

The Effect of Three Methods of Follow-up (Short Message Service SMS, Telephone and Regular) on the Quality of Life in Heart Failure Patients

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Introduction: Modern methods and telemonitoring manage care and control of chronic diseases has improved, meanwhile, the hospital uses traditional methods to teach their patients.

Purpose of Study: The purpose of the study was to compare the effectiveness of three methods of follow-up (SMS, telephone and regular follow up) on the quality of life in heart failure patients.

Methods: In the randomized clinical trial, patients with heart failure admitted to Emam Ali and Emam Reza hospitals were selected. The patients or dependent relatives of the patients had used mobile phones and text messages with a written consent participated in the study. With a convenience sampling the patients selected and patients randomly assigned to three groups of SMS, telephone and regular follow-up, respectively. Each patient was assessed before and in the first, second and third months after discharge, respectively. To collect data, the Minnesota Living with Heart Failure Questionnaire was used. The data were analyzed with software SPSS VER19 by paired t test, repeated measure ANOVA and curves.

Finding: Twenty five patients assigned to each group. There were not statistically significant differences between the quality of life of the telephone follow up before and the first, second and third months, as well as in the regular follow-up (36 ± 12.6 , 41.7 ± 14.4 , 36.5 ± 13.5 and 36 ± 13.2 , respectively) and also there wasn't significant difference between before discharge and after 3 months in regular follow up (38 ± 17 vs. 39.7 ± 17.7) In the follow up via SMS, there was a significant difference between the quality of life before and in the first, second and third months (49.6 ± 21.5 , 43.9 ± 16.6 , 39.1 ± 13.8 and 38.4 ± 12.6 respectively).

Conclusion: Because the heart failure patients need different education and follow up, the result of this study showed that SMS follow up can promote the patients' quality of life, but telephone and usual follow up didn't change the quality of change in heart failure patients. Hence, follow up by SMS may be considered in these patients.

Keywords: Heart failure, Short Message Service, Quality of Life, Telephone Follow-Up.

تأثیر سه روش پیگیری (پیامک و تلفن ثابت و پیگیری معمولی) بر کیفیت زندگی در بیماران نارسایی قلبی

مقدمه: روش های مدرن امروزی و مراقبت و کنترل کردن از راه دور مدیریت کردن بیماری های مزمن را بهبود بخشیده است. لذا طراحی و اجرای مداخلات پیگیری بر اساس روش های از راه دور ضروری به نظر می رسد.

هدف: مقایسه تأثیر سه روش پیگیری (پیامک، تلفن ثابت و پیگیری معمولی) بر کیفیت زندگی بیماران نارسایی قلبی

روش: در یک کارآزمایی بالینی شاهد دار تصادفی شده، بیماران با تشخیص نارسایی قلب در بیمارستانهای امام علی (ع)، و امام رضا (ع) کرمانشاه با کسب رضایت نامه کتبی در مطالعه شرکت نمودند. به روش نمونه گیری در دسترس، بیماران بصورت تصادفی در سه گروه پیامک، تلفن ثابت و پیگیری معمول تقسیم شدند. هر بیمار قبل از شروع پژوهش و در پایان ماه اول، دوم، و سوم با پرسشنامه کیفیت زندگی مینه سوتا Minnesota Living With Heart Failure Questionnaire بررسی شد. داده های پژوهش با نرم افزار SPSS ۱۹ و با آزمون های تی وابسته، تحلیل واریانسها تحلیل شد.

یافته ها: در گروه پیگیری تلفنی تفاوت معنی داری بین کیفیت زندگی قبل از مداخله و ماه اول، دوم و سوم وجود ندارد (36 ± 12.6 ، 41.7 ± 14.4 ، 36.5 ± 13.5 و 36 ± 13.2 به ترتیب) و همچنین در گروه پیگیری معمولی تفاوت معنی داری بین کیفیت زندگی قبل از مداخله و ماه آخر (38 ± 17) در مقابل (39.7 ± 17.7) وجود دارد. نتایج آزمون آماری نشان داد در گروه پیگیری از طریق پیامک تفاوت معنی دار بین کیفیت زندگی قبل از مداخله و ماه اول، دوم و سوم (49.6 ± 21.5 ، 43.9 ± 16.6 ، 39.1 ± 13.8 و 38.4 ± 12.6 به ترتیب) $p < 0.001$ وجود دارد.

نتیجه گیری: نتایج حاصل از پژوهش حاضر نشان داد، که پیگیری بیماران با سرویس پیام کوتاه بر کیفیت زندگی این بیماران موثر بوده است، در حالیکه پیگیری معمولی و پیگیری توسط تلفن ثابت نتوانست بر کیفیت زندگی بیماران تأثیر داشته باشد. لذا پیگیری بیماران با سرویس پیام کوتاه در مراقبت این بیماران مورد توجه قرار گیرد.

کلید واژه ها: نارسایی قلبی، پیامک، کیفیت زندگی، پیگیری تلفنی

تأثیر سه روش پیگیری (پیامک، تلفن ثابت و پیگیری معمولی) بر کیفیت زندگی در بیماران نارسایی قلبی

المقدمه: لقد حسنت الطرق العصرية الحديثة والتحكم عن بعد من متابعة وإدارة الأمراض المزمنة، لذلك فإن متابعة المرضى عن بعد يعتبر ضرورياً جداً.

الهدف: المقارنة بين تأثير الطرق المتبعة الثلاثة التالية على نوعية حياة مرضى القصور القلبي وهذه الطرق هي (الرسائل النصية، الإتصال عن طريق الهاتف، المتابعة العادية)

الطريقة: في إحدى الدراسات العشوائية تم إشراك عدد من مرضى الفشل القلبي في مستشفى الإمام علي (ع) ومستشفى الإمام الرضا (ع) في مدينة كرمانشاه. تم فرز المرضى في ثلاث مجموعات (الرسائل النصية، الإتصال عن طريق الهاتف، المتابعة العادية) تم تقييم كل مريض قبل إجراء الدراسة الحقيقية وبعد مرور شهر وبعد مرور ثلاث أشهر وذلك عن طريق مجموعة من الأسئلة. وقد تم تفسير البيانات عن طريق برنامج Minnesota Living With Heart Failure Questionnaire.

و تم تحليل البيانات بواسطة برنامج spss النسخة ۱۹

النتائج: في مجموعة المرضى ذوي المتابعة عن طريق الإتصال الهاتف لم يكن هناك فارق واضح وذلك قبل متابعتهم وبعد الشهر الأول وبعد الشهر الثالث وكان النتائج كالتالي وبالترتيب 36 ± 12.6 ، 41.7 ± 14.4 ، 36.5 ± 13.5 و 36 ± 13.2 .

في مجموعة المتابعة بالطريقة العادية لقد كان هناك فارق واضح بين كيفية حياة المرضى وذلك قبل المتابعة وفي الشهر الأخير وكانت النسب كالتالي بالترتيب (38 ± 17)، أما بالنسبة لمجموعة المرضى الذين تمت متابعتهم عن طريق الرسائل النصية القصيرة لقد كان هناك فارق واضح في كيفية حياة المرضى وذلك قبل المتابعة وفي الشهر الأول والثاني والثالث وكانت النسب بالترتيب (49.6 ± 21.5 ، 43.9 ± 16.6 ، 39.1 ± 13.8 و 38.4 ± 12.6). وكان $p < 0.001$ أي ذو معنى.

النتيجة: لقد أثبتت نتائج الدراسة أن متابعة المرضى الذين تم التواصل معهم عن طريق الرسائل القصيرة كانت مؤثرة على كيفية حياتهم، في حين أن المرضى الذين تم متابعتهم عن طريق الإتصال الهاتف والمتابعة العادية لم تستطع أن تؤثر بشكل ملحوظ على كيفية حياتهم. لذلك فإن متابعة المرضى عن طريق الرسائل النصية القصيرة يمكن أن تكون مفيدة ويمكن أن يتم الإستفادة منها.

الكلمات الدلالية: الفشل القلبي، رسالة، كيفية العناية، المتابعة الهاتفية.

امراض قلب کے مریضوں کی روزمرہ کی زندگی پر تین روشوں، ایس ایم ایس، لینڈ لائین فون، اور عام طریقوں سے خیریت معلوم کرنے سے ان کی روزمرہ زندگی پر کیا اثرات پڑتے ہیں

ہیک گراؤنڈ: آج کی دنیا میں ماڈرن روشوں اور دور سے بیماریوں کی تیمارداری کی روشوں سے مزمن بیماریوں کنٹرول کرنے میں کافی مدد ملی ہے، اسی بنا پر دور سے بیماریوں کی تیمارداری کرنے کے لئے سسٹم بنانا اور اس پر عمل کرنا نہایت ضروری امر ہے۔

روش: کلینیکل پراسس میں کرمانشاه کے امام علی علیہ السلام اور امام رضا علیہ السلام نامی اسپتالوں میں امراض قلب کے بیماروں کو تحقیق میں شریک کیا گیا، ان بیماروں کو تین گروہوں میں ایس ایم ایس، لینڈ لائین، اور عام طریقوں کے گروہوں میں تقسیم کیا گیا، ہر بیمار کو ڈسچارج ہونے کے بعد پہلے دوسرے اور تیسرے مہینے کے اختتام پر مینی سوتا لیونگ ویٹھ ہارٹھ فیلیور کوسچانیر کے ذریعے معلومات حاصل کی گئیں اور ڈیٹا کا ایکس پی ایس ایس سافٹ ویئر، ٹی ٹسٹ اینس نیز واریانس انالائسنس ٹول سے تجزیہ کیا گیا۔

نتیجہ: پہلے گروہ یعنی لینڈ لائین گروہ میں بیمار کی روزمرہ زندگی پر تحقیق سے پہلے، پہلے دوسرے اور تیسرے مہینے میں کوئی اثر نہیں پڑا۔ دوسرے گروہ یعنی عام طریقے والے گروہ میں تحقیق کے پہلے اور آخری مہینے میں بیمار کی زندگی پر اثر پڑا ہے۔ ایس ایم ایس والے گروہ میں تحقیق سے پہلے اور پہلے دوسرے اور تیسرے مہینے میں خاصہ اثر پڑا ہے۔

نتیجہ: اس تحقیق سے معلوم ہوتا ہے کہ ایس ایم ایس سے بیماروں کی خیریت پوچھنے کے طریقے سے بیماروں کی روزمرہ زندگی پر مثبت اثرات پڑتے ہیں لہذا اس روش کو اپنایا جائے۔

کلیدی الفاظ: امراض قلب، بیمار، ایس ایم ایس، لینڈ لائین فون۔

INTRODUCTION

Heart failure is a complex clinical syndrome that, due to ventricular dysfunction, the heart is unable to pump blood to the body (1). Signs and symptoms include fatigue; limitations on activities, lung congestion, edema, shortness of breath, and the symptoms gradually affect the performance of daily life (2). Heart failure is one of the most common chronic diseases Progressive and life-threatening to an increased rate of hospitalization, reduced life expectancy and poor quality of life, as well as imposing a heavy burden to family and society (3).

The cost of treatment due to frequent admissions covers the important part of the health costs of different countries (4). The cost of the disease is estimated at \$32 billion in 2009 (5). The rate of disability and mortality due to this disease and frequent hospitalization in these patients is also high. (6).

The mortality rate due to cardiovascular disease in Iran is higher than the global statistics (38 %). In fact, heart failure is the most commonly used medical services among other heart conditions, and the rate of re-admission after six months is approximately 44 % (7). The annual cost of heart failure is two percent of the total British health budget, and one out of every four discharged patients is re-admitted within three months (8). The reason for this is the lack of compliance with the drug, diet, and lack of sufficient knowledge and skills to take care of its own. This problem can be prevented using educational interventions. Learning to manage chronic conditions, constitute the basis of self-care. Self-care is very important in congestive heart failure since most health care for these patients away from the healthcare team is monitoring. (9, 10) .

After discharge, they often develop symptoms and complication, because the hospital has little opportunity to educate patients. Follow-up care after discharge is essential for self-care education. Follow-up care makes (make a better relationship) between members of the healthcare team and the patient and increase confidence in the patient(11).

Based on the results of a study with a self-care plan, re-hospitalization and treatment costs have decreased and survival rates and quality of life have increased(12). Social support (family and social networks) has a positive effect on self-care behaviors. Follow-up the diet and medication is an important parameter in treating heart failure patients (6). After hospital discharge, these patients require optimal disease management and proper nursing care. Recent modern methods, telemonitoring care management and chronic diseases' management has improved, which reduces the number and frequency of hospitalization days and the occurrence of emergency conditions for the patient (13). Phone and SMS follow-up is an inexpensive and easy, organized health care interventions which provide information to chronic patients by providing counseling, patient assessment, emergency support and disease management, which helps to have an independent life and change lifestyle, such as changing diet, exercising, following a diet therapy and improving the quality of life and self-efficacy of the patient. Based on these follow-ups, the diagnosis and follow-up of the doctor's instructions can be

managed. It can also be interpreted as heart rate, blood pressure, and blood sugar levels and helped with early diagnosis of complications in emergency situations (14). This care reduces re-hospitalization, mortality, and medical expenses. According to the International Council of Nurses, the use of communication technologies in nursing care of patients has improved, and telephone care eliminates barriers and time and space constraints for medical staff(3).

Nurses can use fixed-line, SMS, and email for self-care in chronic patients. Thetwo interventions including phone and SMS are the same, but completely separate and the consequence of using either of these interventions is reported separately (15). Telephone follow up goals include increasing compliance with the diet and reducing the patient's stress during discharge through training. (11) The short message service advantage is that patients are able to communicate with their nurse and doctor at any location and time, exchange information, ask questions and get advice from them (16). Patients can also be educated through these communication pathways, and nurses can diagnose a patient's problem and provide a solution. As well as patient self-care and problem solving encouraged to participate in the program (17). However, training patients is a common traditional method which this method, despite raising the knowledge of individuals, has little clinical value (18).

Mobile communications provide an opportunity for care to exit from the monopoly of hospitals and transmitted to the daily living environment for patients and as a supportive and reminder tool to encourage patients to be more involved in their health plans (19). While highlighting the benefits of both methods of follow-up patients, two systematic reviews have expressed different opinions (15, 20) The results of the study by Ferrante et al. indicated that telephone education for three years reduced the mortality and hospitalization of these patients. It was also improved in accordance with the dietary regimen, diet and daily weighing (21). Also, the results of the study by Kannisto et al. showed that the use of mobile phones and SMS in training of chronic patients increases the follow-up of the diet, the timely use of drugs and the positive attitude to treatment (22). In another study by Ditewiget al., the effect of self-care intervention reduced mortality and increased the quality of life, but there was no significant statistical relationship (23). In this context, the present study aimed to compare the efficacy of three methods of follow-up (SMS, telephone, and regular follow-up) on the quality of life among heart failure patients.

METHODS

This randomized clinical trial study was conducted randomly. The study population consisted of heart failure patients referring to Imam Ali Hospital and Imam Reza (AS) in Kermanshah. The study lasted from June 2013 to November 2014. Participants were selected by simple sampling, but randomly divided into three groups of SMS follow-up, follow-up, and regular follow-up. To calculate the sample size, the formula for calculating the sample size for comparing the two societies with a confidence level of $z=1.96$, the test power was 1.28 and the mean of group 1 was 58.4 and the mean of group 2 was 32.5 and the standard

deviation of group 1 was 17.7 and the standard deviation of group 2 was 17.5 (21). In each group, at least 10 people and 20% more were estimated for the loss of specimens, 12 were calculated, and according to the availability of samples, 25 in each group, 75 patients were evaluated in the three groups. The criteria for entering them into the study include: using the patient or one of his companions from mobile and text messages, completing written consent, having a functional level of 2 and 3 according to the American Heart Association category, having no work experience in health care centers, diagnosis of heart failure and discharge fraction was less than 40%.

Patients who were reluctant to continue studying, either re-admitted or died during the study were excluded. The data collection tool was Minnesota Living Quality Heart Failure Questionnaire (MIQ). This questionnaire was designed to provide information on the quality of life of patients with heart failure and contains 21 questions, each question being scored on a Likert scale of 0 to 5. The zero number indicates no response (the best case), and the number 5 represents very high (the worst case). For instance, in a question, does the disease cause breathlessness? For No Answer, the score is zero and very much gets a score of five. Scores range from 0 to 105 points. Whatever the total score is higher indicate a lower quality of life. This questionnaire has a high reliability and validity over other existing questionnaires. Its validity is confirmed by content validity method and its reliability is confirmed by using the test-retest method and with Pearson correlation coefficient ($r = 0.86$). The cutting points of quality of life questionnaire with Minnesota heart failure were rated as scores below 24 (good quality of life), score 24 to 45 (mean quality of life), scores greater than 45 (poor quality of life) (24). In this study, the equivalence method was used for confirmation of reliability and this questionnaire

was completed with (Quality of Life in Severe Heart Failure Questionnaire) for 20 patients and the Pearson correlation coefficient was 0.91.

To collect information, patients who were hospitalized for heart failure were identified and in agreement with the department on the day of discharge, the interviewers after explaining the purpose of the study to patients and their companions received written consent from them and entered the study. Then, the quality of life questionnaire was completed and clinical and vital signs were recorded. In the SMS follow-up group, patients' cell phones were trained in terms of access to the Persian menu and if necessary on how to use SMS service. Also, one of the text messages was sent to the patient. In the follow-up group, a phone call was made for 3 months, which was twice a week in the first month and in the second and third months, once a week, between 8 a.m. to 9 p.m. for 10-20 minutes. The calls were conducted by the researcher (first author) with the patient or patient carer. During the conversation, while providing recommendations and asking the patient's condition, the questions were also answered. In the SMS follow-up group, text messages were sent daily to 100 characters a day, six days a week for the first month, and then twice a week during the last two months by the researcher (first author). At the beginning of the study and at the end of the first, second and third months, the Minnesota Quality of Life Questionnaire was completed by phone for the patients in the SMS and telephone follow-up groups.

The content of phone conversations and messages with the extraction from manuals, books and magazines included assessing dietary and pharmaceutical regimens, physical activity as well as signs of exacerbation of infertility. Ability to answer questions in SMS and phone conversations were considered. In non-intervention group, patients received only routine discharge training. At the end of the study, a

Table 1. Demographic characteristics of participants in the research in three follow-up groups

variable	Group	SMS follow-up	Telephone follow-up	Regular follow up	The result of the statistical test
Education level	Illiterate	9 (39.2%)	18 (75%)	12(48%)	*P≤0.6
	Elementary	6(26.1%)	4(16.7%)	7(28%)	
	Guidance s	6(26.1%)	2(8.3%)	4(16%)	
	High school	1(4.3%)	-	2(8%)	
	Higher than diploma	1(4.3%)	-	-	
marital status	Divorced	2(8.7%)	1(4.2%)	5 (20%)	*P≤0.4
	Married	19(82.6%)	16(66.6%)	18(72%)	
	Single (widow)	2(8.7%)	7(29.2%)	2(8%)	
Income	Less than five hundred tomans	14(60.9%)	12 (50%)	21 (84%)	*P≤0.08
	Between a half to one million tomans	9(39.1%)	9(37.5%)	4(16%)	
	More than one million tomans	-	3(12.5%)	-	
Job	Free	3(13%)	5(20.8%)	3(12%)	*P≤0.1
	Unemployed	4(17.4%)	1(4.1%)	1(4%)	
	Employee	2(8.7%)	-	1(4%)	
	Housewife	6(26.1%)	15(62.5%)	14(56%)	
	Farmer	6(26.1%)	3(12.5%)	3(12%)	
	Retired	2(8.7%)	-	3(12%)	

*Kruskal Wallis Test

questionnaire was completed for patients. Completion of the questionnaire at the end of the first and second months could have made patients sensitive to the study and disturbed with the results, so at the end of the first and second months, no questionnaire was completed in this group. In this study, written informed consent was obtained from all participants and the Ethics Committee License was also received before registration at the Iranian Clinical Trial Center.

The data were collected and coded using SPSS / VER19 software and Kruskal Wallis test, Kolmogorov Smirnov, paired t-test and ANOVA with repeated measures, analysis of variance and independent t-test were analyzed. It should be noted that during the study due to death, three of the participants were excluded so that the statistical analysis was performed on 72 subjects. (23 in the SMS group, 24 in the telephone group and 25 in the control group).

FINDINGS

Patients in both groups were homogeneous for all demographic characteristics and disease (Table 1). Of the 24 participants in the telephone follow-up group, there were 9 men (37.5%) and 15 women (62.5%); among the 23 participants in the follow-up group by SMS there were 17 men (73.9%) and 6 women (26.1%), and in the regular follow-up group, there were 11 men (44%) and 14 women (56%). The mean age of participants in the SMS group was 59.7 ± 6.4 ; in the follow-up group via telephone was 60.42 ± 6.9 ; and in the regular follow-up group was 67.9 ± 11 years. The mean number of admitted patients in the telephone follow-up group was 1.58 ± 1.5 and in the SMS follow-up group was 2.1 ± 1.5 and in the regular follow-up group was 2.3 ± 1.3 .

The total score of the quality of life questionnaire was compared before intervention and at the end of the first, second and third months in SMS and telephone follow-up groups as well as in the regular follow-up group (Table 2). The results of t-test showed that there was no significant difference between the pre intervention and the end of the third month in the regular follow-up group.

The results of analysis of variance analysis with repeated values showed that there was a significant difference between the intervention group and the first, second and third months in the follow up group ($p < 0.0001$). However, there is no significant difference between the pre-intervention and the first, second and third months in the telephone follow-up group.

The trend of changes in mean quality of life scores in the two groups of follow-up, telephone and SMS follow-up showed that the SMS follow-up group showed a downward trend (improved quality of life), while in the telephone follow-up group at the end of the first month, scores increased (worsening of quality of life) and did not change much at the end of the second and third months (Figure 1).

DISCUSSION

The findings of the study showed that SMS follow-up led to an increase in quality of life indicators, but this increase was not significant in the phone follow-up group. The present study is consistent with the results of a study by Albert and et.al in 2014. The results showed that telephone intervention did not have a significant effect on the reduction of re-hospitalization and the occurrence of emergency situations. However, it has increased the ability of patients to take care of themselves and to seek medical follow-up (13). Contrary to the present study, the results showed that telephone interventions reduced stress and erosion and improved performance in patients' families in both groups (intervention and control, which were discharged according to the traditional program), but this decrease was significantly more in the intervention group (6). Yan and et.al in the study, with training during discharge and three times a telephone follow up was conducted on 124 Chinese patients. The intervention group has more compliance with the disease and is more familiar with the factors that are involved in a heart attack [25]. The findings are contradictory to the results of these studies, which could be due to the type of telephone intervention that had been contacted three times in Yan's study. There is also a cultural difference between individuals and the level of literacy. Mosavi Far and

Table 2. Comparison of mean and standard deviation of quality of life in the three groups before and after the intervention by groups

Variable	Group	Regular follow up	SMS follow-up	Telephone follow-up	The result of the intergroup statistical test
		Mean ±SD	Mean±SD	Mean±SD	
Quality of life before intervention		38.04±17	49.6±21.5	36±12.6	***P≤0.06
The quality of life of the first month		-----	43.9±16.6	41.7±14.4	****P≤0.09
Quality of life of the second month		-----	39.1±13.8	36.5±13.5	****P≤0.06
The quality of life of the third month		39.7±17.7	38.4±12.6	36±13.2	***P≤0.04
The result of the statistical test is intra-group comparison		*p≤0.06	F= 23.5 **P≤0.0001	F= 3.96 **P≤0.058	

*paired t test
**Analysis of variance with repeated values
***Analysis of variance
****Independent t test

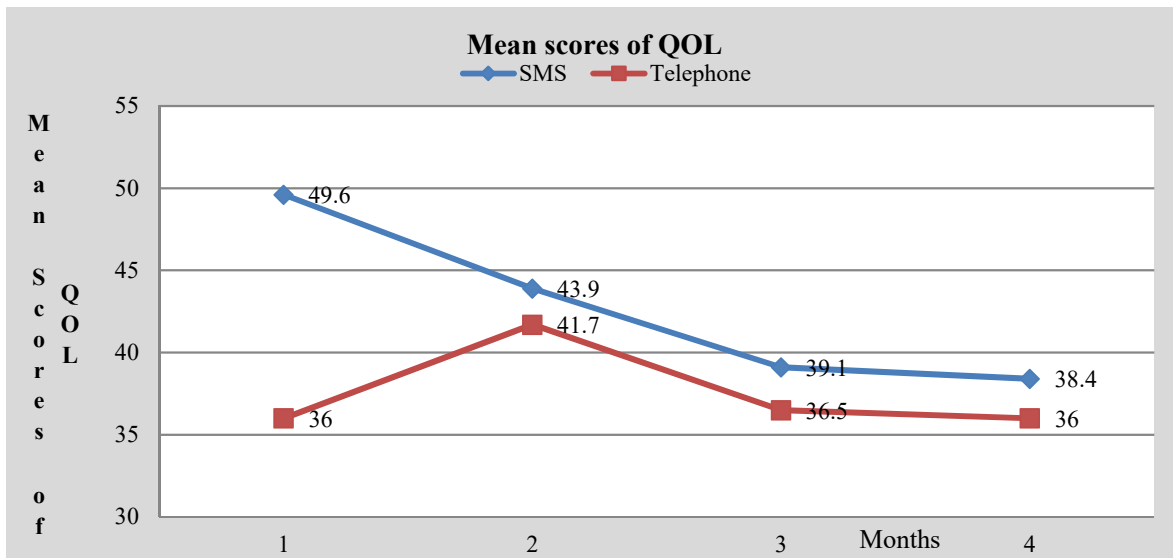


Figure 1. Mean scores of quality of life before and after months of intervention in the SMS and telephone follow-up group.

his colleagues in their study that examined the effect of two follow-ups (telephone and mobile) methods on compliance with diet regimens in diabetic patients showed that both interventions reduced glycosylated hemoglobin levels and the effect of both interventions was statistically similar (19). The results of this study in the follow-up group were inconsistent with the results of the present study. This difference could be due to the better situation of diabetic outpatients compared with the poor condition of patients with heart failure. In another study by Wong et al. in 2011, in the intervention group, dyspnea was reduced and performance improved. Also, edema, the fluid load, and symptoms of the disease increase, but improvement in physical performance did not increase significantly (17). The measurement criterion is different in the present study with Wang's study. Because the quality of life questionnaire was used in this study, while in the Wong study, two criteria for improving dyspnea and physical activity have been used as an intervention. Findings from the study by Ferrante et al. Indicated that re-hospitalization rate in the intervention group was 26% and in comparison with the control group which was 31% there was a further decrease, but did not have a significant effect on mortality. Patients in the intervention group had better indicators in the Minnesota Quality of Life Questionnaire, whose effects remained one to three years after the intervention (21). In the study of Scherr et al. in re-hospitalization and worsening conditions, there was a significant decrease between the intervention group (telephone and SMS education) compared to the control group, but there is still a problem using this technology for the elderly (26). In the experimental study conducted by Wong et al. (2013), SMS education was conducted for 2 years on 44 diabetic patients in China to increase knowledge and moderate lifestyles. In this method, the effect of SMS on prevention of disease, blood sugar control, hypertension and blood pressure was investigated. However, there was no significant difference between the control group (routine care) and the intervention (27). The results of this study were contradictory to the present study, which may be

due to a long two-year follow-up or a cultural difference between individuals.

The study had limitations, including: the lack of control of the researchers on the participants' access to other educational sources, Short-term follow-up (three months) and the need for long-term follow-up, failure to follow some participants' routines, which identified the goal of the study, for patients to resolve the problem, and tried to encourage them to follow the instructions and have a bias in completing self-administered questionnaire, which will carry out generalization of the results with caution.

CONCLUSION

The overall aim of this study was to determine the effect of three follow-up methods (SMS, telephone, and follow-up) on the quality of life in patients with heart failure. Patients with heart failure, due to the nature of the disease, require multiple training and follow-up. The results of this study showed that follow-up of patients with SMS was effective on quality of life of these patients, while regular follow-up and constant telephone follow-up could not affect the quality of life of patients. It seems that follow-up patients with SMS are considered in the care of these patients. Considering the effectiveness of the tele-care approach, it is recommended to use virtual follow-up and care methods, such as the creation of blogs and homepages, as well as SMS in the pursuit of similar chronic illnesses, such as heart and brain strokes.

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REFERENCES

1. Paul P, Williams B. Brunner and Suddarth's textbook of Canadian medical-surgical nursing. New York: Wolters Kluwer; 2009.
2. Dunbar SB, Butts B, Reilly CM, Gary RA, Higgins MK, Ferranti EP, et al. A pilot test of an integrated self-care intervention for persons with heart failure and concomitant diabetes. *Nurs Outlook* 2014;62(2):97-111.
3. Chiang LC, Chen WC, Dai YT, Ho YL. The effectiveness of telehealth care on caregiver burden, mastery of stress, and family function among family caregivers of heart failure patients: a quasi-experimental study. *Int J Nurs Stud* 2012;49(10):1230-42.
4. Kessing D, Denollet J, Widdershoven J, Kupper N. Investigating a TELEmedicine solution to improve medication adherence in chronic Heart Failure (TELEMED-HF): study protocol for a randomized controlled trial. *Trials* 2011;12:227.
5. Sllow-Carroll SH, Fern J, Edward S, Shbrook A. Reducing hospital readmissions. *Common Wealth Fund Pub* 2011; 5: 1473.
6. Graven LJ, Grant JS. Social support and self-care behaviors in individuals with heart failure: an integrative review. *Int J Nurs Stud* 2014;51(2):320-33.
7. Shojaei F. Quality of life in patients with heart failure. *Journal of Faculty of Nursing and Midwifery, Tehran University of Medical Sciences* 2008;14(2):72-8. [In Persian].
8. Dunlay SM, Redfield M, Weston SA, Therneau TM, Long K, Shah ND, et al. Hospitalizations after heart failure diagnosis a community perspective. *J Am Coll Cardiol* 2009;54(18):1695-702.
9. Chen J, Ross JS, Carlson MD, Lin Z, Normand SL, Bernheim SM, et al. Skilled nursing facility referral and hospital readmission rates after heart failure or myocardial infarction. *Am J Med* 2012;125(1):100.e1-9.
10. Ruppard TMDJ, Temple J. Medication adherence interventions for heart failure patients: A meta-analysis. *Eur J Cardiovasc Nurs* 2015;14(5):395-404.
11. Furuya RK, Mata LR, Veras VS, Appoloni AH, Dantas RA, Silveira RC, et al. Original research: telephone follow-up for patients after myocardial revascularization: a systematic review. *Am J Nurs* 2013;113(5):28-31.
12. Rafii FSF, Naasher Z, Azarbaad M, Hoseini F. Perspectives of patients and nurses on the reality of learning cardiac heart failure educational content. *Hayat* 2009;14(3-4):41-55. [In Persian].
13. Albert NM, Levy P, Langlois E, Nutter B, Yang D, Kumar VA, et al. Heart failure beliefs and self-care adherence while being treated in an emergency department. *J Emerg Med* 2014;46(1):122-9.
14. Piamjariyakul U, Smith CE, Russell C, Werkowitch M, Elyachar A. The feasibility of a telephone coaching program on heart failure home management for family caregivers. *Heart Lung* 2013;42(1):32-9.
15. Inglis SCCR, Dierckx R, Prieto-Merino D, Cleland JGF. Structured telephone support or non-invasive telemonitoring for patients with heart failure (Review). *Cochrane Library* 2015(10):1-261.
16. Cynthia M, Walker BLE, Karen S. The role of a self-directed technology to improve medication adherence in heart failure patients. *J Nurse Pract* 2014;10(10):856-63.
17. Wongpiriyayothar A, Piamjariyakul U, Williams PD. Effects of patient teaching, educational materials, and coaching using telephone on dyspnea and physical functioning among persons with heart failure. *Appl Nurs Res* 2011;24(4):e59-66.
18. Moattari AGM, Beigi P, Pishdad Gh. Impact of self management on metabolic control indicators of diabetes patients. *J Diabetes Metab Disord* 2012;11: 6.
19. Mosavi Far SAZM, Shadan P, Haqani H. Effect of two methods of follow-up (telephone and mobile) on adherence to treatment in patients with diabetes. *Iran J Diabetes Metab* 2011;10(4):11.
20. Gurol-Urganci I, Vodopivec-Jamsek V, Car J, Atun R. Mobile phone messaging for communicating results of medical investigations (Review). *Cochrane Library* 2012; 6:1-27.
21. Ferrante D, Varini S, Macchia A, Soifer S, Badra R, Nul D, et al. Long-term results after a telephone intervention in chronic heart failure: DIAL (Randomized Trial of Phone Intervention in Chronic Heart Failure) follow-up. *J Am Coll Cardiol* 2010;56(5):372-8.
22. Kannisto KA, Koivunen MH, Valimaki MA. Use of mobile phone text message reminders in health care services: A narrative literature review. *J Med Internet Res* 2014; 16(10):e222.
23. Ditewig JB, Blok H, Havers J, Veenendaal HV. Effectiveness of self management interventions on mortality, hospital readmissions, chronic heart failure hospitalization rate and quality of life in patients with chronic heart failure: a systematic review. *Patient Educ Couns* 2010; 78: 297-315.
24. Zeighami Mohammadi S, Shahparian M. Quality of life (QoL) and some factors related in males with heart failure in Karaj and Shahriar social security hospitals 2010. *Journal of research development in nursing and midwifery* 2012;8(2):1-13. [In Persian]
25. Yan J, You LM, Liu BL, Jin SY, Zhou JJ, Lin CX, et al. The effect of a telephone follow-up intervention on illness perception and lifestyle after myocardial infarction in China: a randomized controlled trial. *Int J Nurs Stud* 2014;51(6):844-55.
26. Scherr D, Kastner P, Kollmann A, Hallas A, Auer J, Krappinger H, et al. Effect of home-based telemonitoring using mobile phone technology on the outcome of heart failure patients after an episode of acute decompensation: randomized controlled trial. *J Med Internet Res* 2009;11(3):e34.
- Wong CK, Fung CS, Siu SC, Lo YY, Wong KW, Fong DY, et al. A short message service (SMS) intervention to prevent diabetes in Chinese professional drivers with pre-diabetes: a pilot single-blinded randomized controlled trial. *Diabetes Res Clin Pract* 2013;102(3):158-66.