionnaire. Overall health (6 items), physical functioning (10 items), role physical (4 items), part emotional (3 items), pain (2 items), social functioning (2 items), vigor (3 items), and mental health (3 items) are the eight characteristics that make up this scale. These eight dimensions each have points ranging from 0 to 100. A higher score suggests a higher level of life satisfaction. Three-choice questions with marks (zero, 50, 100), five-choice questions with marks (zero, 25, 50, 75, 100) and six-choice questions with marks (zero, 20, 40, 60, 80, 100) are considered. The quality of life component has an average score of 50, with higher and lower values indicating a good and low quality of life, respectively.

SF-36 Quality of Life Questionnaire has been translated into several different languages and its validity and reliability have been confirmed in numerous domestic and foreign studies. In Heydari's study, Cronbach's alpha coefficient (r=0.83) was utilized to gauge the questionnaire's internal consistency, and a retest was conducted to evaluate the tool's reliability. The reliability coefficient of this tool between the two stages has been verified with (r=0.87) (12). A variety of patient groups have been used to examine the validity and reliability of the SF-36. This questionnaire was verified for individuals with coronary artery disease by Failde and Ramos, who also noted its high internal reliability (Cronbach's alpha = 0.72-0.94) (13).

After completing the informed permission form, all patients having coronary artery bypass grafts at the Erbil Cardiovascular Center hospital who met the requirements to participate in the study were enrolled in the study. the researcher explained the demographic characteristics questionnaire and the quality of life questionnaire to the patients, and the questionnaires were face-to-face (interview) individually for about 20-30 minutes with each patient in two sessions of the educational program before and after The test was completed using a questionnaire format. The questionnaire was distributed anonymously and coded. The samples were divided into two control and intervention groups at each center after completing the surveys using random allocation software. Two sets of samples were formed. In the study group, 100 patients received the training program, whereas the control group, 100 patients, did not get the training program. Then, before implementing a real training program, the researcher used a questionnaire consisting of three parts, which include (demographic-social data, medical data of CABG patients health status related to CABG patients and nutritional status). The intervention of the upcoming research consisted of 6 sessions, which included 2 sessions of general education of patients, around 4 physiological dimensions, self-concept, mutual relations, and role-playing and 4 sessions of direct intervention by the researcher in the form of manipulation of the main and background stimuli of incompatible behaviors extracted from the needs assessment form, the researcher, by being present in the hospital and the said department, helped each and every client of the intervention groups in a practical way in meeting their needs. After the determined period, the researcher provided the SF 36 questionnaire to all patients and completed it.

The central indicators of the mean (standard deviation) and frequency (percentage) for quantitative variables were used in data analysis reports on the premise of normalcy. The

statistical significance of the association between the quantitative variables was examined using the (Chi-square) test. T-test and Paired-T test were used to evaluate the effect of training in two groups. Data were analyzed using SPSS V. 23 software. A significance level of $P \leq 0.05$ was considered.

Ethical consent

All experimental protocols were approved by the Department of Adult Nursing, College of Nursing, Hawler Medical University, Erbil, Iraq, and all experiments were carried out in accordance with approved guidelines. Erbil Cardiac Center Hospital received formal approval from the director of health. This hospital gave authorization for the collection of data. After describing the study's goal to the patients, their informed consent was acquired for them to take part.

RESULTS

The intervention group's mean age was 54.32 (11.123), whereas the control group's mean age was 56.63 (9.74). Examining the length of the illness in two groups revealed that it lasts, on average, 4.98 years in the treatment group and 3.61 years in the control group. Additionally, there is a significant difference between the two groups illness durations (P=0.022). A substantial difference between the control and intervention groups in terms of prior hospitalization was found when the educational status, job status, and previous hospital admission variables were examined in two groups ($P \leq 0.003$) (Table.1).

TABLE 1: Socio-demographic variables (Quantitative variables)

Intervention group samples No=100, Control group samples No=100

Socio-Demographical Characteristics	Class	Groups		P-Value**, CI: 95%
		Intervention group	Control group	
		Mean (SD)	Mean (SD)	
Age		54.32 (11.123)	56.63 (9.74)	0.27, -1.438 – 5.018
BMI		22.85 (2.634)	22.71 (2.790)	0.716, - 0.897 – 0.617
Duration of disease		3.61 (3.581)	4.98 (4.737)	0.022, 1.191 - 2.254
Gender	Male	57*	59*	0.886
	Female	43	41	
Education	Illiterate	19	19	0.023
	Read and write	15	19	
	Primary school graduate	15	20	
	Intermediate school graduate	22	16	
	Preparatory school graduate	11	13	
	Institute graduate	12	7	
	College graduate	4	4	
	Post-graduate	2	2	
Occupation Before coronary artery bypass graft	Employed	17	16	0.004
	Unemployed	24	24	
	Housewife	17	19	
	Self-employed	27	29	

	Retired`	15	12	
After coronary artery bypass graft	Returned to work	88	88	1
	Out of work	12	12	
Marital status	Single	8	11	0.5
	Married	87	83	
	Widowed	3	3	
	Divorced	2	3	
Residential area	Urban	83	87	0. 553
	Rural	17	13	
Previous admission to hospital	One time	59	66	0.003
	Two times	23	23	
	Three times	13	8	
	More than three times	5	3	
Cigarette smoking	Yes	18	17	0.5
	No	82	83	

*Frequency (100%) ** P-value based on χ^2 tests, t-test

The SF-36 questionnaire was used in this study to assess patient life quality in two intervention and control groups, and the impact of intervention programs on patient quality of life was examined. In the two groups, the mean of the 8 quality of life dimensions that were looked at was expressed. The examination of Vitality (energy and fatigue) in two intervention and control groups showed that the mean in the intervention group was 56.12 (17.42) based on the Pre-test and the average vitality was 71.34 (19.44) based on the Post-test while the mean of vitality in the control group was 51.69 (22.41) based on the Pre-test and the mean was 49.33 (21.12) based on the Post-test, this difference in the average vitality in the two groups was significant P-Value ≤ 0.001, CI95 %: 7.12-18.26. The examination of Bodily Pain in two intervention and control groups showed that the average pain in the intervention group was 67.41 (19.23) based on the Pre-test and based on the Post-test, the average pain is 43.11 (23.67), while the average pain in the control group is 50.39 (41.36) based on the pre-test, and the average is 52.18 (24.63) based on the post-test and this difference in the mean of pain in the two groups was significant P-Value ≤ 0.002, CI95%: 11.44-23.51.

The examination of General health perceptions in two intervention and control groups showed that the mean in the intervention group was 54.10 (22.34) based on the Pre-test and the mean of general health was 75.26 (25.84) based on the Post-test while the mean of general health in the control group based on Pre-test was 56.16 (20.54) and based on Post-test the mean was 48.47 (22.87) and this difference in the mean of general health in the two groups was significant P-Value ≤ 0.001, CI95%: 13.69 - 25.34.

The examination Limitations in usual role activities because of physical health problem in the two intervention and control groups showed that the mean in the intervention group was 62.77 (24.25) based on the Pre-test and based on the Post-test the mean of physical role functioning was 76.29 (22.10) while the mean of physical role functioning in the control group was 63.5 (18.24) based on the Pre-test and the mean was 68.4 (19.21) based on the Post-test and this difference in the mean of physical role functioning in the two groups was significant P-Value ≤ 0.002, CI95% 4.53 – 14.85.

The examination of Limitations in usual role activities because of emotional problems in the two intervention and control groups showed that the mean in the intervention group was 37.28 (28.41) based on the Pre-test and based on the Post-test the mean of emotional role functioning was 62.55 (36.42), while the mean of emotional role functioning in the control group was 57.63 (29.66) based on the Pre-test and based on the

Post-test, the mean was 48.86 (32.44) and this difference in the mean of emotional role functioning in the two groups was significant, P-Value ≤ 0.001, CI95%: 8.32 - 21.41.

The examination of General mental health (psychological distress and well-being) in the two intervention and control groups showed that the mean in the intervention group was 51.64 (15.24) based on the Pre-test and the mean of mental health was 69.88 (14.31) based on the Post-test while the mean of mental health in the control group was 51.63 (16.74) based on the Pre-test and the mean was 49.66 (16.58) based on the post-test and this difference in the mean of mental health in the two groups was significant P-Value ≤ 0.002, CI95%: 12.56-31.99. Based on the results, there was no significant difference between the intervention and control groups in Limitations in physical activities because of health problems and Limitations in social activities because of physical or emotional problems functioning. (Table.2).

TABLE 2: Investigating the quality of life of the investigated people before and after the intervention

Intervention group samples No=100, Control group samples No=100

Health components	**Group**					**P-Value**
	Intervention group		P-Value**, CI:95%	control group		
	Pre-test*	Post-test*		Pre-test*	Post-test*	
Vitality	56.12 (17.42)	71.34 (19.44)	0.001, 7.12 – 18.26	51.69 (22.41)	49.33 (21.12)	0.7
physical functioning	64.66 (24.32)	79. 24 (21.25)	0.08, 6.58 – 15.36	64.5 (19.24)	67.54 (21.66)	0.4
Bodily Pain	67.41 (19.23)	43.11 (23.67)	0.002, 11.44 – 23.51	50.39 (41.36)	52.18 (24.63)	0.4
General health	54.10 (22.34)	75.26 (25.84)	0.001. 13.69 – 25.34	56.16 (20.54)	48.47 (22.87)	0.6
Role physical	62.77 (24.25)	76.29 (22.10)	0.002, 4.53 – 14.85	63.5 (18.24)	68.4 (19.21)	0.5
Role emotional	37.28 (28.41)	62.55 (36.42)	0.001, 8.32 – 21.41	57.63 (29.66)	48.86 (32.44)	0.8
Social functioning	59.33 (21.65)	74.26 (31.25)	0.09, 10.42 – 33.25	58.20 (19.64)	60.13 (26.31)	0.7
Mental health	51.64 (15.24)	69.88 (14.31)	0.002, 12.56 – 31.99	51.63 (16.74)	49.66 (16.58)	0.3

*Mean (SD), ** P-value based t-test

Nutritional status related to coronary artery graft patients was investigated in the two groups of intervention and control patients. In the nutrition examination, 20 questions were investigated about different aspects of nutritional and consumable materials, and after the intervention, the effect of educational measures was studied in the two groups. Based on the interventions performed in the experimental group, it was shown that appetite reduction was observed in 22 people after the intervention. Weight measurement after intervention was observed in 80 patients. Daily weight measurement was observed in 51 patients, increased consumption of vegetables increased to 74 patients, and increased consumption of legumes increased to 66 patients. An increase in dairy consumption was also seen in 67 patients. Which shows significant changes in nutritional status and improvement of nutritional status of patients (P ≤ 0.05).

Daily sodium and cholesterol consumption in the intervention group decreased so that sodium

consumption was observed in only 15 patients and cholesterol consumption in 35 patients. Also, the amount of spice consumption decreased to 51 patients after the intervention, which all demonstrate the educational program's beneficial effects and the statistically significant difference between pre-and post-test scores (P 0.05) . While consumption of fruit, bread, cereals, nuts, butter, peas, fish, chicken, egg yolk, vegetable oil, red meat, and consumption of tea and coffee did not show any the nutritional status of patients in the control group was also examined. The findings revealed that there was no discernible difference between the pre-test and post-test in terms of either decreasing or increasing food consumption. Results from the post-test revealed that 30 patients experienced decreased appetite. Weight measurement and daily weight measurement in 40% and 12% of the people, respectively, were based on the results of the post-test. A slight increase or decrease was seen in most of the consumed food items. The amount of daily sodium consumption was decreased by 5% based on the results of the post-test. In contrast, 2% less tea and coffee were consumed, according to the post-test data. a noteworthy distinction exists between the two groups (Table.3).

TABLE 3: Distribution of specialties of first choice by age, marital status, parent's educational level and occupation of parents

Intervention group samples No=100, Control group samples No=100

General information	Group											
	Intervention group						Control group					
	Pre-test			Post-test			Pre-test			Post-test		
	Yes*	No*	P**	Yes*	No*	P**	Yes*	No*	P**	Yes*	No*	P**
lose your appetite	38%	62%	0.4	22%	78%	0.008	35%	62%	0.4	22%	78%	0.008
measure weight	42%	58%	0.5	80%	20%	0.032	30%	58%	0.5	80%	20%	0.032
daily weight	13%	87%	0.4	51%	49%	0.041	6%	87%	0.4	51%	49%	0.041
Fruits	56%	44%	0.2	74%	26%	0.07	45%	44%	0.2	74%	26%	0.07
vegetables	53%	47%	0.1	74%	26%	0.05	39%	47%	0.1	74%	26%	0.05
grain bread	27%	73%	0.2	50%	50%	0.08	19%	73%	0.2	50%	50%	0.08
Nuts	23%	77%	0.2	40%	60%	0.09	16%	77%	0.2	40%	60%	0.09
Butter	63%	37%	0.3	51%	49%	0.07	61%	37%	0.3	51%	49%	0.07
chickpeas	67%	33%	0.8	87%	13%	0.07	62%	33%	0.8	87%	13%	0.07
Fish	35%	65%	0.7	42%	58%	0.2	31%	65%	0.7	42%	58%	0.2
chickens	63%	37%	0.6	73%	27%	0.08	56%	37%	0.6	73%	27%	0.08
egg yolks	29%	71%	0.6	38%	62%	0.09	26%	71%	0.6	38%	62%	0.09
vegetable oil	29%	71%	0.3	39%	61%	0.2	24%	71%	0.3	39%	61%	0.2
legumes	47%	53%	0.4	66%	34%	0.012	41%	53%	0.4	66%	34%	0.012
sodium diet	59%	41%	0.4	15%	85%	0.002	45%	41%	0.4	15%	85%	0.002
low cholesterol	61%	39%	0.3	35%	65%	0.003	64%	39%	0.3	35%	65%	0.003
Milk	38%	62%	0.3	67%	33%	0.004	36%	62%	0.3	67%	33%	0.004
Spices	70%	30%	0.2	51%	49%	0.04	69%	30%	0.2	51%	49%	0.04
red meat	74%	26%	0.2	62%	38%	0.08	73%	26%	0.2	62%	38%	0.08
tea and coffee	92%	8%	0.9	86%	14%	0.1	93%	8%	0.9	86%	14%	0.1

*Frequency (100%) ** P-value based on McNemar test

Based on the Pre-test findings and the correlation data, it was determined that there is no relationship between the demographic characteristics and the nutritional state of the patients in the intervention group. While following the intervention, there is a considerable and significant association between the age of the patients and the improvement in their condition (r: 0.5), ($P \leq 0.002$). The length of the illness and the patient's nutritional state have a modest and significant association (r: 0.4), ($P \leq 0.005$). The gender of the patients and their nutritional state are somewhat and significantly correlated (r: 0.4), ($P \leq 0.003$). Education level and patients' nutritional state are strongly and significantly correlated (r: 0.6, $P \leq 0.001$). Additionally, a moderately significant association was found between the variables of marital status and location of residence.

In the analysis of the correlation between the diseases associated with the condition of the patients, the dietary state of the patients and blood pressure disorders were shown to be weakly yet significantly correlated (r: 0.2), ($P \leq 0.004$). Also, the correlation between diabetes and patients' awareness is moderate and significant (r: 0.3), ($P \leq 0.001$). The relationship between ischemic heart disease and patient awareness is somewhat and statistically significant (r: 0.4), ($P \leq 0.02$) (Table.4).

TABLE 4: Evaluation of the correlation of demographic variables with Patients' awareness and nutritional status of patients

Intervention group	Nutritional status	
	Pre-test	Post-test
Age*	r: 0.1 p: 0.6	r: 03 p: 0.02
Duration of disease*	r: 0.4 p: 0.7	r: 0.4 p: 0.05
Gender**	r: 0.5 p: 0.2	r: 0.4 p: 0.03
Education	r: 0.2 p: 0.6	r: 0.6 p: 0.001
Marital status	r: 0.1 p: 0.8	r: 0.3 p: 0.03
Residential area	r: 0.3 p: 4	r: 0.4 p: 0.01
Hypertension	r: 0.3 p: 0.1	r: 0.2 p: 0.004
Debate mellitus	r: 0.2 p: 0.4	r: 0.3 p: 0.001
Ischemic heart disease	r: 0.5 p: 0.09	r: 0.4 p: 0.02
control group		
Gender	r:0.4 p:0.5	r:0.5 p:0.9
Education	r:0.3 p:0.4	r:0.5 p:0.046
Diabetes mellitus	r:0.6 p:0.09	r:0.1 p:0.3
Ischemic heart disease	r:0.2 p:0.5	r:0.3 p:0.4

*Pearson correlation, **Spearman correlation

The correlation between demographic variables and 8 dimensions of the quality of life was also investigated. The correlation between vitality and patients' age (r: 0.24), disease duration (r: 0.31) and education level (r: 0.52) is moderate and significant (P ≤ 0.05) while the correlation between vitality and hypertension is a weak and significant correlation (r: 0.13), (P ≤ 0.004). While there is a high and significant link between social activities and the length of the disease (r: 0.61), (P 0.001), there is a moderate and significant connection between social activity and patients' ages (r: 0.12) and education level (r: 0.43) (P ≤ 0.05).

Pain: The correlation between Pain and the age of patients (r: 0.31) and the duration of the disease (r: 0.44) is moderate and significant (P ≤ 0.05) while the correlation between pain and education level is weak and significant (r: 0.27), (P ≤ 0.09). While there is a weak but significant association (r: 0.25), (P ≤ 0.002) between general health and the length of the disease, there is a substantial and significant correlation between general health and patients' age (r: 0.45) and education level (r: 0.5).

The correlation between physical role functioning and the age of patients (r: 0.46) is a moderate and significant correlation (P ≤ 0.002) while the correlation between physical role functioning and hypertension is a weak and significant correlation (r: 0.22), (P ≤ 0.002). The correlation between emotional role functioning and the age of patients is moderate and significant (r: 0.35), (P ≤ 0.004).

While there is a weak and significant link between social role functioning and education levels (r: 0.16, P ≤ 0.002), there is a substantial and significant correlation between social role functioning and the length of the disease (r: 0.25, P ≤ 0.01). Mental health: There is a moderate and substantial link between people's mental health and their degree of education (r: 0.36), (P ≤ 0.001) (Table.5).

TABLE 5: Evaluating the correlation between patients' quality of life and demographic variables

Health components	Age	Duration of disease	Education	Hypertension
Vitality	r:0.24 p*:0.004	r:0.31 p:0.04	r:0.52 p:0.005	r:0.13 p:0.004
Social activities	r:0.12 p:0.02	r:0.61 p:0.001	r:0.43 p:0.031	r:0.6 p:0.21
Pain	r:0.31 p:0.04	r:0.44 p:0.03	r:0.27 p:0.09	r:0.15 p:0.08
general health	r:0.45 p:0.008	r:0.25 p:0.002	r:0.5 p:0.001	r:0.74 p:0.87
physical role functioning	r:0.46 p:0.002	r:0.24 p:0. 5	r:0.34 p:0.8	r:0.22 p:0.002
emotional role functioning	r:0.35 p:0.004	r:0.15 pr:0.4	r:0.13 p:0.25	r:0.46 p:0.07
social role functioning	r:0.12 p:0.09	r:0.51 p:0.01	r:0.16 p:0.002	r:0.24 p:0.08
mental health	0.28 p:0.08	r:0.4 p:0.9	r:0.36 p:0.001	r:0.17 p:0.7

DISCUSSION

Patients in the intervention group were 55.64±10.832 years old on average, whereas those in the control group were 53.85±12.271 years old on average. The mean age of the patients in the clinical trial research by F Gohari et al. (2022) on patients who had CABG (60.43 6.17) was higher than the average age of the patients in our study (14). In a randomized clinical trial study conducted by B Ghorbani et al. (2021) (15), In contrast to the current study, the findings revealed no significant variations in the co-morbidities in the two investigated groups. The results revealed that the analyzed participants had co-morbidities such as diabetes, hyperlipidemia, blood pressure, COPD, and

chronic renal illnesses. The most common diseases in these patients were hypertension, hyperlipidemia, and diabetes, while in our study, the most common diseases were ischemic heart diseases, hypertension, and diabetes. Also, in our study, the number of patients who had chronic kidney diseases is more than the study and this difference is due to the larger number of samples in our study, in which 100 patients were studied in each group, while in the mentioned study, 39 participants made up the control group, while 37 persons were part of the intervention group.

The SF 36 questionnaire was used in this study to assess the life quality of CABG patients in the studied groups. As a result of implementing educational programs, it was discovered that there is a statistically significant difference between the two groups in terms of vitality, pain, overall health, physiological role functioning, emotional role functioning, and mental health. This difference highlights the crucial fact that the intervention group's patients' quality of life has improved thanks to the educational program. SL Cichosz and others (2020) (16) in their study showed that the intervention was associated with the improvement of subjective quality of life indicators in patients. In order to look at the life quality of patients both before and after CABG, Paari et al (2020) carried out prospective research in Croatia. The research's findings were completely consistent with those of our own. In both our study and Paari's study, it was demonstrated that conducting an intervention enhanced the quality of life of the patients. Patients with coronary heart disease had a low quality of life prior to surgery (17).

The findings of a study conducted by N Fayazi et al (2020), were similar to those of the current study and demonstrated that educational interventions and programs improved patients' quality of life. Finally, educational programs can play a significant and effective role in enhancing patients' quality of life (18).

Based on the obtained results, educational intervention improved nutrition in CABG patients and these changes happened mostly to patients in the intervention group. Although the intervention in the field of nutrition education was not very effective to some extent, the results obtained showed a change in the consumption pattern and adherence to the diet in the intervention group. The importance of nutrition education in cardiovascular patients is a strong reason that it should be investigated in more interventions and educational programs (19, 20).

If there is a change in the lifestyle of the patients, this change should also happen in the diet of the people. In Vieira et al. (2016) study, the results of one year and four years after the follow-up showed that although the difference in the primary and secondary outcomes under the educational program in the two studied groups was not significant, the program was associated with a reduction in complications and outcomes (21).

Y Khudhur and Y Mohammed (2021) (22) showed in their study that following the development of health education, patients' nutrition and knowledge improved greatly, confirming the efficacy of the program of health education in enhancing patients' understanding of HF. Additionally, the outcomes showed improvement in the patient's nutritional condition right away following the start of the training program, which is consistent with our study.

CONCLUSIONS

After the intervention, it was determined that the quality of life of the patients in the intervention group had improved. After the intervention, the patients in the intervention group showed improvement in their eating habits. Finally, this study demonstrated that the coronary artery bypass graft (CABG) patients' health condition improved as a result of the health education program.

Limitation

It is advised that more samples be used in future research to enhance the findings.

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Availability of data and materials
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Competing interests
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