



Original Article

Changes in Dietary Habits Among Patients with Ischemic Heart Disease

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ABSTRACT

Ischemic heart disease (IHD) is a leading cause of morbidity and mortality worldwide, in both developing and developed countries. Patient education, particularly regarding dietary habits, is a cornerstone of secondary prevention and the reduction of disease-related complications. The study aimed to assess changes in dietary habits and selected clinical outcomes among patients with IHD before and after the implementation of a health education program. A Quantitative (pre-experimental) one-group pre-test post-test design was employed. The study was conducted at the Echo Clinic in Khanaqin General Hospital. A convenience sampling method was used to select the study sample (98 diagnosed IHD patients) according to the inclusion criteria from 13th of October 2024 to 25th of May 2025 using a structured questionnaire. Data collection was conducted through direct face-to-face interviews in 35 minutes duration (5 minutes pretest assessment, and 30 minutes first education session) followed by the next session in the next week, then post-test assessment three weeks after the intervention. The data were analyzed using the Statistical Package for the Social Sciences, version 27. To address the study objectives, both descriptive and inferential methods were used. A statistically significant improvement was observed following the program (p-value <0.001) in dietary habits and most clinical measures, including blood pressure and lipid profile. A 4-week dietary health education intervention was associated with short-term improvements in patients' dietary behavior; however, long-term studies with randomized controlled trials are recommended to support its impact on clinical outcomes.

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Keywords: Educational program, Intervention, Ischemic Heart disease, Dietary Change.

1 Introduction

Ischemic Heart Disease (IHD) is the primary cause of morbidity and mortality in both developed and developing countries, with high hospitalization rates [1]. Reports from the World Health Organization (WHO) estimated that about 18 million deaths annually are caused by cardiovascular disease (CVD), with a mortality rate 32.7% [1,2].

Consuming unhealthy diets increases the risk of myocardial infarction by about one-third. The use of high-fat foods and other dietary practices in the West is correlated with the risk of coronary artery disease [3]. Dietary habits improvement and exercise are the key elements for lifestyle change and chronic disease management, which have been extensively studied and have revealed their important role in the management and prevention of cardiovascular disease [4].

Low-quality dietary patterns have become the leading contributor to global mortality, responsible for approximately 11 million deaths and nearly half of all cardiovascular disease-related deaths worldwide [5,6]. Dietary habits are consistently identified as a major contributing factor in the development of coronary artery disease (CAD). Cardiac rehabilitation involves a multidisciplinary approach in which nutritional education is a key component. Evidence in the literature emphasizes that appropriate dietary practices significantly influence cardiovascular health and help reduce the morbidity and mortality associated with cardiovascular diseases (CVD) [7].

Dietary education is a key determinant of health outcomes, especially in the management of complex conditions such as ischemic heart disease. Such programs aim to provide individuals with the knowledge and practical skills required to adopt and sustain heart-healthy dietary practices [8].

Cardiovascular disease represents a major global health challenge that can be addressed through behavioral change. Dietary patterns play a crucial role in influencing cardiovascular risk by affecting

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body weight as well as multiple biological mechanisms^[9,10,11]. One of the biggest causes of the world's illness burden is diet-related risk factors^[12].

Diet represents a major modifiable risk factor in reducing the occurrence of chronic diseases. Recognizing and anticipating the impact of diet-related chronic illness carries significant implications for public health planning and intervention^[12,13].

The 2021 European Society of Cardiology guidelines on cardiovascular disease prevention in clinical practice, as well as the 2019 American College of Cardiology (ACC) and American Heart Association (AHA) Guideline on the primary prevention of CVD, both highlighted the consumption of a plant-dominant diet with a class I recommendation^[14,15].

The current food environment makes it difficult for patients to adopt and maintain healthier dietary behaviors, and numerous social and economic barriers can further limit their ability to make meaningful lifestyle changes^[6]. In spite of these challenges, well-established evidence indicates the importance of dietary interventions in cardiovascular disease prevention and management^[14].

Complicated health conditions such as ischemic heart disease (IHD) need comprehensive care for disease management; accordingly, patient-centered health educational programs are crucial for these patients^[16,17]. These educational programs are organized interventions, evidence-based strategies that significantly improve clinical measures, and behavioral change that enhances patients' ability to manage their chronic cardiac condition effectively, with fewer complications and better quality of life^[18,19].

In particular, dietary behavior is a key modifiable factor in cardiovascular disease management^[11]. Evidence from three large prospective cohort studies with follow-up extending up to 32 years indicates that greater adherence to healthy eating patterns is consistently associated with a lower risk of cardiovascular disease^[10].

Despite this evidence, the burden of IHD remains high in the local context. According to the death record in Khanaqin General Hospital; death rate due to IHD was 35% in 2023, and increased to 47% during January and February 2024^[20], which means an increase in the risk of disease morbidity and mortality in the region. Furthermore, no regional studies have been conducted regarding the dietary changes before and after health educational programs among Ischemic heart disease patients.

Accordingly, the aim of this study was to assess the dietary changes following an educational program in patients with Ischemic Heart Disease (IHD). Furthermore, to determine the clinical outcomes of the study participants.

Research hypothesis:

H1: There is a significant difference in dietary habits before and after the educational program.

H2: There is a significant improvement in selected clinical outcomes following the intervention.

2 Methods and Materials

2.1 Study design and setting

A Quantitative pre-experimental study, one-group pre-test post-test, was employed for the current study. The researchers acknowledge that a one-group pretest–posttest design has inherent limitations, particularly regarding internal validity and causal inference. However, this design was selected due to practical and ethical constraints in the study setting, including limited resources and the difficulty of withholding educational interventions from patients in the setting. The study demonstrates associations and observed changes over time, rather than definitive causality.

A convenience sampling method was employed to collect the study sample. Out of 109 IHD patients, 98 were included in the study; many participants dropped out due to incorrect phone numbers, being out of reach, or incomplete data.

The study was carried out at the Echo Clinic at Khanaqin General Hospital, which is located in Diyala Governorate, Iraq. It is the only General hospital in Khanaqin city that serves countrysides and villages in the region. Diagnosed IHD patients were sent to the researcher via the cardiologist according to the inclusion criteria.

2.2 Ethical Considerations

Official permission to carry out the present study was obtained from the ethical committee of research in the University of Raparin College of Nursing. Confidentiality and anonymity of study participants were maintained, and written consent was taken from each participant. Official agreement letters were sent to the Diyala health ministry- Khanaqin General Hospital for the data collection permission and facility.

2.3 Participants

Participants included adult (≥ 18 years) male and female patients with stable ischemic heart disease who attended the echocardiography clinic and consented to participate. Patients were excluded if they had communication difficulties, did not complete the post-test, or had comorbid heart failure or renal failure. Participants involved in the pilot study were also excluded from the final analysis.

The sociodemographic characteristics of the study sample of 98 participants in Table 1, show that the mean age was 61.17 ± 8.58 , more than one third (37.8%) of them were older adults and old

age (58-65) years. The majority were males (62.2%), married (82.7%), and of urban residency (76.5%). Nearly one quarter (24.5%) were illiterate, one third were housewives (33.7%) or retired (29.6%). Pertaining to monthly income, more than half

(58.2%) had a barely sufficient income, while only (4.1%) had sufficient monthly income. In addition, the majority (64.3%) did not have a family history of IHD.

Table 1: Socio-demographic data of the samples (n=98).

No	Variables	Categories	Frequency	Percentage
1	Age (Years)	42 - 49	3	3.1%
		50 - 57	24	24.5%
		58 - 65	37	37.8%
		66 - 73	20	20.4%
		74+	14	14.3%
		Mean $\pm$ SD 61.17 $\pm$ 8.58		
2	Gender	Male	61	62.2%
		Female	37	37.8%
3	Level of Education	Illiterate	24	24.5%
		Read and write	19	19.4%
		Primary school	18	18.4%
		Secondary school	20	20.4%
		Institute or College	16	16.3%
		Postgraduate	1	1.0%
4	Occupation	Employed	17	17.3%
		Unemployed	7	7.1%
		Housewife	33	33.7%
		Retired	29	29.6%
		Free work	12	12.2%
5	Marital Status	Single	0	00.0
		Married	81	82.7%
		Widow/er	14	14.3%
		Divorced	3	3.1%
6	Residency	Urban	75	76.5%
		Rural	23	23.5%
7	Monthly Income	Sufficient	4	4.1%
		Barely Sufficient	57	58.2%
		In Sufficient	37	37.8%
8	Family History	Yes	35	35.7%
		No	63	64.3%

2.4 Data collection tool

For the data collection tool, a structured, researcher-developed questionnaire was used after an extensive review of related literature and the field expert (cardiology and nursing) consultation to ensure validity and content relevance. Reliability testing conducted on the pretest sample (N = 98) demonstrated acceptable internal consistency, with a Cronbach's alpha of 0.71. In addition, a pilot study was conducted for the stability of the tool over time using test-retest (r=89 with p-value <0.01).

The questionnaire consisted of two parts: clinical measures and dietary habits. Clinical measures included body mass index (BMI), blood pressure, pulse rate, and lipid profile; low-density

lipoprotein (LDL) and high-density lipoprotein (HDL). While the dietary habits included ten questions regarding daily food habits, with three answer Likert scale (never, sometimes, always).

2.5 Educational Program

An educational program was tailored for IHD patients, including healthy dietary habits, pieces of advice, instructions, and details about the disease, which were illustrated in a colored booklet after reviewing the related literature and field expert revision. The booklet was translated into two languages, Kurdish and Arabic, as the population of the study is familiar with these two languages. The program was delivered in two sessions, each 30

minutes in duration. The educational intervention was delivered through individualized face-to-face sessions.

2.6 Data Collection Procedure

A convenience sampling method was employed to conduct the present study. The data was collected through direct face to face interview from 13th of October 2024 to 25th of May 2025. The diagnosed IHD patients were sent to the researcher by the cardiologist according to the inclusion criteria, after finishing their follow-up in the Echo clinic in Khanaqin General Hospital. The patients were seated in a comfortable private room next to the Echo clinic in the hospital. The procedure of data collection started with a pre-test assessment within five minutes, tools used for clinical measures included; weighing scale, measuring tape, sphygmomanometer, stethoscope, and a hand watch.

The lipid profile measures, LDL and HDL, were obtained from patient records. Following the pre-test assessment, the first session was delivered in 30 minutes. A colored hard copy of the educational program booklet was handed to the participant or their relative if they were illiterate in their preferred language for revision at home. The contact numbers of all participants were taken for follow-up and date arrangement for the second session. One week later, the second session was delivered, and then after three weeks, the post-test assessment was conducted.

2.7 Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) version 27 was utilised, applying both inferential and descriptive statistical methods to obtain the study objectives.

3 Results

Table 2 shows the pre–post comparison of clinical parameters among 98 participants using the Wilcoxon signed-rank test, demonstrating statistically significant improvements in most variables following the intervention. Body mass Index (BMI) showed a slight but significant reduction from 28.727 to 28.405 ($p < 0.001$). Systolic blood pressure markedly decreased from 141.888 to 122.837 (Figure 1), and diastolic blood pressure declined from 82.592 to 77.969 (Figure 2), both with significant differences ($p < 0.001$). Similarly, an overall improvement in lipid profile, LDL levels were significantly reduced from 131.590 to 117.810 (Figure 3), while HDL levels significantly increased from 33.418 to 35.380 (Figure 4), ($p < 0.001$). In contrast, pulse rate showed no significant change ($p = 0.965$). As presented in Table 3, the Kolmogorov–Smirnov test revealed that all variables (based on pre–post differences) were non-normally distributed ($p < 0.05$), justifying the use of the non-parametric Wilcoxon signed-rank test for analysis.

Table 2: Pre–Post Comparison of Clinical Parameters Using Wilcoxon Signed-Rank Test (n = 98).

n=98		Mean	SD	SE	Wilcoxon Signed Ranks Test	P-Value
BM	Pre	28.727	5.123	0.518	7.392	<0.001 (HS)
	Post	28.405	4.978	0.503		
Blood Pressure Systolic	Pre	141.888	22.194	2.242	7.732	<0.001 (HS)
	Post	122.837	7.396	0.747		
Blood Pressure Diastolic	Pre	82.592	10.218	1.032	6.160	<0.001 (HS)
	Post	77.969	5.826	0.589		
Pulse Rate	Pre	74.551	9.113	0.921	0.043	0.965 (NS)
	Post	74.408	5.946	0.601		
LDL	Pre	131.590	41.481	4.190	8.204	<0.001 (HS)
	Post	117.810	41.394	4.181		
HDL	Pre	33.418	6.039	0.610	8.332	<0.001 (HS)
	Post	35.380	5.939	0.600		

Regarding dietary habits in Table 4 demonstrates that, following the intervention, participants exhibited statistically significant changes in dietary behaviors as assessed by the Wilcoxon Signed-Rank Test, with all variables showing significant differences ($P < 0.001$) except for red meat consumption, which remained significant at $P = 0.001$. Overall, mean scores increased for most items, including higher reported intake of fish, vegetables, and

fruit juice, along with changes in behaviors related to candy, sugar use, white bread, fried foods, and salt consumption. Furthermore, Table 5 reveals that all variables significantly deviated from the Normal Distribution based on the Kolmogorov–Smirnov Test ($P < 0.001$), thereby justifying the use of a non-parametric test for analyzing pre–post differences.

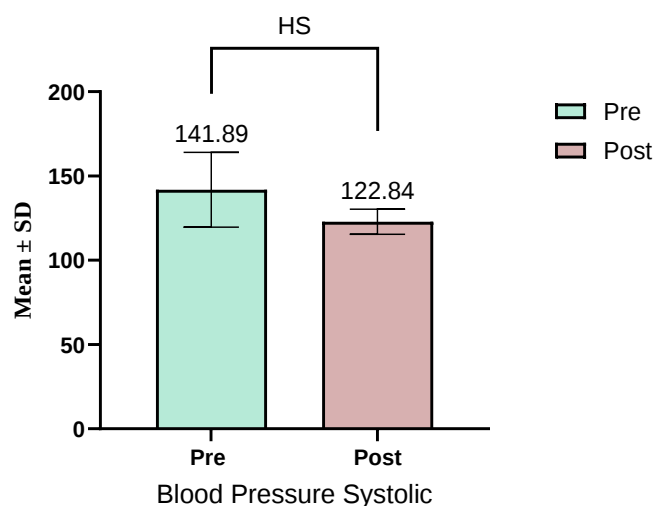


Figure 1: Blood pressure-Systolic pre-post educational program.

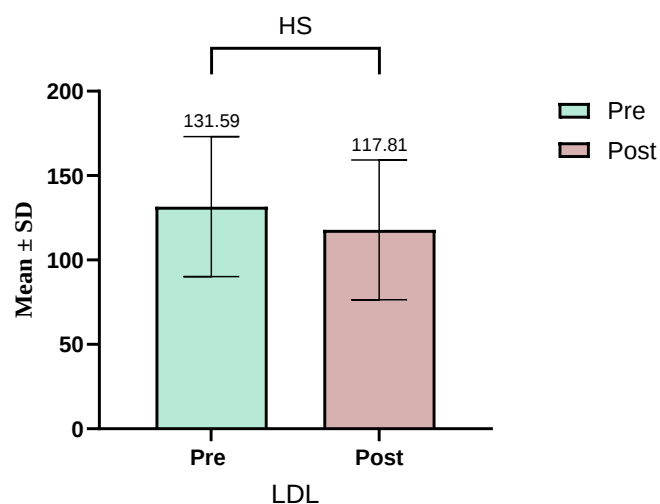


Figure 3: LDL levels pre-post educational program.

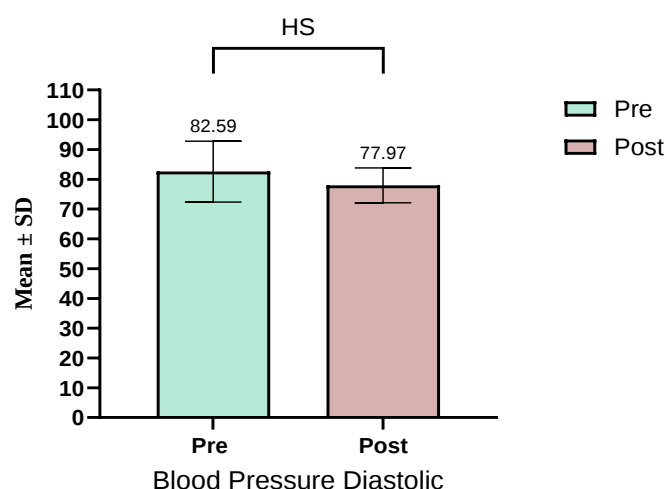


Figure 2: Blood pressure-Diastolic pre-post educational program.

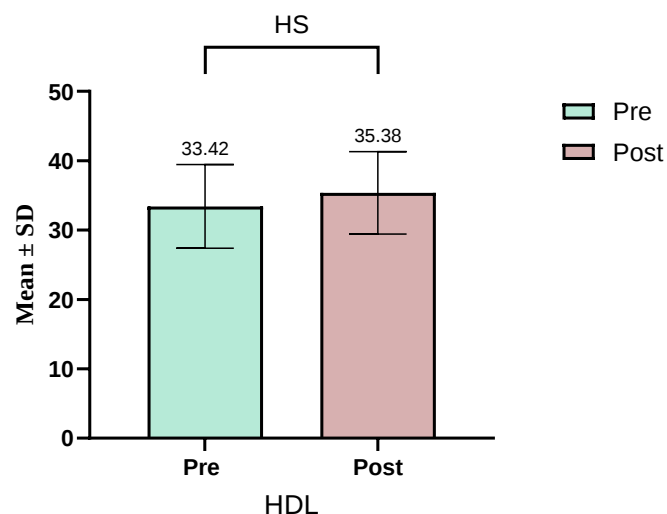


Figure 4: HDL levels pre-post educational program.

Table 3: Tests of Normality for Clinical Parameters Variables Using Kolmogorov–Smirnov Test.

Tests of Normality	Variables	Kolmogorov-Smirnov			Sig.
		Statistic	df	P-Value	
d1	BM	0.130	98	0.009	Non-Normal
d2	Blood Pressure Systolic	0.121	98	<0.001	Non-Normal
d3	Blood Pressure Diastolic	0.189	98	<0.001	Non-Normal
d4	Pulse Rate	0.210	98	<0.001	Non-Normal
d5	LDL	0.173	98	<0.001	Non-Normal
d6	HDL	0.112	98	0.003	Non-Normal

d = deference (Pre-Post).

Table 4: Dietary Habits of Ischemic Heart Disease Patients (Pre-test, Post-test).

n=98		Mean	SD	SE	Wilcoxon Signed Ranks Test	P-Value
1- Do you usually eat fish twice weekly?	Pre	1.90	0.547	0.055	7.620	<0.001 (HS)
	Post	2.51	0.561	0.057		
2- Do you eat a fruit daily?	Pre	2.36	0.596	0.060	5.105	<0.001 (HS)
	Post	2.00	<0.000	<0.000		
3- Do you usually eat vegetables daily?	Pre	2.50	0.677	0.068	5.153	<0.001 (HS)
	Post	2.95	0.264	0.027		
4- Do you eat candy?	Pre	2.18	0.709	0.072	6.964	<0.001 (HS)
	Post	2.82	0.389	0.039		
5- Do you use sugar with tea?	Pre	1.90	0.843	0.085	6.479	<0.001 (HS)
	Post	2.51	0.596	0.060		
6- Do you eat white bread daily?	Pre	1.72	0.847	0.086	7.222	<0.001 (HS)
	Post	2.62	0.566	0.057		
7- Do you eat fried foods?	Pre	1.88	0.828	0.084	7.034	<0.001 (HS)
	Post	2.62	0.528	0.053		
8- Do you usually eat red meat?	Pre	1.98	0.626	0.063	3.402	0.001 (HS)
	Post	2.16	0.372	0.038		
9- Do you eat fruit juice?	Pre	2.08	0.769	0.078	6.949	<0.001 (HS)
	Post	2.90	0.304	0.031		
10- Do you add salt to your meal?	Pre	2.23	0.784	0.079	6.497	<0.001 (HS)
	Post	2.98	0.142	0.014		

HS: highly significant, SD: standard deviation.

Table 5: Tests of Normality for Dietary Habits Variables Using Kolmogorov–Smirnov Test.

Tests of Normality	Variables	Kolmogorov-Smirnov			Sig.
		Statistic	df	P-Value	
d1	Do you usually eat vegetables daily?	0.378	98	<0.001	Non-Normal
d2	Do you eat candy?	0.307	98	<0.001	Non-Normal
d3	Do you use sugar with tea?	0.360	98	<0.001	Non-Normal
d4	Do you eat white bread daily?	0.291	98	<0.001	Non-Normal
d5	Do you eat fried foods?	0.315	98	<0.001	Non-Normal
d6	Do you usually eat red meat?	0.226	98	<0.001	Non-Normal
d7	Do you eat fruit juice?	0.253	98	<0.001	Non-Normal
d8	Do you add salt to your meal?	0.428	98	<0.001	Non-Normal
d9	Do you usually eat vegetables daily?	0.255	98	<0.001	Non-Normal
d10	Do you eat candy?	0.296	98	<0.001	Non-Normal

4 Discussion

To assess the dietary habits before and after the educational program among patients with ischemic heart disease (IHD), the current study was carried out involving 98 IHD patients attending the Echocardiography Clinic at Khanaqin General Hospital.

Most of the patients were in the age group (58-65), the mean age was (61.17), the majority (62.2%) were male, and nearly a quarter of them (24.5%) were illiterate, and secondary school (20.4%), about one third of them were house wives (33.7%) and retired (29.6%). The vast majority (82.7%) were married, and urban residency (76.5%), more than half (58.2%) had barely sufficient income, and lastly, most of them (64.3%) had no family history of IHD. These findings are in line with a previous related study in Iraq [21].

One of the most important findings in this study was a statistically significant improvement in the post-test dietary habits detected with a p-value <0.001 after the educational program, which is in line with previous studies [16,21,22].

These findings are compatible and comparable with previous related studies that used similar educational programs for IHD patients. A study in Kosovo revealed improvement in clinical outcomes following an educational program, with BMI decreasing from 29.01 at pre-test to 27.72 at post-test [16]. In comparison, our study showed a smaller reduction in BMI (from 28.73 to 28.40), which may be attributed to the longer duration of the education program in the Kosova study, which was 3 months, compared with the 4-week program in the current study.

Furthermore, improved physical status overall, LDL mean decreased from (131.59 to 117.81), and HDL mean increased from (33.42 to 35.38). Hence, the pulse rate remained constant pretest and posttest, while the blood pressure means decreased obviously, systolic from (141.89 to 122.84) and diastolic from (82.59 to 77.97). The outcome of previous studies [10,21,23] supported the current study, which revealed that maintaining prescribed dietary habits contributes to improved health outcomes in patients with ischemic heart disease.

The current study revealed the gap in dietary habits among IHD patients and the importance of patient education about maintaining a healthy diet to cope with the disease with fewer complications. The most important factor behind the gap in dietary habits among IHD patients is the lack of dietary education departments in hospitals with trained staff, the traditional beliefs among patients, as well as the misunderstanding of some dietary habits, that fish fat is unhealthy, which may affect their dietary practices [24]. Patient overload and limited time for each patient are other related factors for patients' poor dietary habits literacy [25].

Nurses play an essential role in patient education, providing hospitals with special rooms for patient education, and trained nurses could help to fill this gap [16,23]. Social media and TV channels could also help [26]. Most of the participants of this study

were illiterate and of old age, and those who may rarely use social media [27].

A healthy dietary adherence is core stone of a healthier life for all chronic diseases, one of them IHD [10,11]. The outcome of the current study showed a highly significant benefit from the educational program regarding dietary habits among IHD. Hence, continuous follow-up is important for maintenance [7].

The study was conducted in Khanaqin General Hospital. Physicians in general hospitals are overloaded and time-limited for each patient. The hospital has fewer facilities due to the country's economic status. Dropout of some participants in the post-test and the limited time for data collection, all may contribute to the result.

Conclusion

In this study conducted among patients with ischemic heart disease (IHD) at Khanaqin General Hospital, the majority of participants were male, married, and residing in urban areas. Following implementation of the educational program, significant improvements were observed in dietary behaviors.

Overall, short-term improvements were observed in dietary habits with some clinical parameters following the program. These findings highlight the potential value of educational programs in promoting healthier dietary practices within healthcare settings, which may contribute to improved patient care, reduced hospital readmissions, and lower healthcare costs. Further research, particularly randomized controlled trials with longer follow-up periods, is recommended to provide stronger evidence and explore additional outcomes.

Appendix

A researcher made booklet containing a structured educational program that was developed and designed for patients with ischemic heart disease (IHD), addressing both general information about the disease and, in particular, healthy dietary habits. The educational program was incorporated into the study questionnaire and reviewed by a panel of experts in nursing and cardiology. The final copy was developed after reviewing the previous related studies [7,9,10,16,17,23] and established through expert panel review comments to ensure the appropriateness and validity of the content.

The booklet was translated into Kurdish and Arabic languages according to the patients' understanding of the language. The program was applied in two educational sessions, each lasting 30 minutes. In two successive weeks. Then, after three weeks, the post-test assessment was carried out.

Limitations of the study

Lack of control group, short duration, we also acknowledged that a very high value of reliability ($r=0.89$) may indicate redundancy, which may all affect the final result of the study.

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Authors contribution

The first author conducted the study and prepared the manuscript under the supervision of the second author. Both authors reviewed and approved the final version.

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