DOI: https://doi.org/10.53350/pjmhs22165753

ORIGINAL ARTICLE

Effectiveness of a Diet Exercise Educational Program on Patient's Knowledge to Prevent Coronary Artery Disease Progression After Percutaneous Coronary Intervention

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ABSTRACT

Background: While COVID-19 continues to claim the lives of more than 5 million people each year, cardiovascular disease (CVD) caused the death of over 186 million people each year. Coronary heart disease (CHD), CVD, rheumatic heart disease, and other heart and blood vessel problems are all classified as CVDs. In 2019, CVDs were responsible for 38 percent of the 17million premature deaths produced by non-communicable diseases (before the age of 70). Lifestyle threats such as cigarette smoking, poor diet and obesity, lack of physical activity, and alcoholism can all be avoided (WHO, 2021).
Aims: To assess the patient's levels of knowledge about the effects of exercises and diet to prevent coronary artery disease progression after percutaneous coronary intervention, To find out the relationship between patients' knowledge with their selected demographic variables (age, gender, education level, occupational status, and marital status), and to Find out the association between patients' knowledge concerning diet and exercise after the application of the educational program in the post-test period.
Methodology: Pre-experimental design (one group pretest-posttest) A non-probability (purposive) sample of 35 patients. The study started from November 2021 to May 2022.
Result: The majority of CAD patients are males with age 48 and above, married, secondary school graduates, and housewives. More than half of the study sample had risk factors for coronary artery disease, except for the patient's own smoking. Patients with coronary artery disease had a low degree of knowledge about healthy lifestyles before beginning the educational program. A significant improvement in patients' knowledge regarding healthy lifestyles after giving them the educational program, and there is no relationship between patients' knowledge and socio-demographic characteristics with the exception of gender.
Conclusion: A significant improvement in patient's knowledge regarding healthy lifestyles after giving them the educational program
Keywords: Diet, Exercise, Coronary artery disease, percutaneous coronary intervention

INTRODUCTION

Coronary artery disease is the most common type of heart disease in the United States (CAD). It's also known as coronary artery disease or ischemic heart disease. In some patients, a heart attack may be the first sign of CAD. The medical team may be able to assist in reducing the risk of coronary artery disease[1]

According to the National Heart, Lung, and Blood Institute (NHLB)[2], the treatment protocol for patients with CHD includes three fundamental methods, which are lifestyle change, drugs, and interventional coronary procedures such as percutaneous coronary intervention (PCI) or coronary artery bypass graft surgery, depending on the severity and degree of coronary occlusion.

Percutaneous coronary intervention (PCI) techniques are commonly used to treat cardiac patients percutaneously in order to improve blood supply to the myocardial tissues and prevent complications caused by tissue destruction resulting from ischemia. Many approaches to open occluded arteries, especially coronary arteries, are included in PCI treatments, including percutaneous transluminal coronary angioplasty (PTCA), which was the first one utilized to open the artery by inflating the arterial lumen. Percutaneous coronary intervention is a common interventional procedure for interventional cardiologists due to its ease, safety, and benefit for IHD patients. Coronary stents are routinely utilized to prevent restenosis after PTCA, atherectomy, and thrombectomy procedures [3].

In-stent restenosis is still a common clinical complication after percutaneous coronary intervention. The pathogenic spectrum of ISR's foundation ranges from smooth muscle cell proliferation to neoatherosclerosis[4].

A thrombotic blockage of a coronary stent is known as stent thrombosis (ST). Stent thrombosis is a serious complication of PCI stent implantation. Stent thrombosis has been linked to a significant increase in the risk of morbidity and mortality, with cardiac death or nonfatal myocardial infarction frequently occurring [5].

Intensive dietary and lifestyle changes combined with proper medical treatment may help to halt the development of reducing the amount of noncalcified narrowing of the arteries and reduce arterial stenosis in the body. Novel CTA techniques that track coronary plaque progression may provide unique, pre-event information on therapeutic efficacy and intensity [6].

Lifestyle can be explained as a method of living, it can be either healthy or unhealthy, depending on the person's behavior. A healthy lifestyle (HL) lowers the risk of disease. Healthy lifestyle behaviors (HLBS) include eating a healthy diet, stopping smoking, exercising regularly, and managing stress, as well as taking personal responsibility for one's health in order to achieve optimal levels of self-actualization and wellness. HL boosts one's sense of well-being, health, and overall quality of life[7].

METHODS AND MATERIAL

The study was conducted in the cardiac catheterization unit at Al-Zahraa teaching hospital in AL-Kut City. This study started from November 2021 to May 2022 after getting approval from the hospital.
Inclusion Criteria: Inpatients who are diagnosed with coronary artery disease and treated with percutaneous coronary intervention and agree to participate in the study**,** only patients can come for follow-up and treatment after discharge from cardiac center to re-meet again to take the post-test after application of an educational program**,** Patients who can communicate verbally during interview sessions**,** and Patients are >18 years old.
Exclusion Criteria: The Patients who refused to participate in the study**,** the Patients who refused to complete the post-test program Patients who have come to undergo diagnostic coronary angiography only**,** Patients with hearing problems**,** Patients with mental and psychiatric disorders, and Patients selected for the pilot and preliminary study.
Data collection procedure: After signing the protocol from the College of Nursing / University of Baghdad, the approval of the Ministry of Planning - the Central Statistical Organization was

taken. Then the approval of the ethical committee was taken in the college. And the informed consent was taken from the patient after the interview and explained purpose of the study

Instrument of the study: The data was collected using sociodemographic, the clinical characteristics of the client, and the Coronary Artery Disease Education Questionnaire Short Version (CADE-SV). A self-administered questionnaire was created, and by using structured interviews for the clients that not able to read and write.

Data Analysis Procedure: The collected data were statistically analyzed using SPSS software version 26. There were sections in the questionnaire:

Section 1: Demographics: Section 1 Had questions regarding demographics of the participants including age, gender, marital status, level of education, and occupation.

Section 2: Clinical Characteristics of the participants: It consists of five variables, which include; body mass index, hypertension history, diabetes mellitus history, hyperlipidemia history, and smoking history.

Section 3: the Coronary Artery Disease Education Questionnaire Short Version (CADE-SV) which comprised of 16 items.

Scoring for (CADE-SV) assessed by Yes=3, not sure=2, No=1

Section 4: lifestyle compliance items after PCI: Dietary pattern: consists of 22 items.

Dietary pattern items have been given the following scoring (1) for no once, (2) for1-2 time, (3) for 3-4 time, (4) for 5-6time, (5) for every day.

Section 5: lifestyle compliance items after PCI: Physical activity: comprised of 5 items.

Physical activity domain scored as follows: light (less than 3), neutral (3-5), strong (5-7)

RESULTS

Table 1: Distribution of Socio-Demographic Characteristics of study sample

Variable	Groups	Study Sample (35)	
		Freq.	%
Age groups	18-27	0	0
	28-37	1	2.9
	38-47	7	20
	48 and more	27	77.1
	Total	35	100
	x+SD	55.6 + 9.95	
Gender	Male	22	62.9
	Female	13	37.1
	Total	35	100
Marital status	Married	30	85.7
	Single	0	0
	Divorced	1	2.9
	Widowed	4	11.4
	Total	35	100
Level of education	Do not read and write	3	8.6
	Read and write	5	14.3
	Primary	9	25.7
	Secondary	10	28.6
	Academic	8	22.9
	Total	35	100
Job	Governmental employee	7	20
	Retired	7	20
	Retired and work	0	0
	Free work	9	25.7
	Housewife	12	34.3
	Total	35	100

Freq. = frequency, % = percentage, x+SD = arithmetic Mean ($\bar{x}$) and Standard Deviation (S.D.)

Table 2: Distribution of Clinical Characteristics of Study Sample

Clinical Characteristics	Groups	Study Sample (35)	
		Freq.	%
Body Mass Index	BMI less than 18.5 (Underweight)	0	0
	BMI 18.5 – 24.9 (Normal)	1	2.9
	BMI 25 – 29.9 (overweight)	19	54.3
	BMI 30 or higher (obese)	15	42.9
	Total	35	100
(hypertension)	Yes	21	60
	No	14	40
	Total	35	100
(Diabetes mellitus)	Yes	20	57.1
	No	15	42.9
	Total	35	100
Hyperlipidemia	Yes	22	62.9
	No	13	37.1
	Total	35	100
Smoking	Yes	5	14.3
	No	30	85.7
	Total	35	100
No. of smoking per day	20	2	5.6
	30	1	2.9
	40	1	2.9
	60	1	2.9
	No	30	85.7
	Total	35	100
Other person smoking at home	Yes	13	37.1
	No	22	62.9
	Total	35	100

Freq.= frequency, % = percentage

Table (4.1.) presented that 77.1 percent of the study sample were within age group 48 years and more. Moreover, 62.9 percent of the study sample were males, and 85.7 percent were married. The highest percent 28.6 were secondary school graduate. In addition, 34.3 percent of the study sample were housewives as the highest percent of the study sample.

Table (4.2.) presented that more than half of the study sample (54.3) percent were overweight, 60 percent of them have hypertension, 57.1 percent have diabetes mellitus, and 62.9 percent have hyperlipidemia. In relation to smoking, 85.7 percent of the study sample do not smoke, and 37.1 percent have other person smoke at home.

Table 3: Comparison between Patients' Knowledge (pre-post) test toward healthy lifestyle after percutaneous coronary intervention

Items	Pre-test					Post-test				
	F			Total MS	Ass.	F			Total MS	Ass.
	No	Not sure	Yes			No	Not sure	Yes		
Heart disease only happens in older people who smoke or have high cholesterol?	15	1	19	2.11	M	35	0	0	3	H
Percutaneous coronary intervention, also known as coronary angioplasty, is a non-surgical technique for treating obstructive coronary artery disease, including angina, myocardial infarction and multi vascular coronary diseases	0	1	34	2.97	H	0	0	35	3	H
Medication such as aspirin help prevent blood clot from forming	0	1	34	2.97	H	0	0	35	3	H
Stop taking anticoagulant medications when you feel better	22	5	8	1.6	L	32	3	0	2.91	H
Increase more than the prescribed dose when your health condition worsens	25	5	5	1.42	L	34	1	0	2.97	H
Lifestyle changes like healthy eating can lower your chances of developing heart disease?	0	0	35	3	H	0	0	35	3	H

To help control your blood pressure, eat less salt and exercise regularly	0	0	35	3	H	0	0	35	3	H
Stick to a vegetarian diet and avoid eating eggs to control cholesterol	2	11	22	2.57	H	0	1	34	2.97	H
Resistance training (lifting weights or using elastic bands) can strengthen your muscles and help lower your blood sugar	3	18	14	2.31	M	1	8	26	2.71	H
Warm - up before exercising raises your heart rate and lowers your chance of getting angina	1	11	23	2.6	H	0	4	31	2.88	H
Increase the speed while walking when feeling chest pain to see if it will disappear or not	28	3	4	1.31	L	35	0	0	3	H
Doing exercise to increase physical activity at least half an hour a day every day for five days or most days of the week	2	1	32	2.85	H	0	0	35	3	H
Eating more meat and milk products is a good way to add more fiber to your diet	20	8	7	1.62	L	0	0	35	3	H
Prepared or processed foods such as canned soup, usually have a lot of salt (sodium)	3	11	21	2.51	H	0	1	34	2.97	H
Trans fat is an unhealthy type of fat that is often found in baked or fried foods	2	4	29	2.77	H	0	0	35	3	H
coronary artery disease may occur again	0	3	32	2.9	H	0	0	35	3	H
Total score	0	11	24	2.68	H	0	11	24	2.68	H

Ass. = Asymptomatic significant; H = High (2.34 – 3), M = Moderate (1.67 – 2.33), L = Low (1 – 1.66).

Table (4.3.) presented that there were significant differences were happened at the knowledge of patients related to a healthy lifestyle about percutaneous coronary intervention.

Table 4: Comparison between healthy lifestyle of patients with percutaneous coronary intervention about nutritional style

Items	Pre-test							Post-test						
	F/ times per a week					Total MS	Ass.	F/ times per a week					Total MS	Ass.
	Not once	1 – 2 times	3 – 4 times	5 – 6 times	Everyday			Not once	1 – 2 times	3 – 4 times	5 – 6 times	Everyday		
Eat fruits	0	3	17	1	14	3.74	M	0	26	7	1	1	2.34	F
Vegetables	0	4	2	6	23	4.37	C	0	0	2	13	20	4.51	C
Eat chicken	0	11	15	2	7	3.14	P	0	30	5	0	0	2.14	F
Salad	0	4	3	5	23	4.34	C	0	0	0	3	32	4.91	C
Fish	0	23	8	1	3	2.54	F	0	33	2	0	0	2.05	F
Legumes(beans,chickpeas lentils. Etc….)	3	14	10	5	3	2.74	P	1	1	7	25	1	3.68	M
Free or low fat milk	1	5	8	1	20	3.97	M	0	0	1	2	32	4.88	C
Olive oil	1	7	5	2	20	3.94	M	0	0	0	3	32	4.9	C
Vegetarian Oil (ex: sunflower oil)	8	11	5	1	10	2.82	P	2	1	1	4	27	4.51	C
Eat nuts	2	18	7	3	5	2.74	P	2	17	12	1	3	2.6	F
Full fat milk	26	6	0	1	2	1.48	N	32	2	1	0	0	1.11	N
Full fat milk product (cheese and diary)	18	11	0	2	4	1.94	F	31	3	1	0	0	1.14	N
Eating egg with yolk	15	8	3	2	7	2.37	F	34	1	0	0	0	1.02	N
Red meat	21	12	2	0	0	1.45	N	34	1	0	0	0	1.02	N
Sweets	14	17	2	2	0	1.77	N	23	12	0	0	0	1.34	N
Butter	27	7	1	0	0	1.25	N	33	2	0	0	0	1.05	N
Fat in cooking(palm oil)	22	11	1	1	0	1.45	N	32	3	0	0	0	1.08	N
Pickles	6	16	10	2	1	2.31	F	3	24	6	1	1	2.22	F
Canned food	23	9	3	0	0	1.42	N	32	3	0	0	0	1.08	N
Drinking Coffee	22	8	3	1	1	1.6	N	34	1	0	0	0	1.02	N
Drinking tea	8	4	6	3	14	3.31	P	33	2	0	0	0	1.05	N
Soft drink	29	5	1	0	0	1.22	N	35	0	0	0	0	1	N
Total score	0	25	9	2	0	2.31	F	0	34	1	0	0	2.02	F

Ass. = Asymptomatic significant; C = completely (4.21 – 5), M = mostly (3.41 – 4.2), P = partially (2.61 – 3.4), F = few (1.81 – 2.6), N = none (1 – 1.8)

Table (4.4) presented A significant shifting in (1, 6, 7, 8, 9, 12, 13, 21) items were happened at the knowledge of patients about nutritional style.

Table 5: Comparison between healthy lifestyle of patients with percutaneous coronary intervention (physical activity)

Items	Pre-test					Post-test				
	F/ times a week			Total MS	Ass.	F/ times a week			Total MS	Ass.
	Light (less than 3)	Neutral (3 – 5)	Strong (5 – 7)			Light (less than 3)	Neutral (3 – 5)	Strong (5 – 7)		
1. Do exercise such as walking or jogging slowly for at least 20-30 minutes	1	6	28	2.77	S	0	0	35	3	S
2. riding a bicycle for 20 minutes	12	8	15	2.08	N	2	8	25	2.65	S
3. walking at work or holiday days for 30 minutes	2	5	28	2.74	S	0	0	35	3	S
4. doing housework such as arrangement, cleaning , children rearing and kitchen works	1	5	29	2.8	S	0	0	35	3	S

5. working in the garden of the house for 20 minutes	10	14	11	2.02	N	0	0	35	2.77	S
Total score	2	6	27	2.71	S	1	6	28	3	S

Ass. = Asymptomatic significant; S = Strong (2.34 – 3), N = Neutral (1.67 – 2.33), L = Light (1 – 1.66).

Table (4.5.) presented that there were significant differences in all items about physical activity for patients with percutaneous coronary intervention

DISCUSSION

The result in the table (4-1) concerning socio-demographic characteristics presented that more than half of the study sample were within the age group 48 years and more, male[8], married, had a primary school education, and housewife.

Table (4-2) presented that more than half of the study sample were overweight, suffer from hypertension, have diabetes mellitus[9], have hyperlipidemia, and most of the study participants do not smoke but had other person smoke at home.

Table (4.3) there was a big difference in the knowledge of patients about some areas such as (Heart disease only happens in older people who smoke or have high cholesterol, Stop taking anticoagulant medications when you feel better, Increase more than the prescribed dose when your health condition worsens, Resistance training (lifting weights or using elastic bands) can strengthen your muscles and help lower your blood sugar, Increase the speed while walking when feeling chest pain to see if it will disappear or not, Eating more meat and milk products is a good way to add more fiber to your diet). This result comes into agreement with the finding of Kittan & Hamza who stated that after using an Instructional Programs on Patient's Knowledge Regarding Self-Care Management after Ischemic Heart Disease, there was a highly significant link between (Pre & Post-test case groups) at (p-value = 0.000)[10].

Table (4-4) the patients have insufficient awareness of their disease and the diet that should be followed. The researcher discovered the need to raise awareness about several components of food among individuals with coronary artery disease. The goal of this study was to determine the level of diet knowledge among patients with coronary artery disease so that they may be educated about several components of diets, such as low sodium, low fatty food, low soft drink, high fiber, high protein diet). At al-Nasiriyah heart center in Iraq, a study was conducted that supported the finding which suggested that patients with IHD get health education to improve risk factor management and compliance with healthy lifestyle behaviors such as consuming more fruits and vegetables and avoiding eating red meat than is indicated[11].

Tables (4-5), presented that there were significant differences in post-test knowledge of all items about physical activity for patients with percutaneous coronary intervention after completing the educational program

CONCLUSION

More than half of the study sample had risk factors for coronary artery disease, except for the patient's own smoking Patients with coronary artery disease had a low degree of knowledge about healthy lifestyles before beginning the educational program. A significant improvement in patient's knowledge regarding healthy lifestyles after giving them the educational program

Recommendations

1. Conducting a relatively large nursing health education program for patients after PCI to see how the program affects patients' understanding of healthy lifestyles (especially diet and exercise)

2. Patients in medical clinics should participate in a dietary modification education program to increase their dietary compliance and recovery outcomes.

3. Further research with a large sample size needs to be conducted to find the association between variables.

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