Critical Care Nursing

Iran J Crit Care Nurs 2013;6(1):29-38

Journal home page: www.inhc.ir

Assessment of the effect of patient's education and telephone follow up by nurse on readmissions of the patients with heart failure

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ARTICLE INFO

Article type:
Original article

Article history:
Received: 16 Dec 2012
Revised: 24 Jan 2013
Accepted: 6 Apr 2013

Key words:
Heart failure
Discharge Education
Telephone follow up by nurse
Readmissions

ABSTRACT

Aims: This study has been done with the aim of assessing the effect of patient's education and telephone follow up by nurse on readmissions of the patients with heart failure.

Method: In this experimental study that had been done in 2011, 189 heart failure patients hospitalized in Shahid-Rajayee cardiovascular hospital were selected by purposive sampling method and they were randomly divided into 3 control or intervention groups .The control group received only hospital routine care. The first intervention group received one hour face to face education and one educational researcher made booklet at the time of discharge. Second intervention group in addition to receiving one hour face to face education and educational booklet at the time of discharge, received telephone follow up by nurse for the next 3 months. Data collection tools included demographic questionnaire and readmission check lists. Data were analyzed by statistical tests and $spss_{16}$ software.

Findings: Patient's education during discharge and telephone follow up after discharge decrease readmission level significantly. After 3 months of follow-up there was significant difference respectively for hospital, clinical and doctor's office readmissions (p=0.06), (p=000) (p=000) between groups.

Conclusion: Patients' rapid follow up after discharge can be suggested as away in order to decrease readmissions.

Please cite this paper as:
Shojaee A., Nehrir B., Naderi N., Zareyan A. Assessment of the effect of patient's education and telephone follow up by nurse on readmissions of the patients with heart failure. Iran J Crit Care Nurs 2013; 6(1):29-38.

1. Intrudoction

Heart failure is the most common reasons for hospital admissions. Patients suffering from this disease are at high risk for readmission after discharge [1]. Heart failure impressed many people all over the world and it is expected totally that with population aging and improvement in the survival rate of the patients after myocardial infarction, number of the of the people suffering from heart failure increases [2]. More than 5 million of Americans suffer from this disease and from 1979 to 2003

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hospital discharges with diagnose of heart failure has increased from 399000 to 109300 that this level shows 174 percent increase. Despite medical advances specially using Angiotensin converting enzyme inhibitory, Beta, Angiotensin Antagonists of the patients suffering from heart failure have more than 12 to 15 million visits and 6 and half million hospitalization in the hospital annually [3]. Direct and indirect costs due to this disease in America have been estimated 32 billion dollars annually [4].

Complex and progressive nature of heart failure disease lead to an adverse outcomes that readmission of the cost is the best complication due to this disease. Patients hospitalized in the hospital with heart disease are at the risk of readmission with the level higher than 50% during six months after discharge from the hospital [2, 3]. Readmission for a short time after hospital is an expensive and common problem especially for the people with chronic diseases. Totally in medical cares, 37% of the costs are for taking care of the hospitalized patients that readmissions have important share in these costs, because 18% of the patients after 30 days after discharge are readmitted that has a cost of over 15 billion dollars. According to the recent findings 22% of the admitted patients in public hospitals in 30 days after discharge die or readmit again or refer to emergency ward. Studies showed that readmissions are mostly due to complications and medical errors, lack of follow up care of the patients, lack of social support, weakness of care quality, lack of patients' perceptions of the guidance during discharge and lack of patients' relationship after their discharge with the hospital. Studies have shown that most of these readmissions are as the result of worsening chronic disease along with insufficient follow-up care after discharge. Although relationship between weak care during hospitalization in hospital and possibility of readmission have been proved, this is one aspect of the problem and studies have shown that direct relationship between lack of effective planning during discharge including patients' education, relationship with the patients and their relatives and supporting them after discharge with readmission probably play more role in readmissions. So it is clear that new and progressed ways are necessary for patients' follow up after their discharge [5, 4].

Level of readmission in 6 months after the first hospitalization due to heart failure is usually between 25 to 50 percent different and almost this level is responsible for 70 percent of the costs. While other studies reported level of readmission for heart failure 50 to 79 percent. Despite this fact that management programs of heart failure disease were with this hope that to improve patients' survival level and to decrease readmission level but level of readmission is still approximately high [2].

Since 60 to 70 percent of health care costs are for heart failure related to readmissions so most of the efforts are for decreasing readmissions risks [1]. It has been estimated that 54 percent of readmissions can be preventable. Inappropriate planning and education during discharge and lack of patients' follow up are as the most important factors for readmission [6]. Having a good perception of the reasons and factors related to readmission of the patient from the patents' point of view and their entourages and also health care providers, increase of the obedience of the patients from medication orders, diet and limitation in fluid intake, request for quick help from the patients, appropriate drug regime, increase in follow up visits and heart failure clinics, drug counseling, visiting in the house, patient's education during discharge, patients' follow up and telephone interventions after discharge from the hospital with having several approaches of management programs along with participation of other medical specialists in managing heart failure disease can lead to better adherence and obedience of the patients from treatment programs, improvement in clinical management and decrease in repetitive readmissions and costs [9-7,3-1].

Patients after discharge have several problems such as problems related to the way of daily

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activities, emotional problems, lack of awareness and knowledge about disease symptoms and complications, lack of sufficient help, lack of awareness about drugs and diet, lack of assurance and stress. In recent years the focus of most of the projects are related to the programs during discharge with the aim of decrease of the complications after discharge [10]. Follow up care immediately after discharge is one of the important ways for helping heart failure patients in order to prevent worsening of heart failure disease and decrease in readmission [10,11]. Among this remote nursing can be useful. Remote nursing that is one of the branches of telemedicine and has been defined in the form of providing patients' health needs, coordination, management and providing care services through information and communication technology in spite of cultural, social, time and geographical barriers [12-14].

Follow up calls not only can be used for helping to assess patients' health condition but also it can be important for that whether the patient has a correct perception of the factors causing heart failure, prognosis and treatment, food limitations, liquids and activities, the importance of taking care of himself/herself and symptoms and signs of heart failure worsening. Although education or writing the guidelines and training materials during hospitalization in the hospital and during discharge of the patients and the people with them are counted as the first basic step for decreasing readmission, these are not enough and the patient should be followed up [6]. Lots of studies have shown the effectiveness of tele-monitoring and telephone interventions after discharge by nurse in heart failure patients [6-4, 15, 10, and 9].

Telephone follow up as an appropriate tools for exchange of information, providing health education and awareness, managing symptoms and signs of the disease, rapid complications diagnosis, ensures and provides care services after discharge [10]. Telephone interventions usually need less complicated sources or instruments in compare with complicated interventions.

Telephone interventions also precede transport and geographic barriers and lead to performing clinical actions in large-scale [16]. Evidences support telephone interventions in managing heart failure. Kelark et.al provided a meta-analysis study that includes 14 studies of telephone interventions about heart failure. This study reported a total decrease of 21 percent in readmissions (but not in sum total admissions) 20 percent decrease in the level of death for heart failure patients. Writers also reported the benefits of these interventions for life quality and decrease in costs. In some studies both interventions (structured telephone support and tele-monitoring) had same effects [7]. Totally there are little studies about telephone follow up in Iran and most of the studies were about diabetes. There are lots of studies about the effect of education on different aspects of heart failure disease but so far there were not any studies in order to assess the effect of education and telephone follow up on the level of readmission of the patients. So the present study had been done with the aim of assessing the effect of education and telephone follow up by nurse on the level of readmission of heart failure patients.

2. Methods

The present research was a semi-experimental study. Research community includes people with heart failure diagnosis by 3 people of heart failure fellowships in cardiovascular Shahid-Rajayee hospital in 2011. After getting necessary licenses from vice chancellor for research of Baqiatallah University and coordination with Shahid-Rajayee heart center hospital officials through sampling based on aim, heart failure patients who referred to this hospital and had inclusion conditions to this study had been chosen as samples then they were in 3 groups of control and intervention randomly. We had 3 groups (1 control and 2 interventions) in this study.

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All the samples were 189 and there were 63 in every group. Inclusion conditions were the age 20 and higher than that, heart failure diagnosis by heart failure fellowships teams, class 2 and 3 heart patients, Persian-speaking patient, to have at least degree of the end of guidance school, to have complete consciousness, to have a telephone at home, lack of known speech and hearing problem, lack of progressive form of the disease risk were vital members and unwillingness of patient to continue participation in the study were considered as exclusion criteria. Data collection tools included; demographic questionnaire and researcher made checklist for documenting hospital readmissions, number of clinical visits and visits to doctor's office due to heart failure after discharge.

Data collection was in this way that after entering of the patients that had the conditions according to the inclusion criteria into the study, demographic information questionnaire was completed by the researcher with an interview with the patient. Also readmission checklists were given to the patients during discharge that after three months patients posted these check lists to the researcher. Number of the calls to the patients was in this form that during the first month after discharge there were three calls every week, in the second month two calls every week and in the third month one call every week. Time duration for calls was considered 20 minutes that this time could be different based on needs and patients' educational questions. Totally there were 24 calls with every patient during three months.

The time of the first call was three days after discharge. Calls schedule during patients and their entourages' discharge were given in the written form. Calls content included provided educational materials during discharge that were in the educational booklet, continuous follow up in filling self-care checklists that were given to them, answering the patients and their entourages' questions based on their special needs, analyzing the reasons of patients' unwillingness and providing appropriate resolve for the patient. In addition if the patients and their entourages had any problems or questions they could have call day and night with the phone number that had been made for following up the patients.

All the follow up calls of the patients had been done by the researcher.in addition content of every session call had been written in the form. Provided educational materials to the patients during discharge included (being familiar with the disease process and the reasons exist for this disease, the importance of medications and being familiar with the drugs, the way of their consumption and their complications, diet, limitation in using the liquids, daily weighing, physical action, the way of controlling vital signs, importance of vaccination, the way of opposing stress and depression, being familiar with the signs of making the disease, the importance of quitting smoking and some public educations) that were explained completely in the provided educational booklet for the patient. Also in the second intervention group, the emphasis of the researcher during telephone follow ups was on the provided educational materials during this charge and the material that were in the educational booklet. At the end analyzing the achieved data had been done by using SPSS19 software and descriptive and analytical tests.

3. Results

There are demographic features in table 1. Chis-square statistical test did not report significant difference between three groups from the variables point of view in table 1. So subjects of the study were not the same from the variables point of view.

In table 2 ANOVA showed that there is significant difference between from hospital readmissions approach, times of referring to the clinic, and times of referring to the doctor's office. Scheffehpost hoc test showed that there is significant difference between second intervention group with first (p=0.032) and second intervention group and control group (p=0.008) from readmission in the hospital

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approach. But there was no significant difference between first intervention and control group from this approach (p=0.868). There was significant difference between the three groups altogether from the approach of the numbers of referring to clinic that the most significance one belonged to the second intervention group with the control group (p=0.000).

From the approach of numbers of referring to the doctor's office also there was significant difference in second and first intervention group (P=0.001) and second intervention group with control group (p=0.001), but there was no significant relationship between first intervention group with control group (p=0.706). At the end of the work 4 patients passed away that 3 of them were in control group and 1 of them was in the first intervention group.

4. Discussion

54 percent of readmissions can be preventable and according to the studies inappropriate education and programs during discharge and lack of patients' follow up after discharge are counted as the most important patients' readmission factors after discharge [6].

The results of the present study that was done with the emphasis on both mentioned factors showed that patient's education during discharge along with giving educational booklet and their telephone follow up after discharge cause significant decrease in the level of hospital, clinical readmissions and significant decrease in the number of patients' referring to the doctor's office. In a way that level of patients' referring to doctor's office in telephone follow up group during three months was zero.

Also with considering the results of post hoc tests it can be said that face to face education during discharge along with giving educational booklet to the heart failure patients during discharge cause

Table 1: Absolute and relative frequency distribution of the subjects of the study according to demographic variables in three groups.

Absolute and relative distribution of the samples	All the patients (N=189)	
Demographic variables	Absolute	Relative
The maximum age between 31-60	133	70.3
Married	160	85.7
male	130	68
<BMI25	104	55.1
Three grade of guide school or diploma degree	137	72.5
Awareness about disease	115	60.8
Obeying Low-salt, low-fat diet	112	59.3
Spouse as the most important helper for the patient	117	61.9
Not having any regular exercise program	160	84.7
Experience of smoking during the recent 6 months	22	11.6
Heart class 3	52	27.5
Heart class 2	137	72.5
Non-ischemic heart failure	120	63.5
Ischemic heart failure	69	36.5
Ejection fraction between (10-21) percent	101	53.4
Having Janus 2 plus and higher	39	20.6
fatigue	184	97.4
Shortness of breath	185	97.8
Satisfaction with sleep	108	57.1
Lack of sexual satisfaction	110	69.3
Having digestive problems like (constipation, nausea and vomiting, loss of appetite and bloating)	111	58.7
Consuming drugs		
Inhibitors of Renin-Angiotensin system	181	95.8
Beta-blocker	185	97.9
Digoxin	138	73
Lasix	181	95.8
Aldacton	173	91.5
Sildensfil	71	37.6
Aspirin	56	29.6
atorvastatin	65	34.4
Plavix	20	10.6
Warfarin	67	30.2
Underlying diseases		
Blood pressure	59	31.2
lipid	51	7
diabetes	34	18
Heart failure	63	33.3
Valve disease history	24	12.7
History of heart surgery	21	11.1
Respiratory infection	22	11.6
hypothyroidism	18	9.5

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Table 2: the average and standard deviation of the level of hospital readmissions, numbers of referring to the clinic and numbers of referring to the doctor, 3 months after patients 'discharge in three groups.

Studied groups / Readmissions type	Readmission average and standard deviation in three groups: control	Intervention group	Intervention group 2	ANOVA
Hospital readmissions 3months after discharge	0.33=0.62	0.28=0.63	0.4=0.21	F=5.3 p=0.006
Clinical readmissions 3months after discharge	8.1=0.86	1.4=0.75	1=0.79	F=16.5 p=0.000
Times of referring to doctor 3months after discharge	0.36=0.6	0.44=0.75	0	F=11.3 p=0.000

significant decrease in hospital readmissions and times of referring to doctor's office between first intervention group (education to the patients and giving educational booklet) and control group. So it can be said that face to face education and giving educational booklet should be along with follow up in order to lead to better outcomes in patients.

As it has been emphasized in the studies, educated materials during hospitalization or discharge to the patient should be invigorated after discharge through educational pamphlets, booklet, supporter groups, business in the house and calls [6].

Results of the study of Hope in 2004 showed that there is significant relationship between lack of awareness about disease and lack of obedience of the drugs with emergency ward readmissions. Also it has been shown that there is significant relationship between lack of obedience of medication orders and disability in reading drug labels with increasing hospital readmissions [17]. The results of this study are in agreement with our study.

May be the reason of consistent result was that in this study in addition of other educations the researcher had high emphasize on the importance of the obedience of drug diet with having all the drug labels and forms and explaining the name of every drug for the patient during education, the importance of drug consuming , level of every drug consumption, time of consuming the drugs and observation on the filling of drugs checklist which had been given during discharge in telephone follow ups and the researcher had worked well on the importance of this subject for preventing re-admissions. So it can be said that one of the reasons of significant decrease of readmissions also in telephone follow up groups is this issue.

Fonarow's study had been done in 2007 in America. It showed that using one Angiotensin converting enzyme inhibitor or Angiotensin Receptor Antagonists significantly cause decrease of death and readmission of the patients 60 to 90 days after discharge [18].

As the results of our study show the total average of readmissions level had been low in the three groups of the study, it can be said that may be one of the reasons was that all the patients in three groups of the study achieved determined standard treatment regimen by America heart association for heart failure patients. For example 95.8 percent of the patients achieved inhibitors drugsof the renin–angiotensin system. Although Fonarow et.al in another study explained that executive programs during discharge are more effective on the level of death and readmissions than prescription of an inhibitor drugof the renin–angiotensin system [19].

Anderson in 2007 in his study reported that patients' education by heart failure nurse, nutrition expert and social worker during discharge and strengthen these educations by nurse through visiting the house or follow up calls after discharge cause less readmissions in intervention group 4 than control group [20]. It has been said in many studies that patient's follow up after discharge can strengthen the given educations during discharge [6].

In Stromberg's study in 2003 that heart failure patients' follow up had been done through

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visiting patients in heart failure clinics by nurse it had been shown that there was significant decrease in the level of death and hospital admissions twelve months after discharge in intervention group in compare with control group and the level of self-care behaviors had been increased significantly [21] the results of the mentioned studies were almost in consistent with our results. According to the lack of heart failure clinics directed by heart failure dedicated nurse in our country and also other problems it can be said that follow up calls by nurse can be good replacements of such clinics in our country in order to decrease readmissions, decrease of the consequences of the disease and also increase in self-care behaviors.

Paul in his study in 2008 reported that comprehensive management plans during discharge that included (patients' education, achievement of the appropriate level of treatment, improvement of relationship with the patient, quick notice to the symptoms and signs of the disease and comprehensive follow up of the patient) could cause 36 percent significant decrease in the level of death and hospital readmissions 2 years after patients' discharge [6].

It can be said that our study almost involved all the comprehensive program components of the mentioned study and the result of our study was in consistent with this study.in Hernandez's study that had studied the difference of hospital levels from the approach of rapid follow up of the heart failure patients after discharge, it had been shown that discharged patients with rapid follow up after discharge are exposed with less risk than for readmission 30 days after discharge [22].

Results of this study show the importance of patients' follow up after discharge in order to prevent readmissions. Our study results also show that with using patents' follow up, readmissions can be prevented. In a study that assessed 14 studies that used structured telephone follow ups method or tele-monitoring for patients' follow up after discharge , it had been shown that remote follow up programs cause decrease in the level of hospital admission to the extent of 21 percent and decrease in death level to the extent of 20 percent.

Also it had been shown that new technology can be important and useful tools for strengthen educations that were given to the patient and their follow up after discharge that should be included in the management comprehensive programs during discharge [7, 6]. AS the results of the present study showed and according to the shortage or lack of tele-monitoring equipment and lack of setting up of this method in our country by nurses and considering this point that many studies consider the effectiveness of this method equivalent with structured telephone follow up it can be concluded that this low cost method is an appropriate tool for patients' follow up in our country. Phillips in his study in 2004 that assessed several studies reported that comprehensive programs during discharge decrease level of heart failure patients' readmissions significantly if they are along with follow ups after discharge of the patients and may improve disease health outcomes such as; survival level and life quality without increase in costs.

Although type of follow up after discharge in different studies was different, all of them showed that readmissions level had significant decrease in intervention groups in compare with control group that achieved usual care [23]. In study of Rich, patients achieved directed multilateral interventions that included (patient's education about disease conditions and its drugs, nutritional advices, visiting in the house and follow up calls after discharge). Then patients after three months after discharge had been followed up. Results of the study of Rich showed that readmissions level due to heart failure 56 percent decreased in intervention group in compare with control group [24].

Also in our study patients had been followed up for three months and provided educational materials to the patients were similar to the

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education materials of Rich's study and results of this study are in consistent with our results. The only difference of our study with Rich's study had been in the number of the groups of the study. Dunagan's study in 2005 showed that call interventions cause admissions total decrease but they do not cause readmission decrease due to heart failure. Also it had been shown that follow up call interventions 6 months after discharge cause significant decrease in the number of the days of hospitalization in the hospital, hospital total cost and the number of hospital admissions. Difference of this study with our study was that in this study the average of the patients was higher, there was the presence of heart four class patients, there was not any education to the patients during discharge, all the patients did not achieve the renin-angiotensin system inhibitor drugs and there was difference in follow up duration of the patients [8].

Results of this study were in consistent with our study. Rigel et.al assessed the ability of standard call follow up interventions by nurse for six months after discharge. Results of the study of Rigel indicated that readmissions and costs decreased significantly in intervention group. However, this study showed that emergency ward visits were increased in intervention group [11]. Results of our study are in consistent with this study, but we did not study the number of the patients' referring to emergency ward, but we studies clinical admissions and the number of the times of referring to the doctor's office that there was significant decrease in the second intervention group in compare with the other two groups. In the study of Debosk et.al in 2004 on 426 patients with the average age of 72 patients had been followed up for 1 year after discharge, they achieved that education to the patients and their entourages during discharge and telephone follow up intervention after discharge unlike Rigel's study and ours do notcause significant decrease in the level of readmission [25]. Harrison reported that there is significant relationship between higher age, being male and long-term hospitalization in the hospital with readmissions increase. Also it had been shown that there is significant relationship between early follow up after discharge by telephone with readmission decrease 30 days after discharge [5].

Also in this study there was significant relationship between age and readmission and hospitalization time. But there was no significant relationship between gender and readmission. Also there was significant relationship between hospitalization duration with readmission. Our study also showed that there is significant relationship between hospital readmission and clinical admission and heart class 3 patients. This finding of our study is in consistent with the study of Warner et.al which reported that most of the patients who experience repetitive readmissions belong to class 3 or 4 of the heart failure [26].

Although heart class 4 patients were not in our study and may be this is one the important and effective factors on the low overall readmissions rate in our study. In Dahl's study in 2000 which had been done with the aim of the effect of a guided several approach schedule by an advanced clinical nurse on the consequences such as; clinical management improvement and eliminating support and educational needs of the patients, it had been shown that this intervention leads to decrease in hospitalization time, death and the level of patients' readmissions. It has been said that the most important effective factors of Dahl's study are modulation of educational workers with diet specialists during educational sessions of the nurses with the patients, to involve patients' entourages during educational sessions for increasing treatment acceptance and supporting patients and finally nurse's weekly meetings with heart specialists [27].

Also in this study patients' special needs and problems had been discussed during clinical visits with heart failure specialist and patients' entourages were present during education and telephone follow ups. Patients' entourages' participation in education and also getting help

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from them in order to follow up patients 'self-care behaviors in our study also can be one of the effective factors on readmissions significant decrease. According to the chronic nature of heart failure disease, shortage of knowledge of these patients about their disease nature and the changes that they have to observe in their lifestyle, lack of obedience of the patients from their drug diet, lack of exist of the plans based on aim during discharge and finally high readmissions rates due to disease, according to the mentioned thing it can be said that comprehensive plans during discharge which had been guided by the nurses can significantly improve heart failure disease management decrease readmissions level due to that.

5. Conclusion

Our study showed that patients' education and giving educational booklet to the patient's cannot cause readmissions decrease alone and education to the patient should be strengthened with follow up methods after discharge. Follow up calls is a low cost method for patents' follow up and causes readmissions decrease due to disease.

It should be mentioned that with telephone follow up, education method should not be ignored and other follow up methods like (visiting the house, establishment of heart failure clinics, tele monitoring) should be used besides telephone follow up in order to increase disease consequences. Finally using low cost, acceptable and available method of telephone follow up in order to prevent readmission which is the best complication of heart failure is a reasonable and practicable work and also can be extended for other chronic diseases.

6. Acknowledgment

This study is taken from a student thesis in nursing College of Baqiatallah Medical Sciences University. The researcher thanks and appreciates all the participants who were present in this study. At the end we thank officials of Baqiatallah nursing college and Shahid Rajayee heart hospital and all the people who supported and guided us in any way in doing this study.

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