The Effect of Discharge Planning on Adherence to Treatment in Patients with Ischemic Heart Disease

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Abstract

Background: Ischemic heart disease (IHD) is a common cardiovascular disease. One of the main concerns of health system staff is the non-compliance of these patients in adherence to treatment after discharge from the hospital. Designing and implementing a program to follow up patients after discharge can positively affect their rehabilitation and treatment adherence.

Aim: This study was performed with aim to investigate the effect of discharge planning on adherence to treatment in patients with ischemic heart disease.

Method: This quasi-experimental study was performed with the participation of 70 ischemic heart disease patients hospitalized in Hamadan Cardiovascular Hospital in 2018. Participants were selected by simple random sampling and divided into experimental (n = 35) and control (n = 35) groups using permutation blocks. In the first 24 hours of admission, a researcher-made questionnaire of adherence to treatment was completed by all participants to assess the educational needs. The discharge planning consisted of two stages: before discharge and after discharge from the hospital with telephone follow-up for 2 months. Then adherence to treatment was re-assessed after discharge. Data was analyzed using SPSS software (version 22) by chi-square, Fisher's exact test, independent t-test and paired t-test. P<0.05 was considered statistically significant.

Results: Before the intervention, there was no statistically significant difference between the control and experimental groups in adherence to treatment (p> 0.05); however, after the discharge planning, adherence to treatment significantly increased in all areas in the experimental group (P <0.001).

Implications for Practice: Implementation of discharge planning improves and promotes adherence to treatment in IHD patients.

Keywords: Adherence, Discharge planning, Ischemic heart disease, Treatment

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Introduction

Nowadays, cardiovascular diseases are the most significant cause of death worldwide (1). According to the World Health Organization, 1.7 million deaths occur due to this disease annually, and it is predicted that by 2030, this rate reach to more than 23 million deaths (2, 3). In Iran, cardiovascular disease is the most important cause of death, so that it includes 46% of all deaths in the country (4). Ischemic heart disease (IHD) is a common cardiovascular disease (CVD) (2) in which sufficient oxygen does not reach to a part of the myocardium. The most common cause of IHD is atherosclerotic disease of one or more coronary arteries, which leads to decreased blood circulation to an area of the myocardium resulting in inadequate perfusion of the myocardium coronary artery (5). Regarding the abundance of evidence that indicates the relationship between lifestyle and cardiovascular disease, the need to emphasize lifestyle modification, as an important factor in determining the prognosis and complications of this disease is quite prominent and justifiable (6, 7). IHD patients are at risk of recurrent heart attack and are always struggling with the disease; for this reason, they should be treated long-term to reduce the risk of heart attack recurrence (8). In this regard, one of the major health system employees' concerns is the lack of patients' adherence to treatment after discharging from the hospital (9).

The World Health Organization defines adherence to treatment as the amount to which a patient's behavior conforms, including how he or she receives medication and follows medication regimen, food diet, lifestyle changes, comply with the recommendations of health care providers (10, 11). There are many barriers that prevent patients following the treatment plan. These factors include low levels of knowledge and awareness, difficulty in commuting, financial costs, embarrassment and reduced access to health care services (12, 13). Adherence to treatment is often considered as a crucial remedy option in chronic diseases because it is cheaper than other therapeutic interventions (6). Undoubtedly, teaching health-related behaviors is a method by which one can take a big step in promoting society's health and improving the quality of lifestyle. Educating the patient and following up after discharge plays a vital role in the patient's rehabilitation. One of the methods of education and follow-up is designing and implementation of discharge program for patients (14). A review of previous studies shows that the discharge program has always been considered by researchers. The study of Salmani et al. et al. (2017), which measured the impact of the discharge planning on the quality of patients' life suffered from breast cancer indicated that the discharge planning can be considered as an influential method to improve the quantity of life in patients with breast cancer after surgery (15). Also, Tavşanlı et al. (2013) in their research in Turkey reported that videophone technology is useful in the post-discharge planning to control the blood sugar of diabetic patients (16). In the study of Paryad and colleagues with aim to assess the status of following the care instructions in patients undergoing coronary artery bypass graft surgery, the results revealed that only 11.5 % of the surveyed units had a good adherence to the diet (17); it is obvious that the effectiveness of these services is highly related to the conditions of each country. Considering that post-discharge care for ischemic heart patients is less studied in the country and there are limited internal studies in this area, and since providing educational manuals to patients alone cannot reduce the consequences of chronic diseases and also allocating studies to the post-surgery stages, rehabilitation and advanced stages of the disease; more comprehensive studies are needed in these patients in order to prevent advanced stages of the disease. Therefore, the present study was conducted with aim to determine the effect of discharge planning on adherence to treatment in patients with IHD in Farshchian Cardiovascular Hospital of Hamadan.

Methods

This quasi-experimental study was performed on 70 patients with IHD hospitalized in Hamadan Farshchian Cardiovascular Hospital in 2018. The subjects were divided into experimental (n = 35) and control (n = 35) groups according to the inclusion criteria and using random permutation blocks (CONSORT flow diagram, Figure 1).

Inclusion criteria were full consciousness and lack of cognitive problems, diagnosis of IHD by a specialist and approved by the relevant physician, at least passing 6 months since the diagnosis of the disease, having a mobile phone and the ability to use it. Exclusion criteria were the need for re-admission or emergency interventions during the study, the patient's death, the use of other formal training classes, rehabilitation during the research, and the patient's refusal to continue

participating at any stage of the study. In this way, a permuted block randomization method with blocks of size 4 was used to randomly allocate the participants into two groups of control and intervention. This was conducted using R software version 3.5.2.

The sample size was conducted according to the Cochrane sample size formula for comparing two means by considering the 95% confidence level of the test , the test power equal to 80% and and colleagues and its validity and reliability was confirmed (19). In this study, in order to determine the reliability of the treatment adherence tool, the method of determining the internal correlation of the questionnaire items was used by measuring Cronbach's alpha and its reliability was calculated based on Cronbach's alpha coefficient in three areas of food diet adherence, physical activity and medication regimen as0.96, 0.94, 0.89, respectively. Diet questions involve two sections which address dietary habits and types of consumed foods. The first part contains 10 questions related to the patient's dietary habits on a Likert scale (never, rarely, sometimes, often and always) which is scored from 0 to 4 based on the patient's response, and the second part consists 20 questions including the type of food consumed based on the number of times (daily, 3-4 times a week, 1-2 times a week, 1-2 times a month and never) which is scored from 4-0 (4 means the most desirable answer and 0 means the least desirable answer), and the total points were 0- 120.
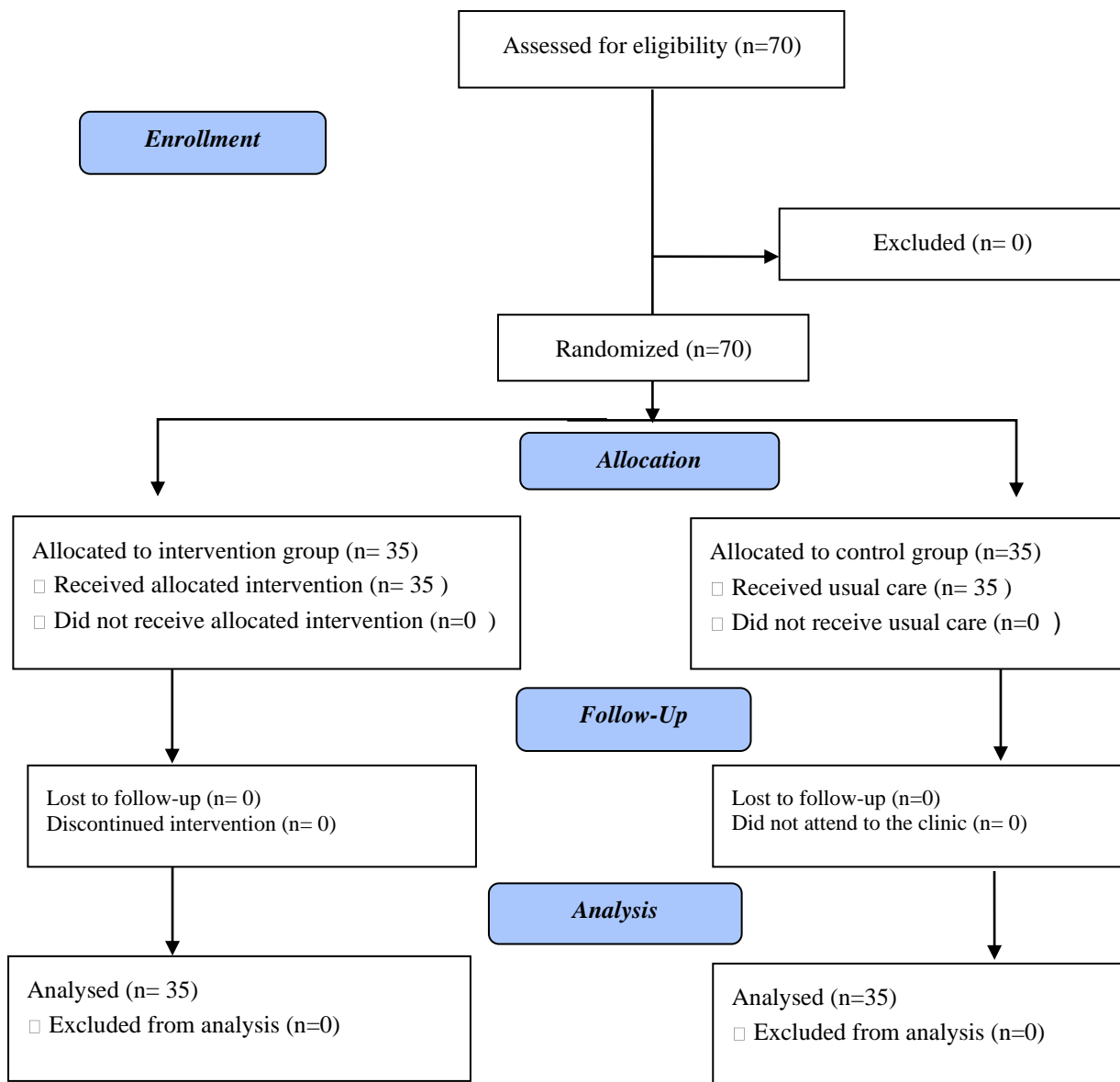

Figure 1. CONSORT flowchart of the study

In the field of exercise / physical activity, the test includes 10 questions related to the pattern of exercise / physical activity, which was scored based on the person's response to the questions with a score of 4-0 (4 means the most desirable answer and 0 means the least desirable answer), and the total score in the field of physical activity was 0-40.

The range of medication regimen consisted of 5 questions related to the patient's medication consumption pattern, which was scored based on the individual's answers to the questions with a score of 0-4, and the total score in this area was 0-20. Then, based on the total scores obtained by patients from the questions in each area, the patients' adherence to treatment was calculated, so the highest possibility in each area indicated the desired adherence to treatment.

The aim and process of the research was explained to all the participants. Patients had given informed consent to the anonymous use of their information for educational and research purposes. Then, discharge planning was performed based on the stages of the nursing process in two stages in four sessions (30minutes) of face-to-face training before discharge and 8 follow-up cases through telephone conversation 10-15 minutes after discharge in the experimental group. The control group only received the usual care of the hospital.

The first stage was the first 24 hours after admission. At this level, the discharge program process began based on the stages of the nursing process (19). In the implementation phase, the training was provided according to the care needs extracted from the latest references in the field of educational needs of IHD patients and previous research in this field, which was arranged based on three areas of food diet, medication regimen, exercise and physical activity implemented by question and answer methods as a care plan in four sessions until the patients were discharged. It should be noted that in all sessions, one of the patient's family members who lived with him/her, or was involved in the patient's care plan was present and the training items were stated in a very simple and comprehensible method. Then in the second phase (post-discharge phase), the follow-up period was divided into two sections of 2 months. In the first two months after discharge, the patients were followed up using a phone call once a week (a total of eight telephone conversations). Telephone follow-ups include: review of the taught content, emphasizing and reminding regular consumption of medicines according to the prescribed time and dosage and the prescribed method of consumption, healthy diet, including: compliance with the restriction of salt consumption and reduction of fat consumption, more fruit consumption, vegetables and fiber, gradual start of physical activity, not consuming alcohol and quitting smoking, as well as measuring blood pressure on a daily basis and informing the doctor about headache, dizziness, abnormally breathing during exercise, chest pain and epistaxis, etc. In the second two months after discharge, the patients contacted the researcher only if there was a problem or went to the hospital in-person. Finally, two months after the end of telephone conversations, the questionnaire of treatment adherence in IHD patients was again completed by the participants in both groups (Figure 2).
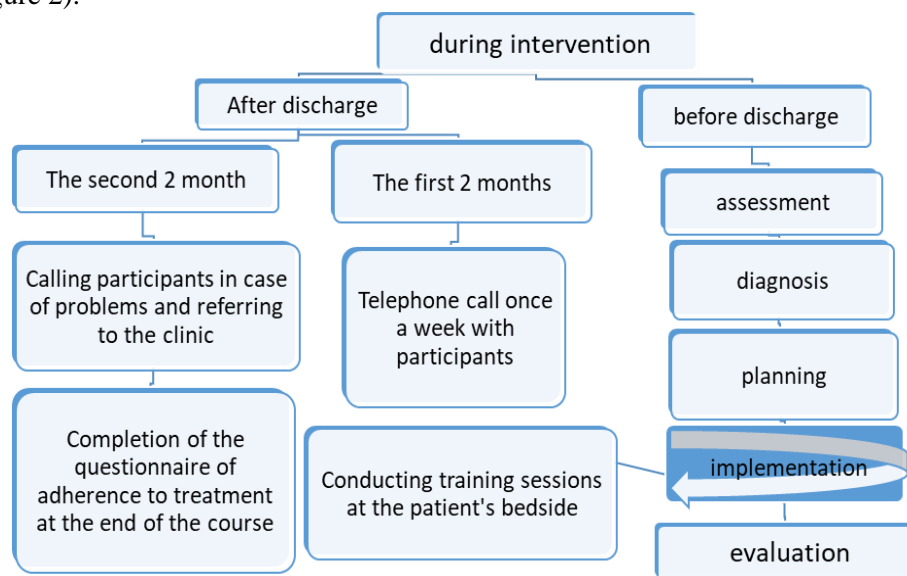

Figure 2. discharge planning based on nursing process diagram

Data analysis was performed by SPSS software (version 22) and using descriptive and inferential statistics test. Paired t-test, Independent t-test, chi-square and Fisher's exact test were used to analyze the data. P<0.05 was considered statistically significant.

Results

In this study, the majority of participants in both intervention and control groups were in the age range of 45 to 65 years. Mean age of patients in the intervention group was (57.49 ± 11.495) year and in the control group was (60.17 ± 11.813) year.

Also, 51.4% of the patients in the intervention group and 48.6% in the control group were male and the rest were female. In addition, most patients in the intervention (77.1%) and control (85.7%) groups were married. In the intervention group, the highest number of patients were illiterate (54.3%) and only 11.4% had university education. Moreover, 48.6% of patients in the control group had no university education and only 5.7% had university education. In the intervention group (71.4%) and in the control group (68.6%) of patients had high blood pressure. In the intervention group (74.3%) of patients and in the control group (42.9%) did not have information about the disease. Therefore, the results of Chi-square test showed no significant difference between the intervention and control groups in terms of demographic variables (except information about the disease) (p> 0.05). Further details on the demographic information of the research samples were shown in Table 1.

Table 1. Demographic Information of Participants

Demographic variables		Experimental group N (%)	Control group N (%)	p-value
Age	<45	(14.3%)5	5(14.3%)	0.530*
	45--65	23(65.7%)	19(54.3%)	
	>65	7(20%)	11(31.4%)	
Gender	female	17(48.6%)	18(51.4%)	0.811*
	male	18(51.4%)	17(48.6%)	
Marital status	single	8(22.9%)	5(14.3%)	0.356**
	married	27(77.1%)	30(85.7%)	
Job status	housewife	15(42.9%)	19(54.3%)	0.337**
	employee	4(11.4%)	4(11.4%)	
	retired	4(11.5%)	5(14.3%)	
	self-employed	13(37.1%)	6(17.1%)	
Education level	illiterate	19(54.3%)	17(48.6%)	0.398*
	under diploma	7(20.0%)	13(37.1%)	
	diploma	5(14.3%)	3(8.6%)	
	academic	4(11.4%)	2(5.7%)	
Residence place	city	19(54.3%)	18(51.4%)	0.967**
	countryside	4(11.4%)	4(11.4%)	
	village	12(34.3%)	13(37.1%)	
Family income	Less than enough	25(71.4%)	24(68.6%)	0.961**
	Enough	8(22.9%)	9(25.7%)	
	More than enough	2(5.7%)	2(5.7%)	
History of suffering chronic diseases	blood pressure	25(71.4%)	24(68.6%)	0.815*
	blood fat	20(57.1%)	15(42.9%)	
	diabetes	9(25.7%)	5(14.3%)	
	respiratory	5(14.3%)	7(20.0%)	
	others	1(2.9%)	1(2.9%)	
Information about disease	yes	9(25.7%)	20(57.1%)	0.008*
	no	26(74.3%)	15(42.9%)	

*Chi-square test/ ** Fisher's exact test

Table 2. Comparison of patients' adherence to treatment plan in experimental and control groups before and after intervention based on discharge plan

Adherence to treatment	Group	Before intervention (Mean±SD)	After intervention (Mean±SD)	Mean change	p-value*
Following food diet	experimental	54.40±8.56	92.23±3.532	37.82	0.001
	control	54.86±8.30	56.54±8.340	1.68	0.001
	p-value**	0.821	<0.001		
Following exercise program & physical activity	experimental	19.73±3.64	32.97±2.467	13.34	0.001
	control	19.91±4.17	20.06±3.977	0.15	0.392
	p-value**	0.761	<0.001		
Following medication regimen	experimental	10.46±2.33	16.06±1.41	5.60	0.001
	control	10.66±2.28	10.69±2.51	0.03	0.869
	p-value**	0.718	<0.001		
Adherence to treatment	experimental	84.49±9.91	141.26±5.24	56.77	0.001
	control	85.43±10.79	87.29±10.62	1.85	0.001
	p-value**	0.705	<0.001		

*Paired t-test   **Independent t-test

Before the intervention, there was no statistically significant difference between the control and experimental groups in terms of adherence to treatment (p> 0.05); however, after the discharge planning, patient's adherence to treatment in all areas significantly increased in the experimental group (P <0.001). In the control group after the intervention, there was a statistically significant increase in the field of food diet and adherence to treatment (p = 0.001); while changes in following the medication regimen, physical activity and exercise program were not statistically significant (p> 0.05) (Table 2).

It should be noted that some areas were significant in the control group, even though this difference was insignificant compared to the experimental group, which can be attributed to the hospital's education and patient's education unit (Table 2).

Discussion

The results of the present study indicated that the use of discharge planning significantly affected adherence to treatment in IHD patients. These results were in line with the findings of the study by Kobe et al. (2014), which in their review article examined the degree of adherence to the treatment in patients with coronary artery disease. Their results indicated that telephone follow-up increased the patient's adherence to treatment and consequently led to less re-admission of patients in the hospital (20). Also, Dale et al. (2015) and Kamrani et al. (2015) in their studies showed that following-up of patients' status by nurses can boost following the treatment plan in chronic patients (21, 22) .

Furthermore, Damush et al. (2015) in a study on patients suffering from stroke showed that adherence to the treatment plan can be significantly improved by using training in their programs (23). The results of the studies by Dizavandi (2021) et al. and Shojaee et al. (2013), which examined the effect of patient's education and telephone follow-up by the nurse on self-efficacy and re-admission of patients with heart failure and covid-19, are also consistent with the results of the present study (24, 25). Therefore, following the treatment programs via continuous training and follow-up, which is the leading pillar of the discharge planning is vital and economical for patients, especially chronic diseases patients, to achieve improvement and promotion of health care. On the other hand, the results of a study conducted by Beaver et al. on patients suffer from breast cancer did not confirm the results of the present research. Their study showed that patients' follow-up did not have much effect on following the treatment in patients with breast cancer (26). The reason for the lack of follow-up in breast cancer patients can be the nature of cancer and its impacts on the patient's ability to accept treatment. A study by Wang et al. (2013) which examined the effect of home visits and telephone follow-up on post-discharge training and re-admission of patient also showed that telephone follow-up alone may not be effective in reducing patients' re-admission. Different methods were utilized for

post-discharge training, and in order to have more influential training, an educational pamphlet was also used in addition to telephone follow-up (27).

One area of following treatment is keeping diet plan. In line with the effect of using the discharge planning on diet adherence, the results of the present study represented a significant increase in patients' diet adherence. In this regard, the study of Zakeri Moghaddam et al.(2016), which was conducted to evaluate the effect of self-management program on therapeutic adherence in patient with ischemic heart disease, showed that the implementation of self-management program leads to better adherence of therapy in these patients (18). The findings of the current research were also consistent with the study by Kamrani et al., which investigated the impact of telephone training and follow-up by a nurse on adherence to treatment in patients with acute coronary syndrome (22). The results of the present study are similar to the findings of Hung et al., who gave telephone counseling to patients after bone marrow transplantation about their nutritional status and physical activity (29), as well as the results of Joekes's study aimed to improve diet adherence in patients with myocardial infarction, and also some other studies which measured the effect of telephone follow-up and discharge planning on the adherence to the diabetic patients (20, 31, 32). However, in the studies by Nahapetyan et al. and Paryad et al., only a small percentage of participants followed the dietary instructions; several factors can influence this outcome (17, 28). Obviously, achieving a proper diet requires a deep understanding of the disease and also having a good economic status of the family, given that most of the patients in the present study did not have a good economic status, it cannot be expected that they have a perfectly appropriate diet and eating habits.

Another area of following the treatment is continuing exercise program and physical activity. The present research indicated that the discharge program increased patients' adherence to the recommended exercise program and physical activity after discharge from the hospital. This finding is consistent with the study of Bikmoradi and colleagues (29). Also, the Lao's study showed that telemedicine can increase continuing the exercise program and exercise ability in patients suffering from chronic obstructive pulmonary disease (30). However, the disease studied in the current research was different from the disease in the Lao's study; also several educational methods such as training sessions, booklets and telephone follow-up were used, which strengthens the trainings provided to the patients.

Another area of treatment adherence is following the medication regimen. The outcomes of this study showed that the implementation of the discharge planning increases adherence to the medication regimen. This finding was consistent with the results of a study by Rinfert et al. (31) which showed increase in the rate of following the use of antiplatelet drugs in patients with stents. This finding was also consistent with the results of other studies which aimed to follow patients through SMS reminder system leading to increased drug adherence in patients suffered from acute coronary syndrome (32-34). The results of the present study were also consistent with the results of the study by Yadegary et al. with the aim of applying an educational program on drug self-management of patients with epilepsy (35). Also, Tang et al. reported the results similar to the results of the present study; they concluded that follow-up improves the patients' drug adherence (36). Therefore, according to the present study, the implementation of discharge planning based on the stages of the nursing process can be introduced as a basic method to increase following the medication regimen. One of the limitations of this study was individual differences of the participants, which may affect the results. Consequently, the researcher's lack of confidence in the accuracy of the answers given by participants was another limitation of the study. Furthermore, individual beliefs and differences affect a person's learning and application of training, which can affect outcomes that cannot be controlled. The strengths of this study included saving the patient's time and money. Blinding method was not used in this study.

Implications for practice

The results of this study indicated that a discharge planning along with treatment plan for IHD patients lead to positive results in terms of following the diet food, exercise and activity plan, medication regimen and in general following the patient's adherence to treatment plan. In this regard, the existence of a comprehensive educational plan based on the patients' needs can reduce health care costs and increase patient's independence. In addition to education, it is necessary to follow-up with aim to establish and create a continuous and dynamic care relationship to increase awareness and

strengthen the performance of an effective care process that improves the quality of patient's life and reduces the complications of the disease. For this purpose, it is suggested that a separate unit called the discharge planning unit be considered in hospitals and medical centers, using the nurses' experiences, in order to design and implement a discharge plan for patients.

Acknowledgments

Conflicts of interest

The authors declared no conflict of interests.

References

1. .Sanaie N, Nejati S, Zolfaghari M, Alhani F, Kazemnezhad A. The effects of family-based empowerment on family cooperation in following patient treatment regime after coroner arteries bypass surgery. 2014.
2. .Miri J, Naderipour A, Ashtaranian H, Hashemian A. The Effect of Choronic Disease Self-Management Program on Health status of Patients Undergoing Coronary Artery Bypass Graft Surgery. Critical Care Nursing 2016;9.(١)
3. .Mendis S, Puska P, Norrving B, Organization WH. Global atlas on cardiovascular disease prevention and control. World Health Organization; 2011.
4. Taebi M, Abedi HA, Abbasszadeh A, Kazemi M. Incentives for self-management after coronary artery bypass graft surgery. Iranian journal of nursing and midwifery research. 2014;19(7 Suppl1):S64.
5. Kasper D, Fauci A, Hauser S, Longo D, Jameson J, Loscalzo J. Harrison's principles of internal medicine. McGraw-Hill Professional Publishing; 2015.
6. Baljani E, Rahimi Z, Heidari S, Azimpour A. The effect of self management interventions on medication adherence and life style in cardiovascular patients. Scientific Journal of Hamadan Nursing & Midwifery Faculty. 2012;20(3):58-68.
7. Mohammadian H, Mousavi G, Eftekhar-Ardebili H, J K-Z. Lifestyle of university student in kashan. 2015:10.
8. Harvey PW, Petkov JN, Misan G, Fuller J, Battersby MW, Cayetano TN, et al. Self-management support and training for patients with chronic and complex conditions improves health-related behaviour and health outcomes. Australian Health Review. 2008;32(2):330-8.
9. Vaillant-Roussel H, Laporte C, Pereira B, Tanguy G, Cassagnes J, Ruivard M, et al. Patient education in chronic heart failure in primary care (ETIC) and its impact on patient quality of life: design of a cluster randomised trial. BMC family practice. 2014;15(1):208.
10. Bocchi EA, Cruz F, Guimarães G, Moreira LFP, Issa VS, Ferreira SMA, et al. Long-Term Prospective, Randomized, Controlled Study Using Repetitive Education at Six-Month Intervals and Monitoring for Adherence in Heart Failure OutpatientsCLINICAL PERSPECTIVE: The REMADHE Trial. Circulation: Heart Failure. 2008;1(2):115-24.
11. Moayed MS, Ebadi A, Khodaveisi M, Toosi MN, Soltanian AR, Khatiban M. Factors influencing health self-management in adherence to care and treatment among the recipients of liver transplantation. Patient preference and adherence. 2018;12:2425.
12. Moayed M, Khatiban M, Toosi MN, Khodaveisi M, Soltanian A, Ebadi A. Barriers to Adherence to Medical Care Programs in Liver Transplant Recipients: A Qualitative Study. International journal of organ transplantation medicine. 2019;10(3):115.
13. Neubeck L, Freedman SB, Clark AM, Briffa T, Bauman A, Redfern J. Participating in cardiac rehabilitation: a systematic review and meta-synthesis of qualitative data. European journal of preventive cardiology. 2012;19(3):494-503.
14. Farazmand J, Nasiripour A, Raeissi P. The effect of telephone follow-up programs after hospital discharge on hope and the quality of life in patients admitted to the coronary care unit (CCU). Journal of Babol University of Medical Sciences. 2017;19(2):41-6.
15. Salmani S, Nikbakht Nasrabadi A, Imanipour M, Hosseini M. The Effects of Discharge Planning

on Quality of Life in Breast Cancer Patients. Novin Health Journal. 2017;1(2):26-33.

16. Tavşanlı NG, KARADAKOVAN A, SAYGILI F. The use of videophone technology (telenursing) in the glycaemic control of diabetic patients: a randomized controlled trial. Journal of Diabetes Research and Clinical Metabolism. 2013;2(1):1.

17. Paryad E, Kazemnezhad Leili E, Booraki S, SadeghiMeibodi A, Nassiri Sheikhani N. Study status of care adherence and its related factors in patients undergoing. Journal of Holistic Nursing And Midwifery. 2015;25(3):34-45.

18. Zakerimoghadam M, Ebrahimi S, Haghani H. The effect of self-management program after discharging on therapeutic adherence in patient with ischemic heart disease. Iranian Journal of Nursing Research. 2016;11(1):17-24.

19. Dehnabi A, Navipour H, Radsepehr H, Tadayonfar M. Presentation of nurses' functional guide for discharge planning on self-efficacy of type II diabetic patients. Quarterly Journal of Nursing Management. 2017;6(2):60-71.

20. Kotb A, Hsieh S, Wells GA. The effect of telephone support interventions on coronary artery disease (CAD) patient outcomes during cardiac rehabilitation: a systematic review and meta-analysis. PLoS One. 2014;9(5):e96581.

21. Dale LP, Whittaker R, Jiang Y, Stewart R, Rolleston A, Maddison R. Text message and internet support for coronary heart disease self-management: results from the Text4Heart randomized controlled trial. Journal of medical Internet research. 2015;17(10):e237.

22. Kamrani F, Nikkhah S, Borhani F, Jalali M, Shahsavari S, Nirumand-Zandi K. The effect of patient education and nurse-led telephone follow-up (telenursing) on adherence to treatment in patients with acute coronary syndrome. Iranian Journal of Cardiovascular Nursing. 2015;4(3):16-24.

23. Damush TM, Myers L, Anderson JA, Yu Z, Ofner S, Nicholas G, et al. The effect of a locally adapted, secondary stroke risk factor self-management program on medication adherence among veterans with stroke/TIA. Translational behavioral medicine. 2015;6(3):457-68.

24. Rajab Dizavandi A, Shakiba A, Rastaghi S, Rad M. The effect of telenursing on the self-efficacy of covid-19 patients after discharge from hospital. Evidence Based Care. 2021;11(3):44-52.

25. Shojaee A, Nehrir B, Naderi N, Zareiyan A. Effect of patient education and telephone follow up by the nurse on the level of hope in patients suffering from heart failure. 2013.

26. Luker K, Williamson S, Hindley A, Susnerwala S, Dunn G, Beaver K, et al. Comparing hospital and telephone follow-up. BMJ. 2009;338:a3147.

27. Wong FKY, Chow SKY, Chan TMF, Tam SKF. Comparison of effects between home visits with telephone calls and telephone calls only for transitional discharge support: a randomised controlled trial. Age and ageing. 2014;43(1):91-7.

28. Nahapetyan A. Relationship between Patients' Knowledge about Post Operative Risk Factors after Coronary Artery Bypass Surgery (CABG) and Adherence to Medication and Lifestyle Changes in Armenia; 2015.

29. Bikmoradi A, Masmouei B, Ghomeisi M, Roshanaei G. Impact of Tele-nursing on adherence to treatment plan in discharged patients after coronary artery bypass graft surgery: A quasi-experimental study in Iran. International journal of medical informatics. 2016;86:43-8.

30. Lao X, Zhang J, Bai C. The implication of telehealthcare in COPD management of China. Expert review of respiratory medicine. 2013;7(5):459-63.

31. Rinfret S, Rodés-Cabau J, Bagur R, Déry J-P, Dorais M, Larose É, et al. Telephone contact to improve adherence to dual antiplatelet therapy after drug-eluting stent implantation. Heart. 2013;99(8):562-9.

32. Khonsari S, Subramanian P, Chinna K, Latif LA, Ling LW, Gholami O. Effect of a reminder system using an automated short message service on medication adherence following acute coronary syndrome. European Journal of Cardiovascular Nursing. 2015;14(2):170-9.

33. Kumar A. The impact of daily text message reminders on medication adherence in healthy volunteers and patients with coronary artery disease. Current Research: Cardiology. 2015;2.(۱)

34. Akhu-Zaheya LM, Wa'ed YS. The effect of short message system (SMS) reminder on adherence to a healthy diet, medication, and cessation of smoking among adult patients with cardiovascular diseases. International journal of medical informatics. 2017;98:65-75.

35. Yadegary M, Dehghan-Naeyeri N, Ali-asgharpoor M, Naseh L. The effect of educational program

on drugs self-management in patient with epilepsy-A randomized clinical trial. Journal of Clinical Nursing and Midwifery. 2013;2.

36. Tang F, Zhu G, Jiao Z, Ma C, Wang B. Self-reported adherence in patients with epilepsy who missed their medications and reasons for nonadherence in China. Epilepsy & behavior. 2013;27(1):85-9.