Effect of Health Promotion Nursing Intervention on Functional Status among Elderly with Cardiovascular Diseases

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Abstract

Aging is an inevitable part of life and the largest risk factor for cardiovascular disease (CVD). A**im:** Assess the effect of health promotion nursing intervention on the functional status among elderly with cardiovascular diseases. **Design**: A Quasi-experimental design was used. **Settings**: The study conducted in cardiac out patients' clinics and inpatients wards at Al-Orman hospital in Assiut university hospitals. **Sample:** A random sample of 70 elderly with CVD was divided equally into two groups (35 study and 35 control). The data collection lasted 7 months from the beginning of December 2020 and ending in late June 2021. **Tools**: Four tools were utilized. **Tool I:** Structured interview questionnaire, **Tool II:** Comprehensive Heart Disease Knowledge Questionnaire, **Tool III**: Instrumental Activities of Daily Living Scale (IADL), **Tool IV:** Katz Index for Activities of Daily Living. **Results**: It was noted that 80.0% of the study group achieved full functional level in posttest. Additionally; a statistically significant difference between study group function level and their knowledge level at P<0.001. There was positive correlation between ADL, IADL and cardiac diagnosis in study group y-0.989. **Conclusion**: Functional level of elderly patients with cardiovascular diseases was greatly affected by a health promotion nursing intervention. **Recommendation**: Providing further health promotion nurse intervention for elderly with cardiovascular diseases in all health care facilities.

Key Words: Health promotion, Functional status, CVD, Elderly.

Introduction:

Aging is the most important risk factor for the development of cardiovascular disease (CVD) because of the lifelong exposure to various cardiovascular risk factors and specific environmental alterations affecting the heart and the vasculature **(Costantino, et al., 2016 and Greco, et al., 2015)**.

Globally, cardiovascular disease is a multifactorial disease that represents a serious life-threatening health issue and health-care cost among elderly which affecting approximately 80% of older adult population **(Webster, et al., 2017).**

Cardiac aging manifests as a decline in function leading to heart failure. Vascular aging is a major risk factor for CVD, refers to the structural and functional defects that occur in the aorta during the aging process. It's important to consider that aging and heart disease are the main health care burdens; therefore it is particularly important to find effective therapies to restore the function of aging heart (**Ding, et al., 2018)**.

There is an enormous opportunity to foster successful aging and increase functional life years through expanded efforts aimed at CVD prevention, including an assessment of the impact of CVD on mortality, morbidity, and health care costs **(Ali & Anne, 2010**).

Therefore, promotion of cardiovascular health requires a multi-sector strategy that promotes a healthy lifestyle, reduces cardiovascular risk factors, and cuts mortality and morbidity through quality health care services. These proposals should be guided by leaders in the scientific community, government, civil society, the private sector, and local communities **(Fuster & Kelly, 2016).**

Likewise; self-management interventions are conducted to equip patients with the knowledge and skills needed to actively participate in managing their own chronic conditions so they can function optimally via symptom monitoring, medication management, and modification of unhealthy behaviors, such as unhealthy diet, sedentary physical activity, and smoking (**Jonkma, et al., 2016**).

In this context; Gerontological nursing plays a crucial role in the recovery, rehabilitation, and outcomes of geriatric cardiovascular disease (CVD), especially for chronic heart illnesses; and can enhance the outcomes of CVD (**Zhang, et al., 2021**).

Besides, they help in promoting successful lifestyle program including diet, exercise, stress reduction, and social support, not only prevent heart disease but also reverse it. As well as, Gerontological nursing establishes life-sustaining activities, and prevent serious negative functional consequences **(American heart association, 2015).**

Significance of the Study:

Cardiovascular diseases remain the leading cause of death in elderly individuals over 65 years old. Among these diseases congestive heart failure, coronary artery diseases (CAD), hypertension, atrial fibrillation have the greatest significance. Those people who die because of CAD, about 80% belong to the 65+ population. CAD is present in 50% of elderly women and 70%-80% of men **(Gadó, et al., 2022).**

Worldwide, cardiovascular disease (CVD) is responsible for an estimated 17 million deaths and leading to 151 million disability-adjusted life years (DALYs) lost (30.0% of all deaths and 14.0% of all DALYs lost). So it is considered a leading cause of morbidity, disability, and mortality. Further, by 2020, 32.0% of the world population deaths caused by CVD while by 2030; it will be responsible for 33.0% of all deaths (24.2 million) (**El-Moselhy, et al., 2018).**

In Egypt, World Health Organization Ranking (WHOR) showed in 2014 that CAD deaths reached 107,232 (23.14%) of all deaths. Age adjusted death rate is 186.36/100,000 population; this ranks Egypt population as #23 in the world. CAD deaths were 78,897 (21.73%) of all deaths, which make CAD the first killer in Egypt in 2013 **(WHOR, 2013).**

Elderly patients with heart conditions may have different responses to health promotion disease self-management interventions, so this study suggested assessing the effect of health promotion nursing interventions on functional status among elderly with cardiovascular diseases.

Aim of the Study

General objectives:

Assess the effect of health promotion nursing interventions on functional status among elderly with cardiovascular diseases.

Specific objectives:

1. To assess level of knowledge regarding cardiovascular disease among elderly.
2. To investigate whether providing health promotion nursing intervention sessions can promote functional ability among cardiac elderly patients.
3. Plan, implement and evaluate health promotion nursing interventions for elderly patients with cardiovascular diseases based on their assessed needs.

Study hypothesis:

- **Hypothesis:**

Health promotion nursing interventions will improve the functional status of elderly patients with cardiovascular diseases.

- **Null hypothesis:**

Health promotion nursing interventions will not improve the functional status of elderly patients with cardiovascular disease.

Subjects and Method

Research design:

Quasi-experimental research design was used.

Setting:

The study was conducted in the inpatient wards and cardiac outpatient clinics at Al-Orman hospital in Assiut University Hospitals which showed a higher flow rate of elderly.

Sample:

Systemic random sample of 70 elderly participants aged 60 years and older who suffer from cardiovascular diseases attended to the previously mentioned settings during years of 2020 and 2021. The sample size was calculated by EP/Info version 3 with 95% confidence interval that estimated by 70 elderly which equally divided into two groups of elderly include 35 for both study and control group.

Inclusion criteria:

- Elderly with stable health condition.
- Alert and able to communicate.

Tools:

Four tools were utilized to collect data for this study:

Tool I: Structured interview Questionnaire:

It was designed by the researcher to gather the necessary study data. It include two parts:

- **Part I:** It includes socio-demographic details as age, sex, place of residence, marital status, current or prior occupations, level of education, economic level, living arrangement, and type of family. These data were used to explore whether there was a relation between the demographic data and cardiovascular disease patients' functional status.
- **Part II:** It includes elderly medical history as the type of CVD that the elderly suffer from (medical diagnosis).

Tool II: Comprehensive Heart Disease Knowledge Questionnaire (Bergman, et al., 2011):

It is an evidence-based knowledge assessment consisting of a 30-item questionnaire, with yes or no questions. It can be used by health professionals like primary care providers, cardiologists, and health educators to tailor educational programs to measure participants' heart disease levels of knowledge.

Scoring system:

Based on a "yes/no" scale each correct answer was given 1 point and a wrong answer 0 point. The total score can be calculated by adding the items of the questionnaire together. Patients were scored based on their level of knowledge as satisfactory when obtaining a score of 21-30 (≥70%), while scores of 0-20(>75%) were considered unsatisfactory.

Validity and reliability:

This tool is valid, reliable questionnaire. The overall 30-item scale had an acceptable internal reliability of .73 for

examining group level scores on heart disease knowledge **(Bergman, et al., 2011)**. The current study, Cronbach's alpha reliability value was 0.85.

Tool III: Instrumental Activities of Daily Living Scale (IADL) (Lawton & Brody, 1969):

It is an appropriate instrument to assess independent living skills. It is most useful for identifying how a person is functioning at the present time, and to identify improvement or deterioration over time.

Eight domains of function measured include; communication ability, shopping, preparation of food, housekeeping, laundry, mode of transportation, responsibility for own medications, and financial responsibilities. For women, all 8 categories of function are measured; while for men, food preparation, housekeeping, and laundering are excluded.

Scoring: clients are scored according to their highest level of functioning in that category. A summary score ranges from 0 (low function, dependent) to 8 (high function, independent) for women, and 0 through 5 for men.

Validity and reliability of IADL:

- To determine the validity of the Lawton IADL, the correlation between the Lawton IADL and four scales of functional status was determined. All the correlations were significant at the .01 or .05 level. Inter-rater reliability was found to be .85 **(Graf, 2008)**
- Regarding the reliability of Instrumental Activities of Daily Living Scale (IADL) in the current study, Cronbach's alpha reliability value was 0.81.

Tool IV: The Katz Index of Independence in Activities of Daily Living (Katz ADL):

It is the most suitable tool to assess the client's performance of daily living activities independently, detect problems in performing such activities and to plan care consequently. This index ranks the adequacy of performance in six functions: bathing, dressing, toileting, transferring, continence, and feeding **(Katz, et al., 1970 ; Wallace, 2007**).

Scoring system: Clients were scored yes/no for independence in each of the six functions. A score of 6 indicates full function, 4 indicate moderate impairment, and 2 or less indicates severe functional impairment.

Validity and reliability of ADL:

This tool is internationally recognized and widely used in objective evaluations of chronically ill and aging persons **(Fuentes-García, 2014).**

- Validation of the Katz index in Turkish older adults: Cronbach's α=0.838. The test-retest reliability and inter-rater reliability ICC= 0.999 (95% CI) were excellent. Katz ADL, BI, and SF-36 PF have all been linked significantly (rs=0.988, p 0.001 and, rs=0.674, p 0.001) **(Arik, 2015)**.
- Katz ADL reliability in the current study, Cronbach's alpha value was 0.86.

I- Administrative stage:

An official letter approval was obtained from the Dean of the Nursing Faculty to the directors of out-patients' clinics and inpatients wards at Al-Orman hospital in Assiut University Hospitals. This letter consists of a permission to carry out the study and explained the purpose and nature of the study.

II- Ethical Consideration:

The research proposal was proved from the Ethical committee in the faculty of nursing. There was no risk for study subject during application of the research. The study was following ethical principles in clinical research. Confidentiality and anonymity were assured. Participants had the right to refuse to participate and or withdraw from the study without any rational any time. All study participants perform oral consent after complete explanation of the study aim and procedure.

III- Pilot study:

Pilot study was carried out prior starting of data collection on 10% elderly patients (7) who excluded from the study. The aim of pilot study is to test the clarity of the tool and to estimate the time needed for fulfilling it. Based on the results of pilot study, the necessary modifications in data collection tools were done.

The health promotion program:

The program was developed based on relevant literature, and **Custódio, et al., 2015**, s integrative review on health promotion initiatives for cardiovascular disease patients. Custódio listed the following as heart disease patients' health promotion activities:

1. **Teaching:** This is an important tool for assisting clients and their families in creating healthy lifestyle habits, changing ingrained patterns of behavior, and maintaining self-monitoring.
2. **Physical exercise programs:** To ensure better physical, mental and social state, to regain maximum functional level.

A simple educational booklet containing knowledge about cardiovascular diseases, risk factors, causes, symptoms, complications, management, nursing intervention, health promotion, and preventive measures was designed and distributed to the elderly participants.

General objective of program:

Improve functional status of elderly with cardiovascular diseases.

Specific objectives:

To detect the effect of health promotion nursing intervention on functional status among elderly with CVD.

The program stages:

It was carried out into four stages:

Assessment stage:

In the first meeting with the patients, the researchers introduced themselves to the participants, shed light on the nature and the purpose of this study. Participations' approval was obtained. Each elderly was interviewed individually by the researchers to gather demographic and clinical data of patient using **tool I, tool II: Comprehensive Heart Disease Knowledge Questionnaire** to evaluate the elderly's knowledge of CVD, **tool III: IADL** to assess independent living skills and **tool IV: The Katz ADL,** to measure the elderly ability to perform activities of daily living independently.

Based on pretest assessment of elderly participants with cardiovascular disease, the program was designed.

Planning stage:

The arrangement of conducting the program was done during this stage; the sessions and time of the program decided. Other facilities were checked and arranged as the teaching place, and teaching methods.

Teaching time: the time of teaching was decided according to the elderly time and the coordination between the researchers and health care team.

Teaching methods and materials: The simple teaching methods were prepared; as discussion, power point presentation, demonstration, and media as pictures, handouts, posters and videos.

Implementation stage:

The elderly with cardiovascular diseases were the target audience for the program. The program's sessions are organized by the researchers. Patients in the study group were divided into small groups (12 group) based on the available timing and readiness to present preparation. The study group elderly were attending one session of 30:45 minutes per week for six weeks period in a variety of numbers ranged between (2-3) in each day according to the date of first interview. A 10 minutes break was taken in between each session.

- **The 1st session:** At the beginning of this session, the researchers explained the objectives of the health promotion program and the teaching topic, obtained participation approval, and assessed the elderly participants' basic knowledge.
- **The 2nd session:** The elderly participants were given clear information regarding CVD, including its definition, different forms, causes, risk factors, changes brought on by ageing, clinical manifestations, and complications.
- **The 3rd session**: It included instruction on proper nutrition for cardiac health, such as recommending elderly people to consume a balanced diet. Choose monounsaturated and polyunsaturated fats from fatty fish, avocados, flaxseed, soy, nuts, seeds, and canola oils. In addition, The researchers determine body mass index (BMI) and provide information on how to maintain a healthy weight and lifestyle, which may be done by eating enough calories, engaging in cardio endurance exercise, and obtaining enough sleep.
- **The 4th session**: The researchers explaining the importance of practicing regular exercise as perform of aerobic exercise and resistance training that help in improving the circulation, which results in lowered blood pressure and heart rate. Also it may help raise high-density lipoprotein (good cholesterol) and lower low-density lipoprotein (bad cholesterol).
- **The 5th session:** It include information on smoking cessation and stress management, because of stress and smoking are the top risk factors for heart diseases when damages the structure and function of the blood vessels so that; smoking cessation will improve cardiovascular health.
- **The 6th session:** The researchers used this time to demonstrate aerobic and resistance exercises to the elderly participants. In order to promote cardiovascular health more widely, increase medication adherence, and maintain regular follow-up, they introduce elderly participants to health services and appropriate public policies.

At the end of each sessions, a summary was given by the researchers and highlighting the most important topics. Before the starting of next session, patients were asked questions related to the topics discussed in the previous session to identify their learning achievement. These sessions were repeated for every new group of studied elderlies. This period lasts 8th weeks.

Evaluation stage:

The evaluation was conducted at cardiac out patients' clinics and inpatients wards in Al-Orman hospital in Assiut University Hospitals for both study and control group. It was done two times, first evaluation was after (8th Wks.) two months (posttest) and the second evaluation follow-up was after (12th Wk.) three months from program implementation. The patients were evaluated by using **tool II: Comprehensive Heart Disease Knowledge Questionnaire** to evaluate the elderly's knowledge of CVD, **tool III: IADL** to assess independent living skills and **tool IV: The Katz ADL,** to measure the elderly ability to perform activities of daily living independently.

The program implementation lasted 7 months from the beginning of December 2020 and ending in late June 2021 when data collection to its session's termination with the last participant. With the end of the current study, All elderly participants in the control group received the health promotion booklet.

Statistical analysis:

Data entry and analysis were done using SPSS version 22 (Statistical Package for Social Science). Data were presented as a number, percentage, mean, and standard deviation. Chi-square and one sample T tests were used for analysis of variables. P-value considered statistically significant when $P < 0.05$.

Results:

Table 1: Displayed that the majority (80.0%) of the study group aged 65-69 yrs. old, while 52.6% of the control group aged 70 yrs. and older, most of the study and control group (71.4% and 60%) were male, respectively. According to residence, 42.9% of the study group and 71.4% of control group lives in the rural area. Also; 80% of the study groups and 54.3% of control groups had low income level.

Figure 1: Presented that 34.3% of the study group diagnosed with myocardial infarction and heart failure while 40.0% of the control group diagnosed with myocardial infarction.

Figure 2: Illustrated that 45.7% and 42.9% of both study and control groups were obese, respectively.

Table 2: Indicated that statistically significant difference in the study group's knowledge level between the pre and posttest.

The study group's score for a satisfactory knowledge level increases from 31.4 % on the pretest to 80.0 % on the posttest and, similarly, 74.3 % on the follow-up test.

Table 3: Cleared that highly statistically significant difference at P<0.000* between both study and control groups regarding the patient's full function ADL level with a mean (22.8±0.92 and 10.6±4.01), respectively.

Figure 3: Showed that the study group's full functional level (ADL) was increased from 26.6% in pretest to 80% in post and follow up test.

Table 4: Revealed that the difference between the study and control groups for IADL was highly statistically significant (P <0.0001).

Table 5: Presented that statistical significant difference between the study participant's knowledge level and their age, residence and education with P<0.000, P<0.010 and P<0.008, respectively.

Table 6: Explained that elderly in the study group who had satisfactory knowledge levels achieved mean±SD 22.8±0.92 and those who had unsatisfactory knowledge achieved mean±SD 10.6±4.01; this difference between study group patients' full function level and knowledge levels was highly statistically significant (P 0.001).

Figure 4: Illustrated that positive statistical correlation was proved between ADL, IADL and cardiac diagnosis among the study group with y=0.989.

Figure 5: Recorded that high function level of the study group based on IADL increase from 33.3% in pretest to 71.4% in posttest and 72.0% in follow up test.

Figure 6: Demonstrated that positive statistical correlation among ADL, IADL and knowledge level for the study group throughout program phases with P<0.000.

Table (1): Socio-Demographic Characteristics of Study and Control Groups Elderly with CVD, 2021.

Socio-demographic variables	Study (n=35)		Control (n=35)	
	No	%	No	%
Age group				
• 60- 69 years	28	**80.0**	18	47.4
• ≥70 years	7	20.0	17	**52.6**
Mean± SD	62.70±5.10		64.60±6.52	
Gender				
• Male	25	**71.4**	21	**60.0**
• Female	10	28.6	14	40.0
Marital status				
• Married	27	77.1	30	85.7
• Un married	8	22.9	5	14.3
Residence				
• Urban	20	57.1	10	28.6
• Rural	15	**42.9**	25	**71.4**
Education				
• Illiterate	5	14.3	7	20.0
• Reade and write	7	20.0	15	42.9
• Basic education	16	45.7	12	34.3
• University education	7	20.0	1	2.8
Occupation				
• Farmer	7	20.0	9	25.7
• Other jobs	12	34.3	8	22.9
• Housewife	6	17.1	10	28.6
• Retired	7	20.0	7	20.0
• Other	3	8.6	1	2.8
Family type				
• Simple	20	57.1	8	22.9
• Extended	15	42.9	27	77.1
Income				
• High	7	20.0	16	45.7
• Low	28	80.0	19	54.3
Smoking status				
• Yes	11	31.4	21	60.0
• No	24	68.6	14	40.0
Practicing regular exercises				
• No	35	100	35	100

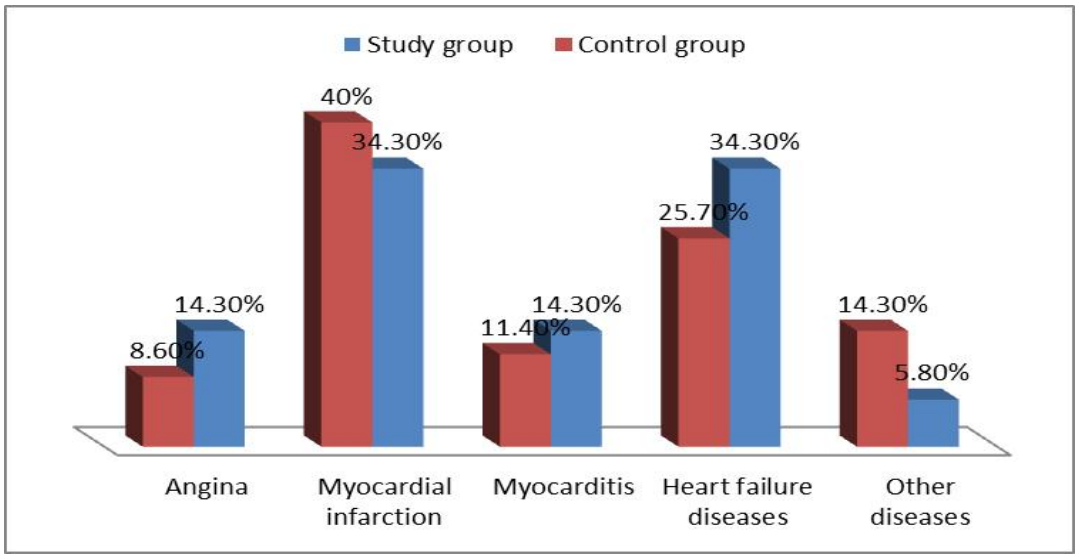

Figure (1): Distribution of CVD Diagnosis among Elderly Patients in Both Study and Control Groups, 2021.

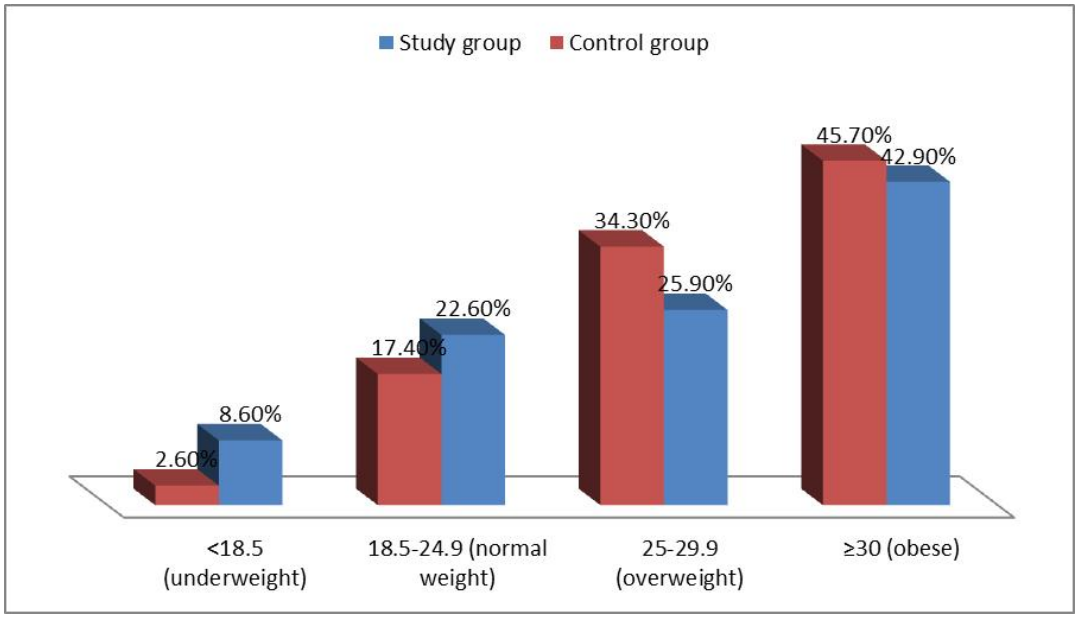

Figure (2): Display of Body Mass Index Among Study and Control Groups of Elderly with CVD, 2021.

Table (2): Distribution of CVD Elderly Patient's Knowledge Level Through Pre, Post and Follow Up Test for Both Study and Control Groups, 2021.

Knowledge level	Study (n=35)						P-value 1	P-value 2	Control (n=35)				P-value 3
	Pretest		Post test		Follow up				Pretest		Follow up		
	No.	%	No.	%	No.	%			No.	%	No.	%	
Satisfactory level	11	31.4	28	**80.0**	26	**74.3**	**0.000***	0.274	10	28.6	14	40.0	0.313
Unsatisfactory level	24	68.6	7	20.0	9	25.7			25	71.4	21	60.0	

P-value 1: Relation between pretest score and post test score for study group.
P-value 2: Relation between posttest score and follow up test score for study group.
P-value 3: Relation between pretest score and follow up test score for control group.

Table (3): Distribution of Functional Level as Regards Activity of Daily Living Among Study and Control Groups of Elderly with Cardiovascular Diseases, 2021.

Functional level	Study (n=35)	Control (n=35)	P. value
	Mean ±SD	Mean ±SD	
Full function	**22.8±0.92**	10.6±4.01	<0.000*
Moderate functional impairment	11.97±0.18	6.27±2.08	<0.047*
Sever functional impairment	3.83±0.7	2.17±0.53	<0.0001*

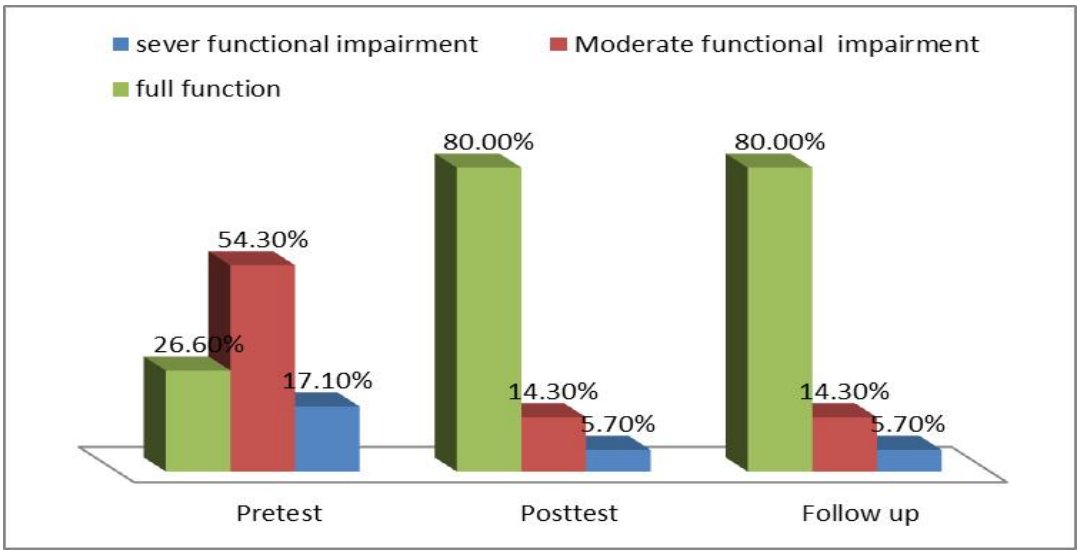

Figure (3): Distribution of the Study Group Patient's Functional Level in Pre, Post, and Follow Up Test, 2021.

Table (4): Distribution of Instrumental Activity of Daily Living for Both Study and Control Groups of Elderly with CVD, 2021.

Instrumental activity daily living	Study	Control	P. value
	Mean ±SD	Mean ±SD	
Low function (dependent)	19.93±2.29	7±1.88	<0.0001*
Limited function	20.17±2.56	6.83±1.29	<0.000*
High function (independent)	24.5±3.08	8.47±1.7	<0.000*

Table (5): Relation between Socio-Demographic Characteristics of Study Group and Their Knowledge Level in Posttest, 2021.

Socio-demographic variables	Knowledge level				P. value
	Satisfactory level (n=28)		Un satisfactory level (n=7)		
	No	%	No	%	
Age group					
• 60- 69 years	26	92.9	2	7.1	**0.000***
• ≥70 years	2	28.6	5	71.4	
Mean±SD	62.70±5.10		64.60±6.52		
Gender					
• Male	20	80.0	5	20.0	0.639
• Female	8	80.0	2	20.0	
Marital status					
• Married	24	88.9	3	11.1	**0.015***
• Un married	4	50.0	4	50.0	
Residence					
• Urban	19	95.0	1	5.0	**0.010***
• Rural	9	60.0	6	40.0	
Education					
• Illiterate	1	20.0	4	80.0	**0.008***
• Reade and write	6	85.7	1	14.3	
• Basic education	15	93.7	1	6.3	
• University education	6	85.7	1	14.3	
Occupation					
• Farmer	4	57.1	3	42.9	0.430
• Technical	11	91.6	1	8.3	
• Housewife	5	83.3	1	16.7	
• Retired	6	85.7	1	14.3	
• Other	2	66.7	1	33.3	
Smoking status					
• Yes	7	63.6	4	36.4	0.101
• No	21	87.5	3	12.5	

Table (6): Relation between Study Group Elderly Patients' Functional Level and their knowledge level in posttest.

Functional level	knowledge level		P. value
	Satisfactory level (n=28)	Un satisfactory level (n=7)	
	Mean ±SD	Mean ±SD	
Full function	**22.8±0.92**	10.6±4.01	<0.001**
Moderate functional impairment	11.97±0.18	6.27±2.08	<0.001**
Sever functional impairment	3.83±0.7	2.17±0.53	<0.001**

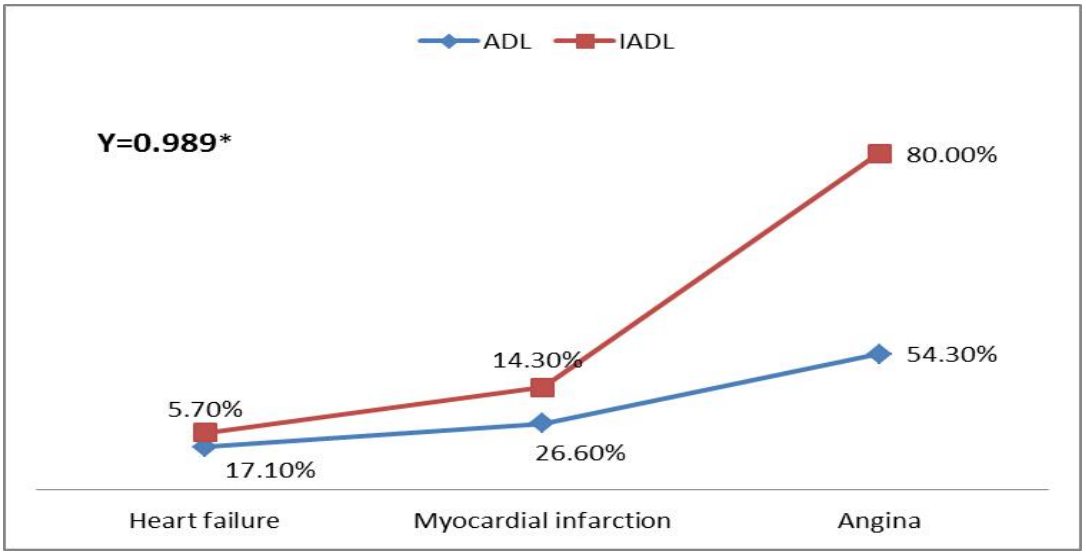

Figure (4): Correlation between ADL, IADL and CVD Diagnosis among Study Group of Elderly, 2021.

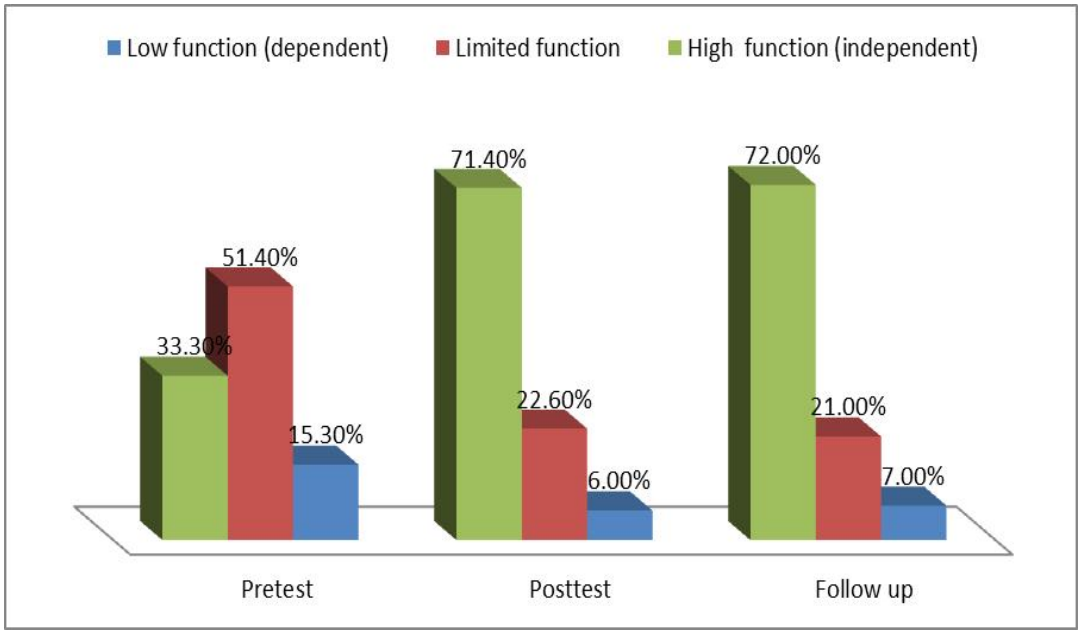

Figure (5): Distribution of IADL level among Study Group Elderly Patients in Pre, Post, and Follow Up Test after Program Intervention, 2021.

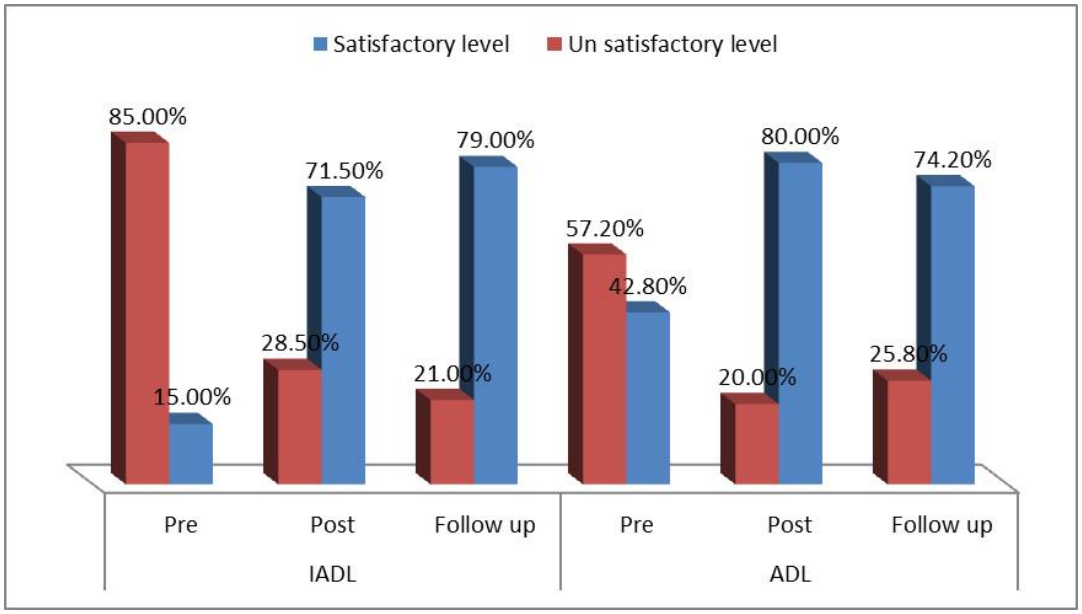

Figure (6): Correlation among ADL, IADL and Knowledge Level of Study Group in Pre, Post and Follow Up test, 2021.

Discussion

Elderly age 65 and older are more likely than younger people to suffer from cardiovascular disease (CVD), which is problems with the heart, blood vessels, or both. Aging can cause changes in the heart and blood vessels that may increase a person's risk of developing cardiovascular disease **(Arjunan & Souza, 2021)**. Therefore, health promotion nursing intervention of the elderlies with CVD can be feasible methods in improving their cardiac fitness, and maintaining physical independence.

The current study showed that more than three quarters of studied elderly aged between 60<70 years old with the mean score of age was (62.70± 5.10). These results are in agreement with **Wu, et al., (2016)** who studied health related quality of life, functional status and cardiac event free survival in patients with heart failure. They noted that the mean score of age was (62±11).

On the other hand, the present study results disagree with **Kantoch, et al., (2018)** who studied treatment of cardiovascular diseases among elderly residents of long-term care facilities and recorded that average age was 76.3±11.2 years old.

As regard gender, the current results showed that more than two thirds of the elderly participant were males; this may be due to elderly men have heavy work that affect their cardiovascular health status and increase in smokers among the male. This result agrees with **Wu, et al., (2016)** who reported that more than two thirds of the elderly were males. In addition to **Arjunan & Souza, (2021)** who studied Efficacy of nurse-led cardiac rehabilitation on health care behaviors in adults with chronic heart failure. They reported that more than third quarter was males.

On the other hand, the results disagree with **Kantoch, et al., (2018)** who reported that about two thirds of the studied elderly was females. Also, this study was confronted with **Van-Dam, et al., (2018)** who studied geriatric rehabilitation in older patients with cardiovascular disease: and reported that more than half of the studied elderly were females. Also, our result is in confronted with **Anh-Luu, et al., (2015)** who studied self-management of heart diseases among elderly. They reported that slightly more than half of the participant elderly were females.

As regard residencey, the results of the present study revealed that more than half of the studied elderly were from urban areas. This result agrees with **Mahros, et al., (2013)** who studied Impact of a Designed Nursing Intervention

protocol on Myocardial Infarction Patient's Outcome at a selected University Hospital in Egypt (shows that, 52.5 % of study sample's age ranged from>50 to65 years). They showed that the majority of studied subjects came from urban areas. These result are also supported with **Arjunan & Souza, (2021)** who reported that half of the studied elderly came from urban areas.

According to the level of education, the results of the current study revealed that more than one third of the participants were not educated; however, almost half of the studied elderly had basic education, this may be due to that the none educated people don't had health awareness regarding their self and not seeking help as early as possible in reverse to literate ones.

These results are supported by **Mahros, et al., (2013)** who revealed that more than one third of the studied subjects were able to read and write. In contrast, these results disagree with **Arjunan & Souza, (2021)** who reported that more than two thirds of the participants had high levels of school and colleagues

As regard marital status, the results of the present study revealed that more than three quarters of the studied elderly were married. This result disagrees with **Anh-Luu, et al., (2015)** who found that less than half of the elderly participant in the study were married.

As regard income, the results of the present study documented that more than three quarters and more than half of the study and control group of elderly participant, respectively had low income. This result disagrees with **Anh-Luu, et al., (2015)** who found that one third of the participant elderly had an income below the country threshold. On the other hand the results are confronted with **Arjunan & Souza, (2021)** who found that more than two fifth of the participant elderly had low income, respectively.

Regarding cardiovascular diseases, the result of the present study showed that about half (34.3%) (14.30%) of the study group diagnosed with myocardial infarction and angina respectively & (34.30%) was diagnosed with heart failure. This result is supported by **Kantoch, et al., (2018)** who reported in their study that more than half was diagnosed with coronary artery diseases and more than two fifth was diagnosed with heart failure. In addition to **Van-Dam, et al., (2018)** who reported that half of the studied elderly have angina, more than one third have heart failure and two fifth had myocardial infarction.

Regarding the body mass index BMI, the result of the present study showed that more than one third of the studied elderly were overweight, while more than two fifth were obese. Our result is supported by the study conducted by **Van-Dam, et al., (2018)** who reported that more than one fifth of the studied elderly were propensity. Also, the result is supported with **Mahros, et al., (2013)** who reported that two fifth of the studied subjects were overweight and almost one third were moderate obese

The results of the current study revealed that more than two thirds of the elderly subjects had unsatisfactory knowledge levels on the pretest in terms of total knowledge score. This might be because there aren't enough health promotion interventions for the elderly and there's a high level of illiteracy, but after the study group received the health promotion nurse intervention, the majority and roughly a third of the studied elderly conducted satisfactorily on post-tests and follow-up tests, respectively.

Also, These reveals that implementation of health promotion nurse intervention had good impact on their knowledge and improved it. Thus, there was statistically significant difference between total score of knowledge in pre, posttests and follow up.

Mahros, et al. (2013) provided evidence to support the findings of the current study, reporting that respondents with higher total knowledge scores were rated as having satisfactory to good levels of knowledge. However, all the studied subjects (100%) remained with an unsatisfactory knowledge level before receiving the designed nursing intervention.

The result of the present study also supported by **Arjunan & Souza, (2021)** who reported that after the program intervention, which was significantly increased with ($P<0.000$) and a mean difference of 0.840. The posttest mean score and the mean difference was 1.289 from posttest one to posttest two was significantly higher with ($P < 0.000$).

Regarding the daily living activities, the result of the current study revealed that more than half of the studied elderly had moderate functional impairment in pretest. This may be due to fear of elderly from pain and dyspnea with more activities. The mean functional status (ADL) was 11.97+0.18 indicated moderate functional impairment among the studied elderly, while after implementation of the health promotion for most of the study group elderly achieve full function in post-test and follow up test. Hence, there was statistically significant difference between function level in pre, posttests and follow up test.

The results of the present study are consistent with **Van-Dam et al., (2018**), who reported that ADL status on admission was moderate care dependence. Also reported that functional status was poor (Barthel index mean score 14.9) and trend towards even lower scores in patients with heart failure. During the program, functional status improved significantly with clinically relevant extent.

The result of the current study revealed that the mean value of ADL 3.83±0.7 indicated severe functional impairment. And the mean value of IADL was 19.93±2.29 indicated low function (dependent) and 20.17±2.56 indicated limited function. Our result is supported by **Kantoch, et al., (2018)** who reported that the mean value of the Activities of Daily Living score was 2.9 +2.7, and the Barthel Index score was 45.3+ 38.5. In contrast, these results disagree with **WU, et al., (2016)** who report that 16.2+ 12.9 which indicated poor functional status**.**

As regard the impact on functional status of the elderly. The result of the current study reported that full functional level (ADL) of study group increases from 26.6% in pretest to 80% in posttest and 80% in follow up test, this indicate the effectiveness of health promotion nursing interventions on functional status among elderly with cardiovascular diseases.

Furthermore, the results showed that there was positive statistical correlation between ADL, IADL, and cardiac diagnosis of study group y=0.989. This findings agree with **Meng, et al., (2007)** who reported that the multivariate regression model showed nurse intervention resulted in improvement in the number of ADL during the follow up.

Concerning to the instrumental activity of daily living (IADL). The current results noted that increases in the functional level of the study group from 33.3% in pretest to 71.4% in posttest and 72.0% in follow up test. This is a result of elderly people's greater understanding of the value of adopting healthy habits to enhance and improve heart health. This findings approves with **Assmann, et al., (2007)** who study assessing risk of myocardial infarction and stroke and reported that functional level significantly improve after intervention than before by 25%.

Also, the current study revealed that positive statistical correlation between ADL, IADL and knowledge level of study group in pre, post and follow up test. This in the same line with **Meng, et al., (2007)** who observed that there was a positive relation between functional level, activity of daily living and elderly knowledge level.

Conclusion

Based on the results of the present study**,** it could be concluded that more than two third of the studied elderly had unsatisfactory knowledge in pretest, while after implementation of the health promotion nurse intervention for cardiovascular diseases their level of knowledge was improved among the majority of the elderly.

Add to that; Prior to the implementation of the health promotion nursing intervention, more than half of the elderly participants in the study had moderate functional impairment (ADL) and limited function (IADL). However, after the intervention, the majority of the elderly participants' functional status had improved to full function and high independent function.

Recommendations

Based on the results of the present study, the following recommendations were suggested:

1. Apply health promotion nursing intervention for elderly with cardiovascular diseases in all health care facilities
2. Establishment of patients' educational centers in hospitals equipped by suitable related materials, medias, and audio-visual aids for teaching all elderly patients' with cardiovascular disease how to live with their medical condition.
3. Furthers research on a larger probability sample selected from different geographical

areas in Egypt are recommended to obtain more generalizable data.

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