Effect of Designed Life Style Modification Program on Outcomes among patients' with Ischemic Heart Disease

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Abstract

Background: life style modification most important in the management of ischemic heart disease patients. **Aim:** The study aimed to evaluate the effect of implementing designed life style modification program on outcomes among patients' with ischemic heart disease. **Design:** Quasi-experimental research design was utilized in this study. **Setting:** The study was carried out in (CCU) and cardiology out-patient clinics at Benha University Hospital. **Sample:** Purposive sample of patients with diagnosis ischemic heart disease who is admitted in mentioned setting of the study during the six months. **Tools:** two tools were used, Tool (1): Structured interviewing questionnaire part one demographic characteristics and part two Assessment of patient's lifestyle practices regarding IHD; tool (2): Patients' clinical outcomes to assess patients' life style practice modification regarding IHD. **Results:** The study reveal that the most of studied patients (99%) had poor total knowledge level regarding ischemic heart disease at pre life style modification program implementation, while, immediately post implementation more than three quarter of them (79%) had good level of knowledge and after three months there was slightly decline in their level of knowledge (55%).respectively with a highly statistically significant difference at ($p \leq 0.001$). **Conclusion:** Providing life style modification program has been shown to be effective on patients ' modification life style practice regarding IHD. **Recommendation:** Continuous education and training of patients regarding life style modification for IHD patients.

Key Words: life style practice modification, ischemic heart disease patients.

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Introduction

Cardiovascular disease is a group of diseases affecting the heart and blood vessels. These diseases can affect one or many parts of the heart and blood vessels. A person may be symptomatic (physically experiencing the disease) or asymptomatic (not feeling anything at all) **(Veronese, 2020)**.

Ischemic heart disease it's the term given to heart problems caused by an occluded coronary artery lead to inadequate supply of blood to the heart and produces angina pectoris or a heart attack. For both men and women, coronary heart disease or ischemic heart disease is one of the leading causes of death in the world. It is usually asymptomatic and can be prevented **(Shahjehan & Bhutta , 2022).**

Factors that can increase risk of developing ischemic heart disease include: Non modifiable factor such as age, sex, family history. Modifiable factor such as tobacco, diabetes, high blood pressure. high blood cholesterol level, cholesterol is a major part of the deposits that can narrow coronary arteries a high level of "bad" (low-density lipoprotein, or high blood triglyceride level. Triglycerides is another type of blood fat, also may contribute to atherosclerosis, obesity is associated with diabetes and lack of physical activity **(Gotto et al., 2020).**

The nurse play important role in gives health education for patients to improve health and prevent a heart attack. Eating healthy food these include: vegetables, fruits, nuts, beans, lean meat, fish, and whole grains. Limit saturated fat, sodium, not smoking, getting regular exercise, taking medicine as doctor order are the main things can do every day to stay health and the important of follow-up care is a key part of the treatment and safety **(Taylor, Dalal & McDonagh, 2021)**.

Significance of the study

Ischemic heart disease (IHD) about 17.7 million people die each year from IHDs, an estimated 31% of all deaths all over the world. Adult are widely challenged by cardiovascular risk factors, including obesity (34.5%), smoking (26.5%), hypertension (23.2%), and elevated blood glucose (17.7%) **(*Noureddine & Massouh, 2019).***

In Egypt reached 107,232 or 23.14% of total deaths. The age adjusted death rate is186.36 per 100,000 of population ranks Egypt as the 23 in the world. About 80% of these deaths occurred in low- and middle income countries and occur almost equally in men and women ***(World Health Organization. 2017)***.

Also, by reviewing the medical records and statistical data of some health care settings in Egypt, demonstrated that on the duration of 2017-2018, the number of patients admitted to CCU hospital was 1158 patients. While in 2019 the number increased into 2110 patients ***(Benha university hospital statistic office,2019) .***

Patients' clinical outcomes are defined as the results of the life style modification program involving primary outcomes as complications of ischemic heart disease, Hospital readmissions, and cardiac mortality, Secondary outcomes as Physiological measurement (blood pressure, blood lipid levels). And Lifestyle behavior (diet, exercise, smoking behavior, and medication adherence **(Hassanin et al.,2020)**

Aim of the study

The study aims to evaluate the effect of implementing designed life style modification program on outcomes among patients' with ischemic heart disease

Study hypotheses:

H1: There will be a significant improvement in patient's knowledge life style post life style modification program implementation than before.

H2: There will be a significant improvement patients' clinical outcomes regarding ischemic heart disease post life style modification program implementation than before.

H3: There will be a significant correlation between patient's life style and patients' clinical outcomes post life style modification program implementation than before.

Subjects and method

Design:

Quasi- experimental research design was utilized to achieve the aim of the study.

Setting:

The study was conducted in coronary care unit (CCU) and cardiology out-patient clinics at Benha University Hospital. The coronary care unit consists of two rooms, the big one contains eight beds and the small room included four beds. Both rooms are

equipped by all necessary devices and equipment's needed for care of IHD patients.

Subjects:

Purposive sample of ischemic heart disease patients who was admitted in the previously mentioned setting were recruited into the current study during six months. **Inclusion criteria:** Adult conscious male and female patients, their ages between 20-50years old and haven't any complication. The total number of patients participate in this study were (100) patients, (10) patients from total number were included from the pilot study.

Tools for data collection:
Two tools were used by the researcher to collect data of the study.

Tool I: Structured interviewing questionnaire *(Appendix I)*: it was developed by the researcher through reviewing related literature and references aimed to assess patient's life style regarding (IHD), it was used pre, immediately post and after three months of life style modification program implementation. Included three parts as follows:

Part one: demographic characteristics of the studied patients and their health history and family history: this part concerned with assessment of the studied patients' demographic characteristics related to age, gender, marital status, residence, educational level and occupation.

demographic characteristics. It was composed of five questions related to age, gender, educational level, years of experiences and training courses.

Patients' health history and family health history: used to assess the studied patients past, present and family health history.

Part two: Assessment of patient's knowledge lifestyle regarding IHD; this part was developed to assess patients' knowledge about life style practice regarding IHD and it included **two sections .**

Section one: questions about IHD .It was developed by the researchers after reviewing of related literature, it adopted by **Alwakeel, et al.,(2019).** and included: definition of IHD, causes, risk factor, signs and symptoms, aggravates factors of chest pain, diagnosis of IHD, complication and protective methods, benefits of physical exercise and medication used

Section two: questions about modification of life style practices and avoiding risk factors. It was developed by the researchers after reviewing of related literature, it adopted by ***(Timby & Smith, 2010).*** And included the following practices:

1- Smoking; included (three items) as practicing cigarette smoking, negative smoking and other types of tobacco used.

2-Nutrition; involving diet and drinks (13 items)

Diet (10 items) :eating fatty foods, eating fast foods, eating frying foods, eating salty foods and eating canned foods, also eat small meal distributed during the day, using unsaturated fat like olive oil, use dairy product that are low in fat, decrease salt in food and eating fruits and vegetables.

Drinks (three items) drinking coffee, tea and soda drinks

3-practicing activities (three items) practice exercises, walking and recreational activity.

4-precaution during practice exercise; (five items) practice exercise prescribed by the doctor, warm up before start, avoiding exercise after eating, avoiding exercise in hot weather and avoiding exercise in case of fatigue**.**

5- Self monitoring; (five items) monitor weight avoid obesity, avoid stressful situation, adherence to medication, control blood pressure and continuous health checkup.

Scoring system: One score was given for correct answer and zero score for incorrect answer. The scores converted into a percent and categorized as follows: < 50% reflects poor knowledge level of lifestyle practices, 50 %-< 75% reflects average knowledge level of lifestyle practices, and ≥ 75% reflects good knowledge level of lifestyle practices.

Tool II- Patients' clinical outcomes sheet *(Appendix II):* This tool adapted from ***(Cole,et-al. 2011)***. And modified by the researcher, it aimed to evaluate the patients' health outcomes regarding ischemic heart disease.it was used three times: pre ,after one month and three months post life style modification program implementation. Patients' clinical outcomes are the

Primary outcomes included: complications of ischemic heart disease and hospital readmissions.

Secondary outcomes included:

A.Physiological measurement related to blood pressure, blood lipid levels.

B. Lifestyle behavior related to (diet, exercise, smoking behavior, and medication adherence)

Total life style behavior; included (20) questions converted into percentage (100%) if patient has correct answer for only 10 question concerned Un Healthy behavior <50% <10, if patient has correct answer for more than 10 questions concerned

Educational program booklet

Containing major headlines of life style modification for ischemic heart disease was designed by the researcher, written in a very simple Arabic language, and supplemented by photos and illustrations to help the patients understanding of the content and divided in to two parts.

Theoretical part included: definition of ischemic heart disease, classification of ischemic heart disease, causes, signs and symptoms, risk factor, management (drugs-surgical procedure), prevention and complications it divided into four ssessions**.**

Practical part included: life style modification related to diet, exercise

Content validity

The face and content validity of the tools were ascertained for comprehensiveness, relevance, simplicity, clarity and ambiguity through a jury of five experts from medical surgical nursing department, faculty of nursing, Benha University. Based on the opinion of panel of expertise some modifications were done and then the final form was developed based on newest current literature and used for data collection.

Reliability

Reliability was testing statistically to assure that the tools were reliable before data collection and it was evaluated using test-retest method by the Cronbach's alpha test which is used to measure the internal consistency. Reliability of **knowledge questionnaire** was determined using Cronbach's alpha coefficient which was 0.835 and, Reliability for the second tool **lifestyle behavior**, reliability was 0.820.

Ethical consideration

Official permissions for data collection were generated from Hospital directors and head managers of the CCU department and cardiology out-patient clinics at Benha university hospital by the submission of a formal letter from the dean of Faculty of Nursing at Benha University. Also, the study approval was obtained from the ethical committee of

Faculty of Nursing before initiating the study work. Oral approval from patients was taken after explanation the aim of the study; they were also informed that their participation is optionally, and that they have the right to withdraw at any time without any consequences. The researcher was assured maintaining anonymity and confidentiality of data and information gathered used only for patients benefit and for the purpose of the study.

Pilot study

Pilot study was conducted on (10%) of all patients in CCU department at Benha University Hospital in order to test the clarity and applicability of the study tools and the guidelines, to estimate time needed for each tool to be filled in as well as to identify any possible obstacles that may hinder data collection. Based on the results of the pilot study the necessary modifications were done to be more applicable tools for data collection. Patients involved in the pilot study were included in the study. The pilot study was done two weeks before starting the study from beginning of December 2021 to end of December 2021.

Field work:

The collection of data and application of educational program was carried out from beginning of January 2022 to end of june2022. The process of data collection was achieved three times: before implementing program (pre-test) to have baseline assessment about patients level of knowledge and life style practice, then immediately (post-test) for patients knowledge and post one month for patients outcome, was post three month following implementation of program (posttest). The precautionary practices measures to prevent the spread of the Corona virus, infection control were followed as maintaining physical distance, wearing facemask, gloves, and using alcohol aseptic solution for both the researcher and the patients used in the study.

The study was conducted on four phases as the following:

Assessment Phase:

Assessment of patient's knowledge regarding IHD and lifestyle practices regarding IHD was done; This assessment shed- light and was given more insight about the current knowledge level to help detecting knowledge and life style practice deficit, as it's the result was obtained from patients assessment sheet, as well as, literature review .Also assessment lifestyle practices regarding IHD patients was be done.

Planning phase:

The researcher was collected data about the study setting to put plan for carrying out the study. The educational program developed by the researcher to meet needs, deficiencies and objective of the program. Moreover, teaching material was prepared e.g. discussion, demonstration and booklet helped in covering theoretical and practical information.

The implementation phase:

١. 1- The life style modification program implementation was conducted in 4 sessions. Each session lasted about 30 minutes, including periods of discussion according to the patients' progress and feedback.

2-The researcher attended the clinical setting (CCU& cardiology out patients clinics) in the morning & afternoon shifts three times weekly during the time of the study to collect data. Patients assessed before and after the implementation of life style modification program (Tool I& Tool II.

3-Different teaching and learning methods were used during the sessions, which included; Power point presentation, pictures, and videos were used to enhance learning of patients about modification life style practices for ischemic heart disease patients.session ranged between 20 – 30 minutes

4-The instructional colored booklet was given to each patients enrolled in the study in order to help for reviewing and support teaching. It was written in Arabic language and supplemented by photos illustrations to help the patients and understanding of the contents.

5-At the beginning of the first session, patients were oriented regarding the program contents, its purpose and its impact on their knowledge on life style practices. Patients were informed about the time of the next session at the end of the session.

6-Each session was started by a summary about what has been discussed in the

previous session and the objectives of the new session, also, the session ended by a summary of its contents and feedback from the patients was obtained to ensure that he/ she got the maximum benefit **.**

Evaluation Phase:

The evaluation of the patients' knowledge was done immediately post program implementation and follow up after three months using tool I and after one month and three months of life style modification program for life style practice using tool II and patients' clinical outcome.

Statistical analysis:

The collected data were tabulated and statistically analyzed using an IBM computer and the statistical package for social science (SPSS) advanced statistics, version 25 (SPSS Inc., Chicago, IL). Numerical data were expressed as mean and standard deviation. Qualitative data were expressed as frequency and percentage. Chi-square test was used to examine the difference and relation between qualitative variables. Fisher's exact test was applied on smaller sample sizes, alternative to the chi-square test, when the frequency count is < 5 for more than 20% of cells. For quantitative data, comparison between two periods within the same group was done using paired t-test. Pearson method was used to test correlation between numerical variables. A p-value < 0.05 was considered significant, and <0.001 was considered.

Results

Table 1: Demonstrates percentage distribution of studied patients according to their demographic characteristics, It shows that, more than half of studied patients (61.0 %) their age was between 40 and 50 years, with mean age and standard deviation 41.87 ± 5.71, more than two third of them (69.0 %) were males and the majority of them (84.0%) were married. As well (81.0 %) of the studied patients were living in urban areas and about two third (65.0%) had intermediate education, majority of them (88.0%) were working and more than two third (68.2%) their works require physical effort.

Table (2): The table illustrates the distribution of the studied patients according to their medical history. Related to past history, it was noted that most of patients (90.0%) did not performed any surgical operation. Related to Present medical history, more than three quarter of the studied patients (77.0 %) weren't suffer from comorbid diseases, about two third of them (66.0%) were diagnosed with IHD since less than one year , near than half of them(47.0%) used nitrates as a medication for ischemic heart disease and more than half (52.0%) of the asked medical help when feeling pain and pressure in the chest. Related to family history, the majority of the studied patients family members (82.0%, 89.0%,87.0%) respectively had not ischemic heart disease, not performed artery stent operation or heart catheterization.

Table (3): Table 3: Reveals that more than half of studied patients had incorrect answers related to definition of perfusion, signs and symptoms of IHD, aggravating factors of chest pain and diagnosis of IHD pre life style modification program implementation (88% ,69% ,72% and 65%) respectively , while immediately post life style modification program implementation three quarter or more had correct answers related to these items(83%,75%,75% and82%) respectively but after three months there was a slight decline in these results, respectively post three months of program implementation also there were highly statistically significant differences in the studied patients to total knowledge about ischemic heart disease between pre, immediate post and post three months of life style modification program implementation ($P \leq 0.001$).

Figure (1): The figure demonstrates that the most of studied patients (99%) had poor total knowledge level regarding ischemic heart disease at pre life style modification program implementation, while, immediately post implementation more than three quarter of them (79%) had good level of knowledge

and after three months there was slightly decline in their level of knowledge (55%).

Table 8: Reveals that majority of studied patients(83% , 86% and 81%) respectively had incorrect knowledge related to observe body weight and avoid obesity, adhere to medication according to the doctor's instructions and continuously measure blood pressure pre life style modification program implementation, which changed to (84%, ,81% and 80%) respectively of them had correct knowledge related to these items post life style modification program while there was a slight decline in these results post three months of program implementation, also there was a highly statistical significant difference in the total scores of the studied patients knowledge about healthy lifestyle practices regarding self-monitoring between pre, immediate post, post three months implementation ($P \leq 0.001$) .

Figure (2: This figure documented that the total (100%) of studied patients had unhealthy life style behavior pre life style modification program implementation, however, post one month implementation most of them (90%) had healthy life style behavior ,while post three months slight increase in healthy life style behavior was observed(96%) ..

Table (14): It is noted that is negative correlation between total patients' knowledge about lifestyle modification and their clinical outcomes except in two items (High density lipoprotein and Secondary outcomes (lifestyle behavior) and a highly statistical significant correlation between patient's life style and patients' clinical outcomes post life style modification program implementation **(**$P \leq 0.01$).

Table (1): Percentage distribution of studied patients according to their demographic characteristics (n = 100)

Patients' demographic characteristics		**No.**	**%**
Age	20- < 30 30 - < 40 40 – 50	2 37 61	2.0 37.0 61.0
	Mean ± SD	**41.87 ± 5.71**	
Gender	Male Female	69 31	69.0 31.0
Marital status	Married	84	84.0
	Single	13	13.0
	Divorced	3	3.0
Residence	Urban	81	81.0
	Rural	19	19.0
Educational level	Illiterate	6	6.0
	Read and write	17	17.0
	Intermediate education	65	65.0
	University education	12	12.0
Occupation status	Not working or retired	12	12.0
	Working	88	88.0
Nature of effort required for work	Physical effort	60	68.2
	Mental effort	28	31.8

Table (2): Distribution of the studied patients according to their health history (n = 100)

Patients' health history		No.	%
Past history			
Presence of previous surgery	Yes	10	10.0
	No	90	90.0
Present history			
Suffering from comorbid disease	Yes	23	23.0
	No	77	77.0
Type of comorbid diseases*		**(n = 23)**	
	Diabetes mellitus	7	30.4
	Hypertension	12	52.2
	Diseases of the digestive system	7	30.4
	High blood cholesterol	12	52.2
	Diseases of the kidneys	5	21.7
	Diseases of the respiratory system	6	26.0
	Lupus erythematosus	1	4.3
Period since diagnosis (in years)	< 1 year	66	66.0
	1 < 5 years	24	24.0
	≥ 5 years	10	10.0
	Mean ± SD	**1.44 ± 0.67**	
Medications taken for ischemic heart disease	Nitrates	47	47.0
	Inhibitors of calcium channels	5	5.0
	Aspirin	29	29.0
	Cholesterol-lowering drugs	19	19.0
Reasons for asking medical help	Feeling pain in the stomach	15	15.0
	unable to walk	15	15.0
	Feeling pain and pressure in the chest	52	52.0

	Feeling dizzy and lack of concentration	18	18.0
Family history			
ischemic heart disease	Yes	18	18.0
	No	82	82.0
Artery stent operation performed	Yes	10	10.0
	No	89	89.0
Heart catheterization	Yes	13	13.0
	No	87	87.0

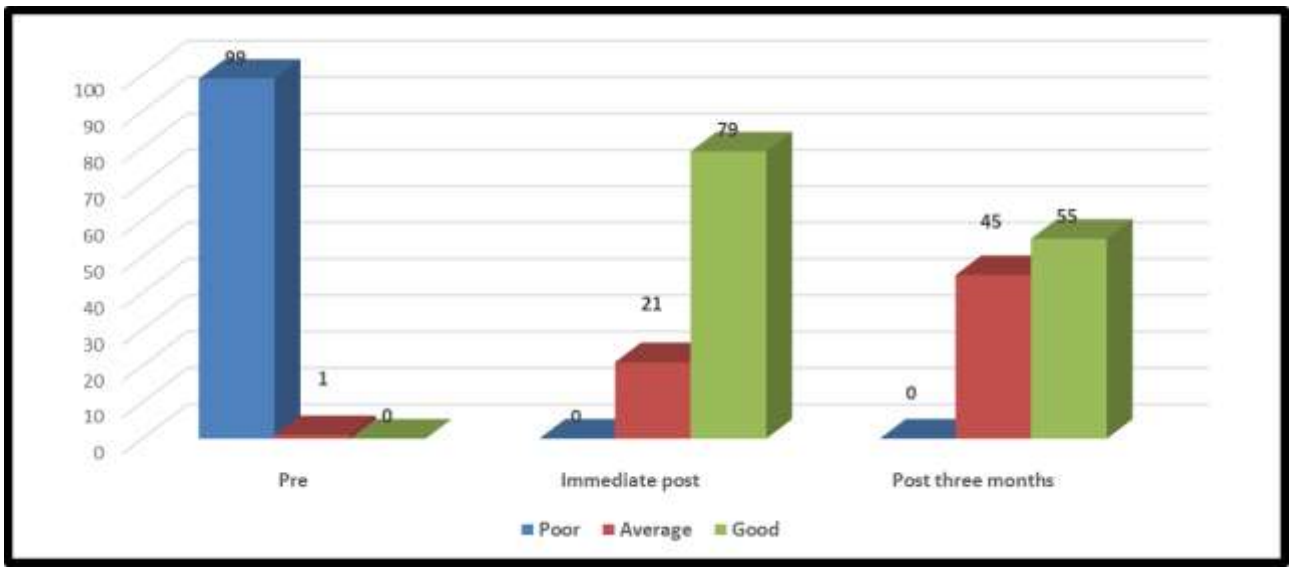

Figure (1): Difference between total knowledge level among studied patients regarding ischemic heart disease during (pre program, immediate post and three months post program implementation) n =100

Table (3): frequency and percentage distribution of studied patients regarding to their knowledge about ischemic heart disease (n = 100). Pre, immediately post and after three month of program implementation.

Knowledge about ischemic heart disease	Response	Knowledge (pre program) (n= 100)		Knowledge (immediate post program) (n= 100)		Knowledge (post 3 months of program) (n= 100)		X^2 test P value (1)	X^2 test P value (2)
		(No.)	%	(No.)	%	(No.)	%		
Definition of perfusion	Correct	12	12.0	83	83.0	81	81.0	5.880 *FEp* 0.029*	4.552 *FEp* 0.048
	In correct	88	88.0	17	17.0	19	19.0		
Definition of ischemic heart disease	Correct	43	43.0	70	70.0	69	69.0	9.250 *FEp* 0.004*	7.643 *FEp* 0.008*
	In correct	57	57.0	30	30.0	31	31.0		
Causes of ischemic heart disease	Correct	26	26.0	73	73.0	70	70.0	4.261 *FEp* 0.043*	5.702 *FEp* 0.024*
	In correct	74	74.0	27	27.0	30	30.0		
Risk factors of ischemic heart disease	Correct	25	25.0	74	74.0	71	71.0	8.385 *FEp* 0.003*	7.139 *FEp* 0.010*
	In correct	75	75.0	26	26.0	29	29.0		
Signs and symptoms of ischemic heart disease	Correct	31	31.0	75	75.0	71	71.0	5.626 *FEp* 0.024*	5.654 *FEp* 0.018*
	In correct	69	69.0	25	25.0	29	29.0		
Aggravating factors of chest pain	Correct	28	28.0	75	75.0	72	72.0	4.233 *FEp* 0.043*	5.764 *FEp* 0.024*
	In correct	72	72.0	25	25.0	28	28.0		
The diagnosis of ischemic heart disease	Correct	35	35.0	82	82.0	80	80.0	5.506 *FEp* 0.027*	4.396 *FEp* 0.039*
	In correct	65	65.0	18	18.0	20	20.0		
Complications of ischemic heart disease	Correct	27	27.0	73	73.0	69	69.0	4.737 *FEp* 0.041*	6.840 *FEp* 0.014*
	In correct	73	73.0	27	27.0	31	31.0		
Protective method of ischemic heart disease	Correct	25	25.0	70	70.0	65	65.0	5.143 *FEp* 0.025*	7.751 *FEp* 0.007*
	In correct	75	75.0	30	30.0	35	35.0		
Medications used for treatment	Correct	29	29.0	69	69.0	67	67.0	8.147 *FEp* 0.004*	6.815 *FEp* 0.010*
	In correct	71	71.0	31	31.0	33	33.0		
Side effects of aspirin	Correct	23	23.0	70	70.0	68	68.0	12.801 *FEp* <0.001**	14.057 *FEp* <0.001**
	In correct	77	77.0	30	30.0	32	32.0		
Other treatment methods	Correct	32	32.0	74	74.0	72	72.0	6.315 *FEp* 0.013*	5.608 *FEp* 0.019*
	In correct	68	68.0	25	25.0	28	28.0		
Total	Mean ± SD	3.36 ± 2.58		8.87 ± 1.73		8.55 ± 1.78		T=- 16.06 <0.001**	T=- 15.07 <0.001**

(FEp) p value for Fisher exact for chi square *(*) Statistically Significant at ≤0.05* *(**) Highly statistically significant at ≤0.001* *(t) paired t test*

(1) comparison between Pre program and immediate post program
(2) comparison between Pre program and three months post program

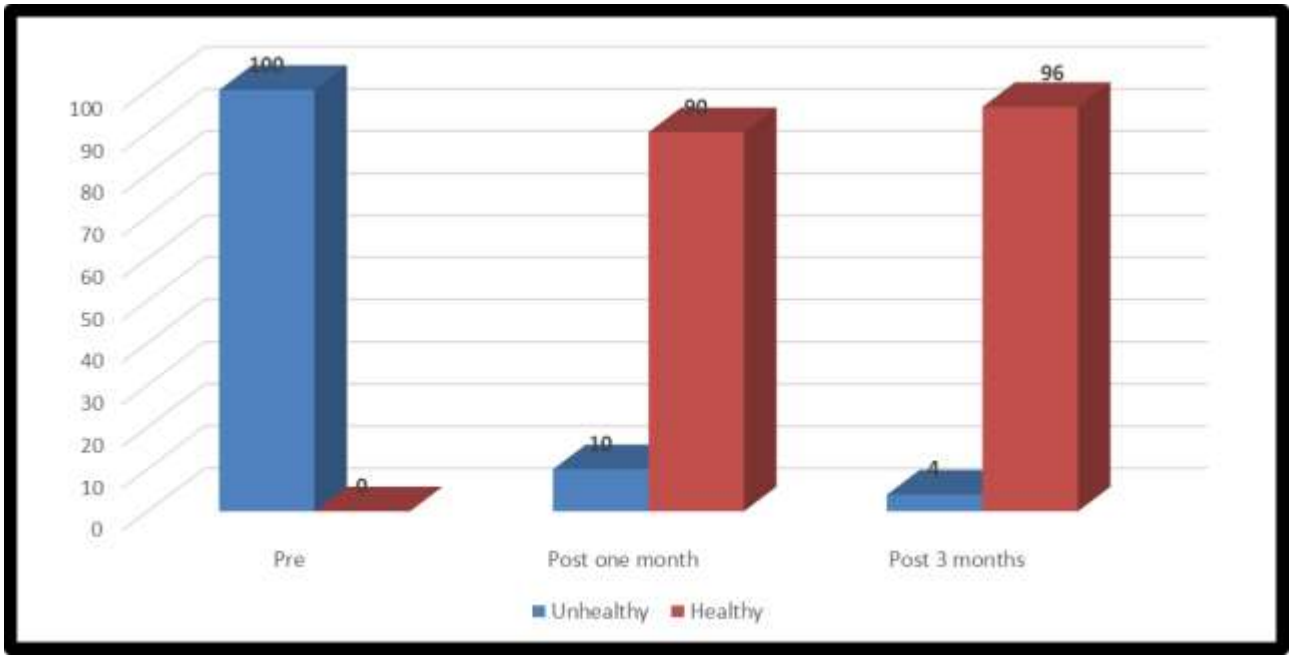

Figure (2): Difference between life style behavior level among studied patients with ischemic heart disease during (preprogram, post one month and 3months of program implementation) n =100

Table (8): frequency and percentage distribution of studied patients according to their knowledge about healthy lifestyle practices regarding self-monitoring (n = 100).

Knowledge about healthy lifestyle practices regarding self-monitoring	**Response**	**Knowledge (pre program) (n= 100)**		**Knowledge (immediate post program) (n= 100)**		**Knowledge (post 3 months of program) (n= 100)**		**X^2 test P value (1)**	**X^2 test P value (2)**
		(No.)	**%**	**(No.)**	**%**	**(No.)**	**%**		
Observe body weight and avoid obesity	Correct	17	17.0	84	84.0	75	75.0	3.901 0.048*	3.992 0.046*
	In correct	83	83.0	16	16.0	25	25.0		
Avoid exposure to stressful situations	Correct	17	17.0	75	75.0	75	75.0	3.992 0.046*	3.992 0.046*
	In correct	83	83.0	25	25.0	25	25.0		
Adhere to medication according to the doctor's instructions	Correct	14	14.0	81	81.0	70	70.0	3.819 0.051*	4.050 0.044*
	In correct	86	86.0	19	19.0	30	30.0		
Continuously measure your blood pressure	Correct	19	19.0	80	80.0	76	76.0	5.864 *FEp* 0.011*	7.407 *FEp* 0.005*
	In correct	81	81.0	20	20.0	24	24.0		
Commitment to the periodic examination of the body regularly	Correct	16	16.0	73	73.0	74	74.0	4.161 0.041*	3.862 0.049*
	In correct	84	84.0	27	27.0	26	26.0		
Total	Mean ± SD	0.83 ± 0.84		3.93 ± 0.92		3.70± 0.94		T=-30.69 <0.001**	T=-26.82 <0.001**

(FEp) p value for Fisher exact for chi square *(*) Statistically Significant at ≤0.05* **(**)** *Highly statistically significant at ≤0.001 (t) paired t test*

(1) comparison between Pre program and immediate post program
(2) comparison between Pre program and three months post program

Table (14): Correlation coefficient between Total knowledge about lifestyle implementation (n=100).

Patients' clinical outcomes	Total knowledge about lifestyle modification (post 3 months of program)	
	R	P value
Primary outcomes		
Repeated admission to hospital since disease	-0.366	<0.001**
Times of readmission	-0.575	0.025*
Secondary outcomes (physiological measures)		
Blood pressure level	-0.349	<0.001**
Blood cholesterol level	-0.415	<0.001**
High density lipoprotein	0.416	<0.001**
Low density lipoprotein	-0.375	<0.001**
Secondary outcomes (lifestyle behavior)	0.342	<0.001**

**A Highly Statistical significant p ≤ 0.001

Discussion

Cardiovascular diseases are a public health concern everywhere, especially ischemic or coronary heart diseases (CHD) which are on top of causes list of mortality and morbidity in both genders globally. From which nearly 80% occurs because of modifiable risks factors such as sedentary life, high fat diet, high blood pressure, smoking, diabetes, obesity, dyslipidemia and stress all are the main risks which lead to increased prevalence of CHD especially in Egypt reached 107,232 or 23.14% of total deaths from IHD **(AlRahimi et al., 2020)**.

Healthy lifestyle choices such as eat a healthy balanced diet, perform regular physical activity, keep a healthy weight, stop smoking, avoid alcohol consumption, keep blood pressure level under control, keep blood lipids within normal level and take prescribed medicine **(Regmi & Siccardi, 2022).**

Strategies to improve adherence to healthy lifestyles and drug therapies are essential and can be implemented at health system, health care and patient levels with using of education, technology and personalized approaches. Improving quality of medical education with a focus on ischemic heart disease prevention for patients' physicians, nurses, health workers, and the public is required **(Gupta &Yusuf ,2020)**

So, this study aimed to evaluate the effect of implementing designed life style modification program on outcomes among patients' with ischemic heart disease**.** To fulfill the aim of this study, the discussion of the findings is presented in the following sections.

Part I: Demographic characteristics and medical history of the studied patients.

Regarding age: The present study revealed that, more than half of studied patients their ages were between 40 and 50 years. This might be because; this is the most affected age with ischemic heart disease. This result was agreed with **Hassanin etal., (2020)** who studied " Demographics, clinical characteristics, and outcomes among hospitalized heart failure patients across different regions of Egypt, " and concluded that Ischemic heart disease affects more than half of the sample in age over 45years in their study.

The result of the current study also similar to the finding of study conducted by **Tsao et al., 2022),** whose study entitled " Heart Disease and Stroke Statistics—2022 Update: A Report From the American Heart Association " and reported that the prevalence rate of IHD increases as people get older particularly after 45 years of age.

As regard to gender, the present study revealed that more than two third of the studied patients were males. **From the researcher's point of view**, this result might be because of stressors they face and unhealthy life style behavior they followed. This finding agreed with **Khan et al.,(2020**) who studied " Global Epidemiology of Ischemic Heart Disease", and reported that more than two third of studied patients were males.

In addition to, **Brown, Gerhardt & Kwon, (2022)** who studied "Risk Factors for Coronary Artery Disease ", and showed that the male-to-female ratio was 2.1:1. So men had a higher prevalence of IHD than woman. But this finding was in contradict with study by **Einarson et al., (2020)** study entitled " Prevalence of cardiovascular disease in type 2 diabetes: a systematic literature review of scientific evidence " they reported that more than half of the studied patients with ischemic heart disease were females.

Concerning to marital status, the present study finding revealed that the majority of studied patients were married. From the researcher's point of view, this result might be due to the physical and social stress in their life and their families' responsibility. This finding was in consistence with **Wong et al., (2019),**who studied " Marital status and risk of cardiovascular diseases: a systematic review and meta-analysis " they reported that married patients who have ischemic heart disease represented the higher percentage of their study subject than single and widow patients.

As regard to residence, the finding of the present study represented that majority of the studied patients were living in urban areas, from the present study researcher's point of view, this might be due to sedentary life style and advanced technology in urban areas that reduce physical activity than in rural lead to accumulation of bad cholesterol in coronary artery.

Results were similar also to findings of study by **Singh et al., (2020),** who studied "Urban-Rural Differences in Coronary Heart Disease incidence in the United States ". They revealed more than two third of studied group were living in urban areas.

In respect to the level of education, the result of the present study revealed that about two third of the studied patients had intermediate education. This finding agreed with the finding of study by **Ahmed, Abdallah & Abdelatief, (2020**), study entitled " Factors Affecting the Outcomes of Patients with Ischemic Heart Disease at Intensive Care Units " they reported that two third of studied patients had intermediate education.

Similarly, this result supported by the result of study by **Tsao, et al,(2022)** , they stated that most of patients with ischemic heart disease had intermediate education level and the minority had university education and incongruent with the result of study by **Gomar et al., (2019),** about "Epidemiology of coronary heart disease and acute coronary syndrome" and showed that most of studied subjects were Read and write.

Regarding to occupation status, the result of the present study revealed that majority of studied patients was working.
This result was consistence with the result of

Khan et al.,(2020), who reported that most of studied subjects were working. This result was in the same line with the result of study by **Jian & Siegrist, (2021),** about " Occupational Risks of Recurrent Coronary Heart Disease," and stated that more than two third of studied subjects were working.

As regard to nature of effort required for work. The result of this study revealed that more than two third of studied patients their works require physical effort. This result agreed with the results of the study by **Sara et al., (2020)**, whose study entitled "Association between work-related stress and coronary heart disease ", they noted that more than half of studied patients had their works require physical effort.

Regarding past medical history. The result of this study revealed that most of patients did not performed any surgical operation. This result was agreed with the result of study by **Taylor, Dalal & McDonagh, (2021),** who studied "The role of cardiac rehabilitation in improving cardiovascular outcomes ". They revealed more than two third of studied group had not performed any surgical operation.

Also, the result of the present study was consistent with the result of study conducted by**Jagadish, Sivaraman& vukkarasu, (2019*).*** titled "The patient with ischemic heart disease undergoing non cardiac surgery ", and reported that more than half of studied patients had not performed any surgical operation. Similarly, this result was agreed with **Hassanin etal., (2020),** and illustrated that most of studied patients had not performed any surgical.

Regarding to Present medical history. The finding of the present study showed that more than three quarter of the studied patients weren't suffer from comorbid diseases, This finding was consistence with the finding of study by **Köhler et al., (2020)** about " Patient empowerment and general self-efficacy in patients with coronary heart disease ".And concluded that more than half of studied patients hadn't suffered from comorbid diseases.

But this finding was in contradict with **Kendir et al., (2019)** who studied" Cardiovascular disease patients have increased risk for comorbidity" and stated that majority of studied patients had suffer from comorbid diseases.

As regard to Period since diagnosis. The present study revealed that about two third of studied patient were diagnosed with IHD since less than one year. This result was supported by the result of **Mehta, Wei & Wenger, (2020),** who reported that more than half of studied patients were diagnosed with IHD since less than one year. This finding was also similar to the finding of study by **Nouri et al., (2020),** about "Temporal Trends of the Incidence of Ischemic Heart Disease in Iran ". And revealed that more than two third of studied patients were diagnosed with IHD since less than one year.

Regarding to Medications taken for ischemic heart disease.the finding of the present revealed. Near than half of study patients used nitrates as a medication for coronary heart disease. This result was congruent with **Perdoncin & Duvernoy,(2019).**who studied " Treatment of Coronary Artery Disease in Women ", and showed that more than two third**s** of studied patients used nitrates as a medication for ischemic heart disease**.**

As regard to Reasons for asking medical help. The finding of the present study showed

that more than half of studied patients asked medical help when feeling pain and pressure in the chest. This result was supported by the result of study by **Taylor, Dalal & McDonagh, (2021),** who concluded that most of studied patients asked medical help when feeling pain and pressure in the chest.

Regarding to family history. The finding of the present study showed that the majority of the studied patients' family members had not ischemic heart disease, not performed artery stent operation or heart catheterization. This result was supported by **Shahjehan & Bhutta , (2022)**, whose studied Coronary Artery Disease and reported that majority of studied patients family members had not ischemic heart disease, not performed artery stent operation or heart catheterization.

Similarly, this result agreed by **Jagadish, Sivaraman& vukkarasu, (2019*).***and revealed that more than half of studied patients had not performed any surgical operation. But this finding was in contradict with **Sabatine et al., (2021)** study entitled " Percutaneous coronary intervention with drug-eluting stents versus coronary artery bypass grafting in left main coronary artery disease: an individual patient data meta-analysis " and stated that more than half of studied patients family members had ischemic heart disease, performed artery stent operation or heart catheterization.

Part II: Patients' knowledge about IHD& lifestyle practices modification for ischemic heart disease.

A. Knowledge about Ischemic Heart disease.

As regard to patient's knowledge about ischemic heart disease, the present study revealed that more than half of studied patients had incorrect answers related to definition of perfusion, signs and symptoms of IHD, aggravating factors of chest pain and diagnosis of IHD pre life style modification program implementation .This result agreed with the result of study by **Hertz et al., (2019)** about "Knowledge, attitudes, and preventative practices regarding ischemic heart disease among emergency department patients in northern Tanzania ". and revealed that patients have unsatisfactory knowledge about general information related to Ischemic Heart disease preprogram implementation.

This result agreed with the study results by **Gupta & Yusuf , (2020):** about " Challenges in management and prevention of ischemic heart disease in low socioeconomic status people ", who stated that most of the studied patients, had unsatisfactory knowledge preprogram implementation and emphasized that those patients with Ischemic Heart disease need education, counseling and support to enable them to adjusting their chronic illness and their treatment.

B. Knowledge about healthy lifestyle practices preprogram implementation.

Regarding smoking. the present study revealed majority of the studied patients had incorrect knowledge related to cigarettes smoking, avoid exposure to secondhand smoke, and smoking other types of tobacco pre life style modification program implementation.

This finding supported by **Salehi et al., (2021)** who studied "Effect of cigarette smoking on coronary arteries and pattern and severity of coronary artery disease " and revealed that more than half of studied patients had unsatisfactory knowledge preprogram implementation related to cigarettes smoking on a regular basis, avoid exposure to second hand smoke.

This result was in congruence with the result of study by **Stallones, (2019)** about "The association between tobacco smoking and coronary heart disease ", showed that most of studied patients had incorrect knowledge preprogram implementation related to cigarettes smoking on a regular basis, avoid exposure to secondhand smoke and Smoking other types of tobacco**.**

Regarding to patients' total knowledge: this study revealed that the most of studied patients had poor total knowledge level regarding ischemic heart disease at pre life style modification program implementation .This result in the same line with the of study result **Brinks, et al., (2021),** who titled "lifestyle modification in secondary prevention". they reported more than three third of studied patients had poor total knowledge level regarding ischemic heart disease at pre life style modification program implementation.

Also, the result was consistent with **Jung & Yang, (2021),** who studied "Factors influencing health behavior practice in patients with coronary artery diseases". And noted that majority of studied patients had poor total knowledge level regarding ischemic heart disease at pre life style modification program implementation.

As regard to total patients' life style behavior: The finding of the study revealed that improvement in the studied patients' life style behavior post program implementation. This result was in the same line with the result of study by **Lönnberg et al., (2020),** who studied " Improved unhealthy lifestyle habits in patients with high cardiovascular risk: results from a structured lifestyle programmed in primary care " and reported that the majority of studied patients had unhealthy life style behavior preprogram implementation, while, post program implementation most of them had healthy life style behavior and slight increase in healthy life style behavior in follow up. Also, this result agreed with the result of study by **Livingstone et al., (2021**) whose study entitled "Unhealthy Lifestyle, Genetics and Risk of Cardiovascular Disease and Mortality in Individuals from the UK Biobank" and stated that most of patients had unhealthy life style behavior preprogram implementation, while, most of them had healthy life style behavior post program implementation.

According to finding of this study there were high statistically significance regarding the total patients outcome at pre, post one month and after three months of lifestyle modification program implementation. This result was supported by **Lindsey et al., (2021),** study titled "Guidelines for measuring cardiac physiology in mice," and reported that the statistical significant difference between patients life style behavior indicating healthy life style behavior after program implementation, compared with unhealthy life style behavior before program implementation

Part (V): Correlation coefficient between patients' knowledge about lifestyle modification and clinical patients' outcomes.

As regard to Correlation between patients' knowledge about lifestyle modification and clinical patients' outcomes. The present study noted that is negative correlation between total patients' knowledge about lifestyle modification and their clinical outcomes except in two items (High density lipoprotein and Secondary outcomes (lifestyle behavior) and a highly statistical significant correlation between patient's life style and patients' clinical outcomes post life style modification program implementation (P <0.001).**From the researcher point of view**, when the knowledge increased that lead to decrease primary outcome ad secondary outcome (physiological measurement) except high density lipoprotein and secondary outcome (life style behavior) increase with increase knowledge. This result agreed with the result of study by **Ezzati & Salehi , (2019),** who studied " correlation of heart knowledge and cardiac risk factors with readiness for lifestyle modification in companions of patients with cardiovascular diseases in the west of iran ". and declared that a negative correlation between total patients' knowledge about lifestyle modification and their clinical outcomes except in two items (high density lipoprotein and secondary outcomes life style behavior).

This finding in the same line with the result of study by **Elbashir et al., (2022),** who reported that there is negative correlation between total patients' knowledge about lifestyle modification and their clinical outcomes except in two items (high density lipoprotein and secondary outcomes life style behavior).

To sum up the discussion of the current study, the study results documented that, the study patients showed statistical significant improvement of the knowledge resulting in improving their life style practice for ischemic heart disease patients immediately post and at follow up after three months and improved patients outcome post one month and at follow up post three months compared to pre life style modification program which support the study hypotheses.

Conclusions: Based on the results of the present study and research hypotheses, the following can be concluded:

Life style modification program effectively improved patients' knowledge regarding life style practice among ischemic heart disease patients where their knowledge were significantly more competent post Life style modification program implementation than pre. And there was highly statistically significant negative correlation between total patients' knowledge about lifestyle modification and their clinical outcomes except in two items (high density lipoprotein and secondary outcomes life style behavior) post life style modification program implementation p< 0.01.

Recommendations: In the light of the findings of the current research, the following recommendations are suggested:

- Establishing a written updated protocol for assessment life style practice regarding IHD and care with continuous education & appraisal to ensure enough knowledge, and complete safe life style practices, which certainly leads to minimizing the incidence of complications.
- Close supervision of nurses during performing their skills to determine areas of deficiency that needs corrective action.

- Emphasize multidisciplinary collaboration to reliably implement safe life style practice protocol in an effort in coronary care units for IHD patients'.
- Further study is needed about modification life style practice for ischemic heart disease on larger sample size to evaluate its effect on patients' performance and patients' outcomes.
- Ongoing educational guidelines and training courses for nurses about ischemic heart disease and life style practice

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