Effect of medical and nursing teaching program on awareness and adherence among elderly patients with chronic heart failure in Assiut, Egypt

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Introduction
Heart failure (HF) among geriatric population is an eminent problem, and patient awareness of the disease and subsequent adherence to the treatment may decrease the burden of this serious problem.
Objective
The purpose of the study is to evaluate the effectiveness of medical as well as nursing teaching program on awareness and adherence among elderly patients with chronic HF.
Patients and methods
The study was carried out in the Internal Medicine Department of Assiut University Hospital. Total coverage sample of elderly patients included 100 patients from both sexes, and their age ranged from 60 to 75 year. The study was carried out in the Internal Medicine Department of Assiut University Hospital. Overall, three tools were used in this study: (a) patient interviewing sheet (pretest and post-test) tool consisting of two parts regarding demographic characteristic and medical data, (b) Atlanta HF knowledge test, and (c) adherence questionnaire.
Results
The main results yielded by the study proved a highly statistically significant difference between pretest and post-test regarding awareness and adherence for patients.
Conclusion and recommendations
This study concluded that the medical and nursing teaching program was effective for awareness and adherence of the patients. More follow-up studies are needed to improve awareness and adherence for older adult patients with chronic HF to prevent complications.

Keywords:
adherence, awareness, chronic heart failure, elderly, medical and nursing teaching program

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Introduction

Chronic heart failure (CHF) is an abnormal clinical syndrome that involves inadequate pumping and/or filling of the heart, which is characterized by typical symptoms (e.g. breathlessness, ankle swelling, and fatigue) and accompanied by signs (e.g. elevated jugular venous pressure, pulmonary crackles, and peripheral edema) that cause the heart to unable to provide sufficient blood oxygen to meet the demands of the tissues. In clinical practice, the terms acute and CHF have been replaced by the term congestive heart failure (HF) because not all HFs involve pulmonary congestion. However, the term CHF is still commonly used. HF is associated with numerous cardiovascular diseases, particularly hypertension, coronary artery disease such as angina, and myocardial infarction [1].

Management of the patients with CHF includes providing health education and counseling about sodium limitation, regular body weight monitoring with signs and symptoms of body fluid retention, encouraging regular exercise, fluid intake restriction, smoking, and alcohol cessation. Medications are prescribed based on the patient's type and severity of CHF [2].

Low adherence to sodium diet intake and failure to medications regimen as directed are the two most common reasons for readmissions of patients with CHF to the hospital [3].

Therefore, it is critical to accurately assess a patient's diet. Diet teaching is essential to the patient's control of CHF. In addition to diet plan programs, evaluating patients' food sociocultural value assists in making

appropriate food choices when developing a diet plan [4].

Medical personnel including doctors and nurses have an important role in educating patients with CHF to manage their disease process independently. Successful management of CHF patients depend on several important principles including patient controlled sings and symptom and self-care management such as diet control regarding salt and water intake through peer restriction, drug regimens, daily weights, and exercise plans. The success of the treatment plans is essential to improve outcome and quality of life [5].

Significance

CHF is the most common heart disease among older adults and is the most common reason for hospital readmission and death worldwide. From the extensive literature review and clinical experience in internal medicine department at Assiut University Hospital, we observed that the patients with HF have significantly increased deterioration of quality of life. These patients are in bad need for teaching program to improve their condition.

Aim

The aim of the study was to evaluate the effectiveness of both medical and nursing teaching program on awareness and adherence among elderly with compensated CHF.

Patients and methods

Design of the research

A prospective nonrandomized controlled observational study was conducted.

Quasi-experimental design was used in this research.

Setting

This study was conducted in the outpatients clinic of Internal Medicine Departments at Assiut University Hospital, Assiut, Egypt.

Patients

Total coverage included 100 older adult patients from both sexes, and their age ranged from 60 to 75 year, collected from May to December 2016. The inclusion criteria were HF patient New York Heart Association class I and II diagnosed by cardiologists, based on signs and symptoms, chest radiography, and ECG, echocardiography. They agreed to participate in the study and ability to communicate and answer the questions. Exclusion criteria were young adults, elderly with psychiatric problems and CHF.

Resting trans-thoracic echocardiography was performed according to American Society of Echocardiography using (Philips Envisor 2002; USA). The procedure was done with a 2.5-MHz multiphase array probe in standard parasternal and apical views according to the recommendations of the American Society of Echocardiography. Ejection fraction (EF) for assessment of cardiac function was assessed using modified biplane Simpson's method from the apical two and four chambers; indeed echocardiography is used also for left ventricular dimensions and valvular assessment [6].

Research hypotheses

HF teaching program will reduce the severity of disease symptoms and will improve awareness and adherence of older adult with CHF, improve quality of life, and reduce rate of rehospitalization.

Study tools

Data pertinent to the study were collected using the following tools.

Patient interviewing sheet (before and after)

Tool I: it was designed by researchers and consists of two parts: part 1 includes demographic characteristics such as age, sex, residence, marital condition, educational level, and occupation, and part 2 includes medical data such as duration of disease, risk factors, smoking, family history, and comorbid chronic disease.

Tool II (Atlanta HF knowledge test): it was developed by Carolyn *et al.* [7]. It is used to assess patients' knowledge regarding HF such as definition of HF, causes, signs and symptoms, complications, and treatment. It consists of 30 questions; six of them were Yes or No quires to measure CHF elderly patients ability to help themselves as regard daily habits which related to heart failure management, e.g., avoid salty foods, drink lots of fluids, stop smoking, etc. The rest of the questions were multiple-choice questions to measure knowledge of elderly people with HF about their disease [7].

Tool III (adherence questionnaire): the questionnaire includes diet, daily physical activities, and drug adherence. Adherence to diet was measured by the Eating Behavior Questionnaire. This consisted of seven points, with a yes or no option, about increase of salt in diet taken by the patients in the past week and

prevented and allowed foods. The second section was for daily physical activities adherence, and included seven items. The third section of the questionnaire (medication adherence) included six items about the reasons for nonadherence included taking medication forgetfulness, being careless, worsening subjective health, and improved subjective health. Scoring was done for each item, yes=1 and no=0. The reliability of test–retest was set at *P* less than 0.0000* (*n*=100) of the study [8].

Method or procedure

Preparatory phase

A review of current and past, local and international related literature such as textbooks, articles, journals, periodicals, and magazines was done. Study tools were formulated and teaching program were designed based on patients' needs. The content was written in simple Arabic language. The instructional booklet includes definition of HF, causes, signs and symptoms, complications, treatment, and therapeutic regimen includes diet, physical activity, and medication.

Procedure/data collection

The program is applied through four stages (assessment, planning, implementation, and evaluation phase).

Assessment phase

The researchers interview each patient individually and explain the nature and purpose of the study. The researchers filled out tools before and after the application of teaching program to assess the awareness of patients and the adherence level by questionnaires.

Planning phase

The arrangement of conducting the program was done during this phase. The sessions and time of the program were decided. The chosen facilities were checked and arranged during this phase such as teaching place, audiovisual aids, and handout.

Teaching time

The time of teaching was decided according to coordination between the researchers and each elderly patient individually.

Teaching place

The study program was conducted in the Internal Medical Department.

Teaching methods and materials

It was important, before implementing the teaching program, to prepare simple teaching instruments and audiovisual aids to be used; as Arabic booklet it waik's gave to each studied patient at first time after filling the preassessment tools by this study researching team for every patient.

Implementation phase

The teaching program was conducting during the period from May to October 2016, three days weekly, and the average number that was interviewed was 3–7 elderly per week. The approximate time spent during filling of sheet was ~30–45 min according to response of patient, and the total number of session was three. The teaching program was implemented for each elderly patient individually at the outpatient clinic of Internal Medicine Department. Before beginning of the first session, an orientation to the program and its purpose was given, and it includes definition of HF, signs and symptoms, risk factors, complications, and preventions. The elderly were informed about time of session taken. Each session started by summary about what was given during previous sessions and objectives of the new topics. Finally, the post-test for patient's awareness and adherence level was implemented by using the same format of the pretest each session to determine the effect of the implemented program.

Evaluation phase

After implementing the educational program for elderly patients, reassessment was done by the post-test to assess participant's awareness and the adherence level.

Ethical considerations

Before the pilot study, ethical approval was obtained from the Scientific Research Ethical Committee of Assiut University, and written informed consent was obtained from each participant after explaining the purpose of the study. In addition, they were assured that anonymity and confidentiality would be guaranteed, and their right to withdraw from the study at any time without any reason was stated.

Statistical design

The obtained data were reviewed, prepared for computer processing, coded, analyzed, and tabulated. Data entry was done using the computer software package, whereas statistical analysis was done using the SPSS 16.0 statistical software package (SPSS Inc., Chicago, Illinois, USA). Data were presented using descriptive statistics in the form of frequencies and percentages, means, standard deviations, and using chi-square test.

Statistical correlation between awareness and adherence was considered at *P* less than 0.05.

Result

Table 1 shows the age range from 60 to 75) year, with mean age of 65.5±5.3 years. Approximately half (51.0%) of them were male, and more than two-thirds (65.0%) of them were from urban areas. Also, more than three-quarters (77.0%) of them were married, and most of them (80.0%) were not working.

Table 2 illustrates that the duration of HF ranged from 3 to 12 years, with the mean±SD of 4.1±3.3 years, and the highest percentage of patients were smokers, had chronic disease, and had no family history of the similar condition.

Figure 1 shows that less than three-quarters (73.0%) of patients had poor awareness level before application of teaching program, whereas only 9.0% of them had good adherence. Regarding adherence to therapeutic regimen, two-thirds (63.0%) of the patients had good level after application of teaching program, and only 7.0% of them had poor adherence level. There was a statistically significant difference between pretest and post-test regarding awareness and adherence for the studied sample.

Table 3 demonstrates that correlation between patients' awareness and adherence, before and after application of the teaching program, there is a statistically significant difference (P=0.001**.)

Table 1 Demographic characteristics for studied sample

Demographic characteristics	*N*=100 [*n* (%)]
Age (years)	
Range	60–75
Mean±SD	65.5±5.3
Sex	
Male	51 (51.0)
Female	49 (49.0)
Residence	
Urban	65 (65.0)
Rural	35 (35.0)
Marital status	
Married	77 (77.0)
Widowed	23 (23.0)
Education	
Illiterate	20 (20.0)
Read and write	35 (35.0)
Basic education	35 (35.0)
Secondary/university	10 (10.0)
Occupation	
Worked	20 (20.0)
Not worked	80 (80.0)

between awareness and adherence before and after teaching program application with significant positive correlation after program application.

Table 4 presents that there is a statistically significant difference between awareness level about CHF and their residence and education before the program (P<0.007** and P<0.001**, respectively). However, no statistically significant difference was found between awareness level and their sex, marital status, and occupation in pretest and post-test.

Table 5 demonstrates that there is a statistically significant difference between adherence level about CHF and their residence, education, and chronic illness before the program (P<0.032**, <0.001**, and <0.050*, respectively). However, no statistical significant difference was found between adherence level and their sex, marital status, and occupation in pretest and post-test.

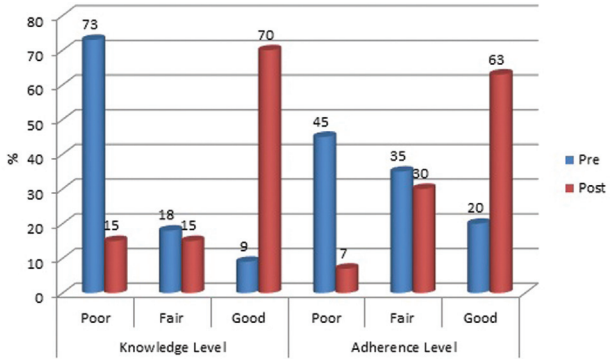
Discussion

CHF is a major health care problem not only for patients but also for their family and society, as it

Table 2 Medical data for studied sample

Medical data	*N*=100 [*n* (%)]
Duration of heart failure (years)	
Range	3–12
Mean±SD	4.1±3.3
Smoking	
Yes	57 (57.0)
No	43 (43.0)
Family history	
Yes	37 (37.0)
No	63 (63.0)
Chronic diseases	
Yes	75 (75.0)
No	25 (25)

Figure 1



Frequency distribution of awareness and adherence level for the studied patients in pre & post teaching program

significant contributes to the large costs associated with the care of patients with CHF. Hospital admissions and costs for CHF have increased over the past two decades to the point where CHF now accounts for 2% of the total health care expenditure [9].

The current study shows that mean age was 65.5±5.3 years; this might be because of some age-related change in cognitive function. The score of knowledge was high in younger elderly than those with advanced age; this age group might have the ability for learning than older ones. The highest percentage was male and married. Moreover, there was a predominance of urban population and those that did not work. Those mostly related to the read and write and basic educational level patients; it was mentioned in many literatures that educated elders can properly identify and help be aware of the important role of social support in realizing the need for increasing contacts with mates, family members, and friends to achieve a highly satisfying life. The current study shows that the highest percentage were smokers, had chronic disease, and had mean duration of HF disease of 4.1±3.3 years.

This study results come in agreement with Roger *et al.* [10] as regard age of the studied patients and the risk factors, he demonstrated that there is increased risk of developing heart failure in patients over 40 years by 20% . 75% of CHF had hypertension as a risk factor followed by heart attack ie ACS, followed closely by diabetes. In addition, Kiernan [11] stated that approximately half of patients with CHF will die within 5 years of diagnosis.

The current study shows that the highest percentages of patients had poor awareness in before the application of teaching program, whereas after application of the teaching program, the highest percentage had good awareness. There was a significant statistically difference between pretest and post-test regarding

Table 3 Correlation between awareness and adherence for studied patients (pretest and post-test)

Adherence level	Awareness level [*n* (%)]							
	Pretest (*n*=100)			*P* value	Post-test (*n*=100)			*P* value
	Poor (*N*=73)	Fair (*N*=18)	Good (*N*=9)		Poor (*N*=15)	Fair (*N*=15)	Good (*N*=70)	
Poor	31 (42.5)	9 (50.0)	5 (55.6)	0.245	3 (20.0)	3 (20.0)	1 (1.4)	<0.001**
Fair	30 (41.1)	3 (16.7)	2 (22.2)		11 (73.3)	8 (53.3)	11 (15.7)	
Good	12 (16.4)	6 (33.3)	2 (22.2)		1 (6.7)	4 (26.7)	58 (82.9)	
Total	45 (100)	35 (100)	20 (100)		7 (100)	30 (100)	63 (100)	

Table 4 Relation between awareness level about chronic heart failure and their demographic characteristics

Demographic characteristics	Awareness level about chronic heart failure [*n* (%)]							
	Pretest			*P* value	Post-test			*P* value
	Poor (*N*=73)	Fair (*N*=18)	Good (*N*=9)		Poor (*N*=15)	Fair (*N*=15)	Good (*N*=70)	
Residence								
Urban	41 (63.1)	15 (23.1)	9 (13.8)	0.007**	4 (6.3)	8 (12.7)	51 (81.0)	0.002**
Rural	32 (91.4)	3 (8.6)	0 (0.0)		11 (29.7)	7 (18.9)	19 (51.4)	
Marital status								
Married	59 (76.6)	11 (14.3)	7 (9.1)	0.205	13 (16.5)	12 (15.2)	54 (68.4)	0.710
Widowed	14 (60.9)	7 (30.4)	2 (8.7)		2 (9.5)	3 (14.3)	16 (76.2)	
Education								
Illiterate	18 (90.0)	1 (5.0)	1 (5.0)	<0.001**	4 (20.0)	2 (10.0)	14 (70.0)	0.603
Read and write	25 (75.8)	8 (24.2)	2 (6.1)		6 (18.2)	7 (21.2)	20 (60.6)	
Basic education	27 (73.0)	7 (18.9)	1 (2.7)		5 (13.5)	5 (13.5)	27 (73.0)	
Secondary/university	3 (30.0)	2 (20.0)	5 (50.0)		0 (0.0)	1 (10.0)	9 (90.0)	
Occupation								
Work	16 (80.0)	3 (15.0)	1 (5.0)	0.692	3 (15.0)	3 (15.0)	14 (70.0)	1.000
Not work	57 (71.3)	15 (18.8)	8 (10.0)		12 (15.0)	12 (15.0)	56 (70.0)	
Family history								
Yes	17 (68.0)	4 (16.0)	4 (16.0)	0.367	0 (0.0)	4 (17.4)	19 (82.6)	0.072
No	56 (74.7)	14 (18.7)	5 (6.7)		15 (19.5)	11 (14.3)	51 (66.2)	
Chronic diseases								
Yes	19 (76.0)	2 (8.0)	4 (16.0)	0.157	5 (18.5)	2 (7.4)	20 (74.1)	0.404
No	54 (72.0)	16 (21.3)	5 (6.7)		10 (13.7)	13 (17.8)	50 (68.5)	

**$P<0.01$, statistically significant difference.

Table 5 Relation between adherence level about chronic heart failure and their demographics

Demographic characteristics	Adherence level about chronic heart failure [*n* (%)]							
	Pretest			*P* value	Post-test			*P* value
	Poor (*N*=45)	Fair (*N*=35)	Good (*N*=20)		Poor (*N*=7)	Fair (*N*=30)	Good (*N*=63)	
Residence								
Urban	26 (40.0)	21 (32.3)	18 (27.7)	0.032*	4 (6.3)	14 (22.2)	45 (71.4)	0.065
Rural	19 (54.3)	14 (40.0)	2 (5.7)		3 (8.1)	16 (43.2)	18 (48.6)	
Marital status								
Married	33 (42.9)	30 (39.0)	14 (18.2)	0.302	4 (5.1)	27 (34.2)	48 (60.8)	0.105
Widowed	12 (52.2)	5 (21.7)	6 (26.1)		3 (14.3)	3 (14.3)	15 (71.4)	
Education								
Illiterate	10 (50.0)	6 (30.0)	4 (20.0)	<0.001**	2 (10.0)	6 (30.0)	12 (60.0)	0.777
Read and write	16 (45.7)	16 (45.7)	3 (8.6)		3 (9.1)	12 (36.4)	18 (54.5)	
Basic education	19 (54.3)	11 (31.4)	5 (14.3)		1 (2.7)	10 (27.0)	26 (70.3)	
Secondary/university	0 (0.0)	2 (20.0)	8 (80.0)		1 (10.0)	2 (20.0)	7 (70.0)	
Occupation								
Work	8 (40.0)	8 (40.0)	4 (20.0)	0.853	0 (0.0)	6 (30.0)	14 (70.0)	0.378
Not work	37 (46.3)	27 (33.8)	16 (20.0)		7 (8.8)	24 (30.0)	49 (61.3)	
Family history								
Yes	10 (40.0)	9 (36.0)	6 (24.0)	0.794	0 (0.0)	5 (21.7)	18 (78.3)	0.144
No	35 (46.7)	26 (34.7)	14 (18.7)		7 (9.1)	25 (32.5)	45 (58.4)	
Chronic diseases								
Yes	6 (24.0)	12 (48.0)	7 (28.0)	0.050*	0 (0.0)	11 (40.7)	16 (59.3)	0.129
No	39 (52.0)	23 (30.7)	13 (17.3)		7 (9.6)	19 (26.0)	47 (64.4)	

*$P<0.05$, statistically significant difference. **$P<0.01$, statistically significant difference.

awareness for the studied sample. In this regard, Abd El-Hameed *et al.* [12] supported these result when reporting that a higher statistically significant difference was present between patients knowledge score before and after exposure to the nursing designed protocol.

In agreement with this, Hussain and Mohamed [13] reported that there was significant improvement in patients' knowledge after the implementation of the nursing teaching program for hypertensive patients. The current study's results agree with Heydari [8] who found that awareness of disease and adherence to physical activity were low in most patients. It is recommended that studies should be conducted to explore effective educational programs and develop strategies to improve adherence to therapeutic regimen among patients with cardiac disease.

The current study shows that the highest percentage of patients had poor adherence before the application of teaching program, whereas after the application of teaching program, the highest percentage had good adherence. There was a significant statistical difference between pretest and post-test regarding adherence for the studied sample.

This study finding is in line with Smeltzer and Bare [14] who emphasized that the teaching care plan involves patient education and implementation in the therapeutic regimen to promote adherence. When the patient understands that the diagnosis of CHF can be successfully managed with changes in lifestyle and medications regimen, it leads to less of recurrences HF attack, decrease in hospitalizations, and increase of life expectancy. Patients and their families need to be taught to follow the medication regimen as prescribed, maintain a low-sodium diet, take routine body weights, engage in physical activity, and recognize symptoms that indicate worsening CHF. Interventions that may promote adherence include teaching to ensure accurate understanding [14].

The current study shows a statistically significant difference between awareness and adherence after application of teaching program. This finding was consistent with Heydari *et al.* [8] who revealed that awareness about HF disease may play an important role in patient adherence, and adherence is very important for self-care element in patients with CHF. A significant correlation was found between knowledge and adherence. Awareness about the HF disease is a key factor for patient's drug adherence. In contrast with other studies, Nieuwenhuis *et al.* [15] found no significant relationship between knowledge and adherence to the treatment regimen. Lennie *et al.* [16] added that only few patients who had knowledge about the HF disease followed their adherence to therapeutic regimen.

Residence as shown in our study had a significant effect on both patient awareness and hence adherence to therapy, as urban patients had higher level of awareness and adherence than rural patients. However, with the application of teaching program, it had significant effect on both rural and urban population regarding awareness and adherence, but still urban population had the higher level of awareness and adherence. This is explained by medication feasibility and high educational level, more healthy life style, different demographics, and health behaviors in urban than rural areas. Additionally, rural patients have less access to cardiologists.

This was in agreement with Young *et al.* [17], who founded that patients with HF discharged from rural hospitals had a higher 30-day hospital readmission and mortality than those from urban hospital, which may indicate poor awareness and adherence of rural patients.

On the contrary, level of education was a very significant parameter in awareness and adherence of our patients to their treatment in before and after application of teaching program, as we had a high percentage of illiterate population (20%) that had a negative correlation with awareness and adherence. However, after the teaching program application, there was an insignificant difference between patient categories regarding education level, as there was improvement in awareness and adherence level among illiterate patients.

Conclusion

After application of medical and nursing teaching program shows a significantly improvement in patient's awareness of disease and adherence among older adult patients with HF. The patients' awareness has led to a better change in their practice and has increased in their adherence. Finally, medical professionals with the nursing team in HF clinics integrating the multidisciplinary team have an essential role in the follow-up and management of patients. This approach aims at the permanent training, improvement, and evaluation of self-care abilities, which include weight monitoring, sodium and fluid restriction, physical activities, regular use of medications, monitoring of signs and symptoms of worsening, and the early seeking of medical help.

Recommendations

Further cohort studies on a larger scale are required to improve awareness and adherence among geriatric populations with CHF.

Providing an in-service training program for medical personnel to increase knowledge and adherence about CHF disease is also needed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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