

# Two Methods of Discharge Care Program Follow-up on Drug Treatment Adherence of Patients with Heart Failure

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## Abstract

**Background:** Heart failure is a potentially life-threatening condition that disrupts the normal flow of blood throughout the body. Patients with heart failure lack sufficient knowledge regarding drug treatment adherence. An effective discharge plan and its continuity can improve treatment adherence.

**Aim:** This study was performed with aim to compare two methods of discharge care program follow-up on drug treatment adherence of patients with heart failure.

**Method:** This quasi-experimental was conducted in 2022-2023 on 126 patients with heart failure in Iran. Participants were divided into the two intervention groups via telephone call (group A), and via video message (group B) and a control group (group C). The required data were collected through Morisky Medication Adherence Scale (MMAS-8) before and 12 weeks after the start of the intervention. In the intervention groups, the care plan was presented to the patients every two weeks.

**Results:** The mean drug treatment adherence scores increased to  $2.47 \pm 1.68$  in group A,  $1.51 \pm 2.11$  in group B, and  $0.83 \pm 1.60$  in group C, which was significantly different in each group and among the three groups ( $p < 0.001$ ). The Mean changes in the patient's drug treatment adherence in group A were statistically significant only compared to group C ( $p < 0.001$ ). After adjusting confounding variables (age, gender and cause of heart failure), there was a significant difference among the three groups in the patient's drug treatment adherence and quality of life ( $p = 0.002$ ).

**Implications for Practice:** According to the obtained results, the nurses are recommended to continue the care program after discharge and use technologies to improve treatment adherence.

**Keywords:** Care program, Drug treatment adherence, Heart failure, Telephone, Telenursing, Video recording

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## Introduction

Heart failure is a common disease with a poor prognosis and significant consequences such as mortality, morbidity, and healthcare costs (1-3). It is one of the main causes of death in the world among cardiovascular diseases (4). This disease can have common signs such as dyspnea, chest pain, palpitations, weakness, fatigue, liver congestion, ascites, quality of life disturbance, and limitations in daily activities (4,5). It is important to make change in lifestyle and take prescribed drugs, avoiding smoking for treatment of diseases (6). Patients with heart failure do not have enough knowledge regarding treatment regimen adherence and don't pay enough attention to the symptoms of the disease (7). It seems that patients do not use one-third to one-half of their prescribed medications in long-term conditions. Poor recall, difficulty in taking drugs, not correctly understanding and following instructions, and forgetting to take medication are some of the factors that make non-adherence to treatment (8). Patients are more likely to adhere to treatment if they know the reason for taking the drug, understand the effectiveness and benefits of the drug, figure out the benefits of using the drug (9).

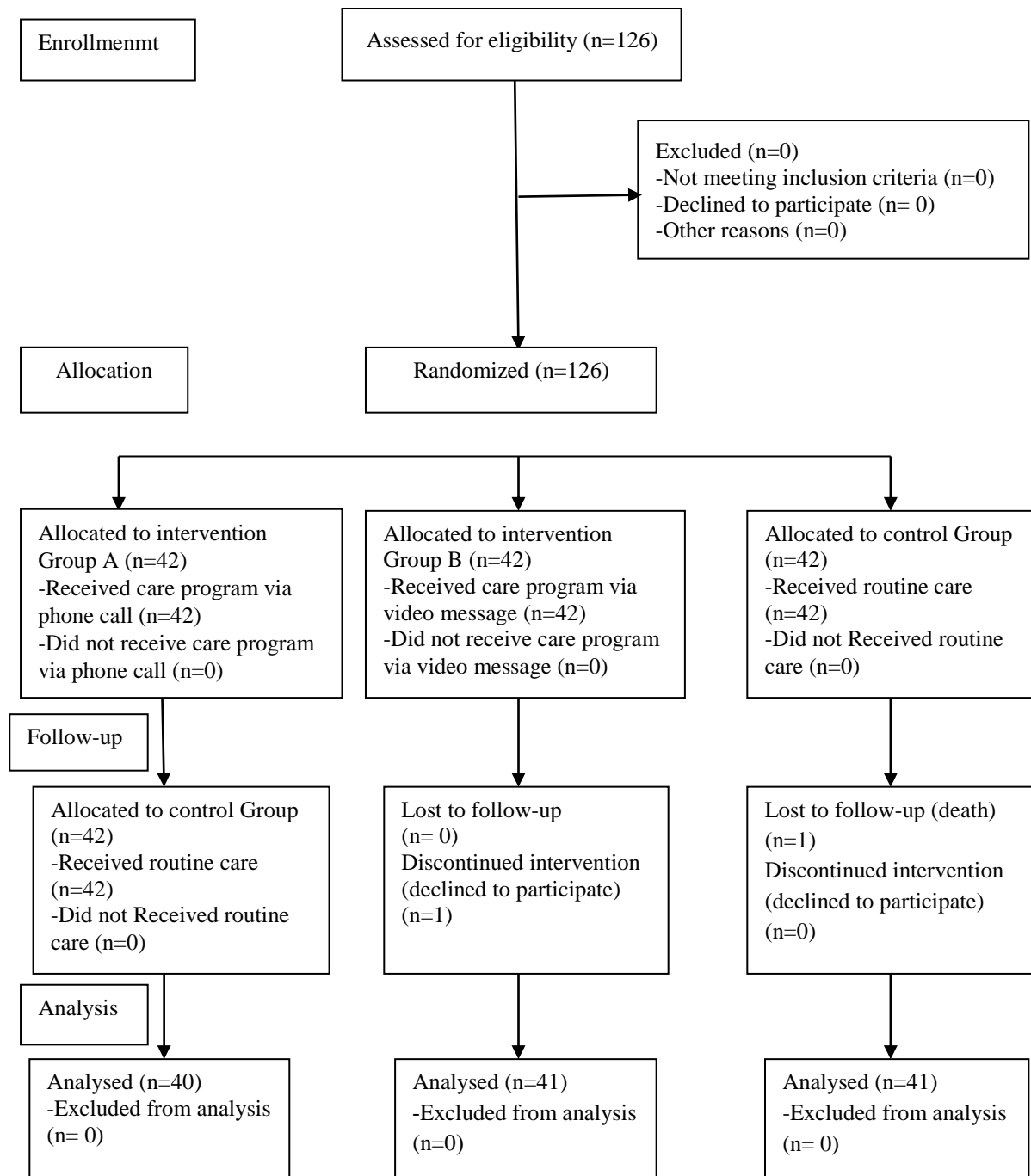
Some other methods for treatment adherence include educating patients to make decisions about their medications, comprehensibility, and accessibility of information, giving information about the risks and benefits of treatment, and patient concerns' recognition about medications (8). Additionally, when patients actively participate in the treatment process and are involved in informed decision-making, it can also increase treatment adherence (10). Clinical outcomes and self-care behaviors in patients can be improved by designing and implementing an efficient and appropriate healthcare program (11). Patients need continuous and long-term care after discharge (12). Telenursing is one of the ways to increase well-being and improve the services provision to patients and can improve self-care behaviors and decrease the needs of family caregivers (13,14). Telenursing can increase patients' understanding of their health condition (15). Telenursing for patients offers numerous advantages, including no limitations in time and place of treatment, which resulting in faster access to healthcare and services. Furthermore, it is effective in cost management (16). However, one of the disadvantages of remote health methods is the lack of access to the patients, particularly vulnerable populations, due to limited infrastructure and resources (17). It is possible to provide services and follow up care remotely by using technologies such as mobile phones, computers, Internet and social media such as Instagram, WhatsApp, and Telegram (18-21). Remote nursing care is expanding and developing and it is necessary to promote professional nursing based on the current demands of the society and the use of technology (15,22,23). Bernal-Jiménez et al. in 2021 investigated the effect of the health program via mobile phone on lifestyle and treatment compliance in people with coronary heart disease. Their results showed the effectiveness of health program through mobile phone on improving treatment adherence and lifestyle in these patients (24).

To the best of our knowledge, there is no study that compares the effect of two methods of the discharge care plan follow-up in the form of phone calls and video messages on drug treatment adherence of patients with heart failure. According to the importance of heart failure disease and the effect of a care plan more help is provided for patients to lead a better life by identifying a care plan that has a greater effect on patients' adherence to drug treatment. Therefore, the present study was performed with aim to compare the effect of two methods of the discharge care plan follow up in the form of phone calls and video messages in social networks on compliance with drug treatment in patients with heart failure.

## Methods

This quasi-experimental study with a pre-test and post-test design was performed in 2022-2023 on 126 patients with heart failure who were hospitalized in Modares Hospital in Tehran or referred to the hospital clinic as outpatient. The inclusion criteria were age 18-70 years, diagnosis of heart failure (The New York Heart Association Class I to III), ability to answer the questions, having a smartphone, absence of speech, hearing, and vision disorders, and no cognitive or mental disorders. Patients who didn't complete the research tools and those who didn't answer the phone calls were excluded from the research. The sample size in this study was determined according to the study of Mohammadi et al. (25), with a statistical error of 5% and a power of 80%, and using G\*Power software (version 3.1.9.2). Therefore, 38 patients were selected in each group that considering the 10% chance of dropping, 42 subjects were placed in each group and a total of 126 participants were

determined to be included in the study. At the end of the study, two participants due to death and two patients due to unwillingness were removed from the study. Finally, analysis was conducted on 122 participants (Figure 1).



**Figure 1.** CONSORT flow diagram of the study

This study was conducted after obtaining the code of ethics and sampling permission. A demographic questionnaire and MMAS-8 were used for data collection. The demographic information questionnaire also includes seven questions regarding age, gender, education, occupation, cause of heart failure, duration of heart failure, and presence of other diseases. The Morisky Medication Adherence Scale (MMAS-8) remains one of the most widely used mechanisms to assess patient

adherence. This scale contains 7 questions with “Yes” or “No” response choices and an additional Likert-type question (totally 8 questions). The question No. 8 is scored as (zero=never, one=occasionally, two=sometimes, three=usually, and four=always, where the score is divided by four). The total score ranges from 0 to 8. Scores of less than 6 indicate low adherence, scores of 6 to < 8 indicate moderate adherence, and score= 8 indicates high adherence. The validity of the Persian version of MMAS-8 was determined in the study of Moharamzad et al. on the patients with high blood pressure and it had good validity and high reliability ( $r=0.940$ ) (26). Morisky et al. in their study also showed that the instrument is reliable ( $\alpha=0.83$ ) (27). In the research by Mehrtak et al., the reliability of the tool was calculated by Cronbach's alpha 0.68 (28). In the present study, the questionnaire was given to 20 patients to measure its reliability, and internal reliability was calculated by determining Cronbach's alpha coefficient (0.72) using SPSS version 19 software.

Available sampling was done among all patients with heart failure class I to III hospitalized and referred to the outpatient clinic of Modares Hospital in Tehran. The patients had willingness to participate in the research and met the inclusion criteria. The researcher explained about the objectives of the research, the method, and duration of the research, the free participation in the research, and the confidentiality of people's information. The informed consent form was obtained from all the participants. The demographic information questionnaire and MMAS-8 were provided to the research units at the beginning of the intervention and end of the sixth session. Then the subjects were randomly divided into three groups (the intervention groups via telephone call (group A) and via video message (group B) and a control group (group C) by block randomization in 14 blocks of 9 blocks. To blind grouping, the allocation was done by someone other than the researcher through the internet link of blocked randomization.

The study was conducted over 12 weeks. The hospital discharge care plan was represented to all patients at first of the study. The patients in group A received the care program via mobile calls six times (once every two weeks for three months) for 30 minutes at a specific time which was set by the participants. The patients in group B received the care program through video messages sent via the WhatsApp social network and other available social networks. These video messages were sent individually to each patient every two weeks and lasted 20 to 30 minutes. The self-care program was related to the lifestyle, breathing pattern, assessment of cardiac output and tissue blood supply, fatigue, improvement of activity tolerance, diet and substances needed by the body, prevention of constipation, and diarrhea, control of nausea, and vomiting. Also, a care plan was provided in the field of infection prevention, fluid volume control, sexual activity, pregnancy, sleep pattern, smoking, mental factors and anxiety, improvement of body image, cardiac warning signs, medication counseling and management after discharge, identification of the person who is in charge of drug management at home, explain the reason for prescribing each drug, how it works and the duration of its use to the patient and caregivers, familiarity with drug interactions, know the side effects of drugs, ask the patient or caregivers about how to manage drugs and the concerns in this field, emphasize on the importance of coordination with health care providers in connection with changing the drug regimen and follow-up. At the beginning of each session, the patient's questions regarding the matters taught were answered, and to measure the efficiency of the care program provided, the patients were asked questions at the end of each session.

Reliable sources were used to collect educational materials (29-37) and the materials were provided to the six nursing faculty members who specialize in cardiovascular diseases and one heart failure specialist for review and evaluation of validity. Drug treatment adherence of all participants was evaluated by MMAS-8 before and after the intervention. It was compared in each group separately and among three groups (A, B, and C) by using statistical analysis. The normality of the data was confirmed using the Kolmogorov-Smirnov test. Data were analyzed by SPSS software (version 19). T-test was applied to compare MMAS-8 before and after the intervention in each group. ANOVA test was conducted to compare the results between the intervention and control groups and to determine the drug treatment adherence changes after the intervention among three groups with controlling the effect of confounding variables (age, gender and cause of heart failure).

## Results

A total of 122 patients participated in this study. The demographic characteristics of the patients in the control and intervention groups were presented in Table 1. The mean age scores of the patients

were  $54.85 \pm 11.68$  year and  $54.58 \pm 10.01$  year and  $52.09 \pm 13.25$  year in the intervention group A, intervention group B and control group, respectively ( $p=0.507$ ).

**Table 1. Demographic variables of the patients in the control and intervention groups**

| Variables                     | Group                                 |  |                   | P-value | statistical test result |
|-------------------------------|---------------------------------------|--|-------------------|---------|-------------------------|
|                               | Intervention group via phone call (A) | Intervention group via video message (B) | Control group (C) |         |                         |
| <b>Gender</b>                 |                                       |  |                   |         |                         |
| Female                        | 15                                    | 18                                       | 23                | 0.232*  | 2.919                   |
| Male                          | 25                                    | 23                                       | 18                |         |                         |
| <b>Education</b>              |                                       |  |                   |         |                         |
| Below bachelor                | 23                                    | 24                                       | 26                | 0.737*  | 6.873                   |
| Bachelor                      | 14                                    | 12                                       | 12                |         |                         |
| Master and PhD                | 3                                     | 5  | 3                 |         |                         |
| <b>Occupation</b>             |                                       |  |                   |         |                         |
| Unemployed                    | 20                                    | 14                                       | 20                | 0.453*  | 3.665                   |
| Employed                      | 20                                    | 27                                       | 21                |         |                         |
| <b>Cause of heart failure</b> |                                       |  |                   |         |                         |
| Congenital                    | 9                                     | 10                                       | 2                 | 0.036*  | 6.644                   |
| Adventitious                  | 31                                    | 31                                       | 39                |         |                         |
| None                          | 11                                    | 14                                       | 15                |         |                         |

\* Chi-Square test

Changes in the patients' drug treatment adherence before and after the intervention were compared in the intervention and control groups separately (Table 2).

**Table 2. Changes in patient's drug treatment adherence before and after the intervention in the intervention and control groups separately**

| Group                                    | Mean±Standard Deviation     |                             |  | Test result               |
|--|-----------------------------|-----------------------------|--|---------------------------|
|  | Before intervention         | After intervention          | Difference before and after intervention |                           |
| Intervention group via phone call (A)    | 6.10±1.93                   | 8.58±1.78                   | 2.47±1.68                                | $p<0.001^*$<br>$t=-9.322$ |
| Intervention group via video message (B) | 6.83±2.32                   | 8.34±2.00                   | 1.51±2.11                                | $p<0.001^*$<br>$t=-4.587$ |
| Control (C)                              | 6.68±1.85                   | 7.51±1.96                   | 0.83±1.60                                | $p<0.001^*$<br>$t=-3.328$ |
| Test results between three groups        | $p=0.242^{**}$<br>$F=1.434$ | $p=0.035^{**}$<br>$F=3.455$ | $p<0.001^{**}$<br>$F=8.436$              |                           |

\*T-test; \*\*ANOVA test

**Table 3. Mean score of drug treatment adherence of patients before and after the intervention in the intervention and control groups**

| Variable   | Group   | Group   | Mean±SD          | Test result |
|--|---------|---------|------------------|-------------|
| The difference in average scores of patient's drug treatment adherence in pre-test and post-test | Group A | Group B | $0.96 \pm 0.40$  | * $P=0.061$ |
|  |         | Group C | $1.64 \pm 0.40$  | * $P<0.001$ |
|  | Group B | Group A | $-0.96 \pm 0.40$ | * $P=0.061$ |
|  |         | Group C | $0.68 \pm 0.39$  | * $P=0.237$ |
|  | Group C | Group A | $-1.64 \pm 0.40$ | * $P<0.001$ |
|  |         | Group B | $-0.68 \pm 0.39$ | * $P=0.237$ |

\*Post Hoc test

The difference in the mean scores of patients' drug treatment adherence before and after the intervention among the three groups was presented in Table 3. The results showed a statistically significant difference in the patients' drug treatment adherence before and after the intervention in each group and also indicated a statistically significant difference among the three groups ( $p < 0.001$ ).

After adjusting confounding variables (age, gender and cause of heart failure), there was a significant difference among the three groups in the patient's drug treatment adherence and quality of life ( $p = 0.002$ ).

## Discussion

The purpose of the present study was to compare two methods of discharge care program follow-up using phone calls and video messages in social networks on drug treatment adherence of patients with heart failure. The results indicated that the mean scores of patients' drug treatment adherence significantly increased after the intervention in all three groups. When patients understand the effectiveness of a drug and its potential side effects, it can lead to increased adherence to the treatment (10). Thus, motivation increases adherence to drug treatment. These findings are in accordance with the results of the study by Gour et al. (2022) with aim to determine the effect of remote assessment by using an online video-based educational module in order to modify lifestyle and treatment adherence in women with polycystic ovary syndrome. The findings indicated that the intervention had a positive effect on the lifestyles modification and were complied with the treatment (38). The educational programs through video may increase attention and accuracy to educational items that was similarity of the present study and Gour et al.'s research.

Also, providing a self-care educational program and lifestyle modification can increase the knowledge of patients about disease management and improve their lifestyle according to the disease. The results of Bruggmann et al.'s study (2021) with aim to investigate the effects of the interactive web-based video on drug adherence of patients with myocardial infarction showed that the intervention has led to an increase in patients' knowledge and adherence to drug treatment (39). Similar to the results of the present study, increasing awareness about drugs and their correct use can increase drug treatment adherence. However, Fields et al. (2016) investigated the effect of remote ambulatory management in the form of follow-up phone calls on treatment compliance in patients with obstructive sleep apnea. Their results showed that the intervention did not affect treatment adherence (40). The reason for this different finding may be the difference between educations before intervention. The education in the Fields et al.'s study was face-to-face in the control group, but it was given through a digital video screen and an information sheet in the intervention group which was confusing for participants. Another reason for this discrepancy could be telephone follow-up with a time delay of two to six months after the completion of the study.

The research conducted by Kröncke et al. in 2021 explored the effect of video consultation on adherence to drug treatment, medical appointments, and psychosocial status in young patients who underwent liver transplantation in childhood. The results represented decrease in patients' adherence, acceptance of video consultation, and participation in medical appointments. The researcher believes that the young age of the participants, the fear of transplanting and visiting a local doctor, and the long distance from the treatment center are among the reasons for the ineffectiveness of the intervention (41). One of the reasons for the discrepancy with the present study is the age difference of the patients in the two studies. Patients in Kröncke et al.'s study were young and they may not have had enough desire and opportunity for video counseling. Also, due to being involved with the disease since childhood, they may have less willing to continue and adhere to the treatment.

Also, the results of our study indicated that changes in the mean scores of drug treatment adherence of patients improved in group A in comparison with group B after the intervention, but, it was not statistically significant. Moreover, it improved compared to group C and it was statistically significant. These parameter improved in group B compared to group C after the intervention, but it was not statistically significant. In the explanation of the mentioned finding, it can be concluded that the patients may have paid more attention to the materials related to the use of drugs that were directly presented to them through telephone calls. Thus, the mean scores of drug treatment adherence more increased in group A. Also, other patients received better results related to the improvement of disease-annoying symptoms by taking drugs. So, the desire to follow the drug treatment increased in

all groups. The patient's medication adherence scores in the intervention groups more increased compared to the control group.. The study conducted by Kumar et al. (2018) in India determined the type of mobile phone application that patients with TB prefer to remind them to take medication and adherence. Their research showed that the participants prefer voice calls over SMS-based reminders. Also, most participants preferred to connect with healthcare workers via video compared with in-person (42). Their result was similar to the results of the present study. It seems that the patients prefer connecting to health care workers directly to receive a reminder to take medication and their desire and attention to the recommendations increase compared with other methods. In an examination carried out by Schulze et al. in 2019, the effect of telemedicine in the form of phone calls and text messages on medication adherence was evaluated in patients with severe mental illness. The results showed that the intervention led to improved medication adherence in patients after six months (43). Similar to the results of the present study, they used two methods of telemedicine transmission for patients and the intervention has led to improved medication adherence in patients.

Among the strengths of the research, we can point out the reproducibility, direct comparison of the results, and the use of a large statistical population. One of the limitations of this research can be the researcher restriction to evaluate the study on larger scale and in different geographical areas due to budget and time limitations. Also, the individual beliefs of patients related to heart failure disease, the treatment process, and the acceptance of the provided training can affect the results of the research, which cannot be managed. It is suggested that the effect of Telenursing program on drug treatment adherence be investigated in future research in patients over 70 years old and heart failure class IV of the New York Heart Association. Also, it is recommended that the effect of Telenursing program on drug treatment adherence in patients with heart failure be compared with other educational methods like group education and face-to-face training.

### Implications for practice

Patients with heart failure need long-term care which is related to the disease and pay attention to treatment costs due to the chronic nature of heart failure and the increase in the burden of cardiovascular diseases. Mobile phones can be used to transfer the care plan to patients at home and remote follow-up due to the possibility of wide mobility, availability, and low cost. It is possible to continue nursing care in this way.

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### Conflicts of interest

The authors declared no conflict of interest.

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