

Motivational interviewing as a new approach to improve outcome through self-care behavioural changes in advanced heart failure patient: a case report

Kazushi Sakane , Yumiko Kanzaki *, Takahide Ito , and Masaaki Hoshiga

Department of Cardiology, Osaka Medical and Pharmaceutical University, 2-7 Daigakumachi, Takatsuki, Osaka 569-8686, Japan

Received 30 April 2021; first decision 15 June 2021; accepted 20 September 2021; online publish-ahead-of-print 1 October 2021

Background

A lack of adherence and inadequate self-care behaviours are common reasons for recurrent hospitalizations among patients with heart failure (HF). Although patients recognize the importance of HF self-care, it is sometimes difficult to correct their behavioural patterns. Motivational interviewing is a communication technique to resolve ambivalence towards changing behaviour, and it has been widely used to promote behavioural changes and improve outcomes in various chronic diseases. We described a case of advanced HF with reduced ejection fraction in which motivational interviewing led to stabilize the patient's condition.

Case summary

A 33-year-old man was diagnosed with dilated cardiomyopathy who experienced repeated episodes of HF requiring hospitalization despite optimal guideline-based HF treatment. Transthoracic echocardiography disclosed a severely reduced left ventricular (LV) contraction (LV ejection fraction 18%) and cardiopulmonary exercise testing disclosed markedly reduced functional capacity and increased ventilatory response (peak VO_2 of 10.7 mL/min/kg, predicted peak VO_2 of 34.7% and VE/VCO_2 slope of 35.2). In this case, poor adherence to self-care such as excessive fluid intake and excessive daily activities after hospital discharge was the main cause of recurrent hospitalization for HF. Despite repeated patient education to correct his diet and lifestyle, he could not change his lifestyle behaviour. However, motivational interviewing dramatically helped stabilize the patient's condition and prevent HF re-hospitalization.

Discussion

In general, patients with advanced HF and reduced ejection fraction despite optimal medical therapy should be evaluated to assess their eligibility of cardiac transplantation or palliative care. Motivational interviewing might represent a new therapeutic approach for stabilizing and preventing HF through self-care behavioural changes, even in patients with advanced HF and severely reduced ejection fraction.

Keywords

Advanced heart failure • Self-care • Patient education • Motivational interviewing • Heart failure with reduced ejection fraction (HFrEF) • Case report

Learning points

- Motivational interviewing might be useful in improving heart failure (HF) self-care behaviours.
- Motivational interviewing might help improve clinical status and prevent re-hospitalization in patients with advanced HF and severely reduced left ventricular ejection fraction.

* Corresponding author. Tel: +81 726 83 1221, Fax: +81 726 84 6597, Email: in3089@osaka-med.ac.jp

Handling Editor: Takeshi Kitai

Peer-reviewers: Pierpaolo Pellicori and Massimo Mapelli

Compliance Editor: Brett Sydney Bernstein

Supplementary Material Editor: Fabienne Vervaat

© The Author(s) 2021. Published by Oxford University Press on behalf of the European Society of Cardiology.

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial License (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact journals.permissions@oup.com

Introduction

Advanced heart failure (HF) is characterized by progressive symptoms, worsening cardiac function, and repeated hospitalization despite guideline-directed treatment.¹ The general management of advanced HF includes optimizing all standard evidence-directed medical and device therapies, palliative care, and cardiac transplantation. A lack of treatment adherence and inadequate self-care behaviours are common reasons for recurrent hospitalizations among

patients with HF.² Despite the importance of HF self-care regarding positive health outcomes, some patients with HF have inadequate self-care behaviours.³ Motivational interviewing is a communication technique for resolving ambivalence to behavioural modification.⁴ It has been widely used to improve treatment adherence and outcomes in various chronic conditions including tobacco or alcohol addiction, obesity, and diabetes mellitus,^{5–7} and it might be useful for improving HF self-care.^{8,9} We encountered a case of advanced HF with reduced ejection fraction in which self-care education using motivational interviewing prevented HF re-hospitalization through self-care behavioural changes.

Timeline

Case presentation

The case involved a 33-year-old man diagnosed with dilated cardiomyopathy (DCM) who experienced repeated episodes of HF requiring hospitalization despite optimal guideline-based HF treatment. His medical history included refractory Crohn's disease (he had been treated with ustekinumab, methotrexate, 5-aminosalicylic acid, and elemental diet since August 2017). His first episode of HF occurred 9 years ago. He was diagnosed with DCM and severely reduced left ventricular ejection fraction (LVEF, 24%), and treatment with beta-blockers, mineralocorticoid receptor antagonists, and angiotensin-converting enzyme inhibitors was initiated. The patient did not require readmission for HF for 6 years. However, he was re-hospitalized with worsening HF and LVEF (18%) 3 years ago because of poor medication adherence and excessive fluid intake.

After hospital discharge, he required unplanned hospitalization seven times over the next 2 years, because of worsening HF, despite evidence-based pharmacological therapy, cardiac resynchronization therapy, and usual self-care education (USCE). He was re-hospitalized in December 2019 with worsening HF symptoms only 30 days after his previous hospital discharge (Figure 1).

Date	Events	Pharmacological treatment	Non-pharmacological treatment	Lifestyle advice	Body weight (kg)	Blood pressure (mmHg)	Heart rate (bpm)	Rhythm	B-type natriuretic peptide (pg/mL)	Left ventricular end-diastolic diameter (mm)	Left ventricular ejection fraction (%)
February, 2012	Heart failure hospitalization (HFH), 1st	Carvedilol	Cardiac rehabilitation (CR)	Usual self-care education (USCE)				Normal sinus rhythm (NSR)	1150	70	24
	Diagnosed with dilated cardiomyopathy	Spironolactone Enalapril			68.9	98/60	100	NSR			
June, 2014				USCE	59.5	120/70	80	NSR	36		
January, 2018	HFH, 2nd, on admission on discharge		CR	USCE	59.8	96/75	106	NSR	946	73	18
					54.3	83/53	83	NSR	262		
May, 2018	HFH, 3rd, on admission on discharge	Pimobendan	CR	USCE	59.6	93/67	95	NSR	1734	74	13
					53.5	80/50	75	NSR	287		
August, 2018	HFH, 4th, on admission on discharge		CR	USCE	61.5	97/50	110	NSR	1211	79	22
					55.3	79/48	78	NSR	432		
September, 2018	HFH, 5th, on admission on discharge		CR	USCE	59.8	90/70	112	NSR	1666		
					55.5	92/55	84	NSR	288		
July, 2019	HFH, 6th, on admission on discharge		CR	USCE	59.8	88/67	109	NSR	1767	75	15
					56.8	99/69	85	NSR	573		
August, 2019	HFH, 7th, on admission on discharge		CR	USCE	58.5	91/67	101	NSR	1628	74	15
					56.5	89/63	82	NSR	405		
September, 2019	HFH, 8th, on admission		CR,	USCE	58.9	85/58	93	NSR	1859	80	22
			cardiac resynchronization therapy								
	on discharge				56.0	97/67	91	NSR	257		
December, 2019	HFH, 9th, on admission on discharge		CR	Motivational Interviewing	61.0	85/53	114	NSR	988	78	18
			CR		57.0	90/60	92	NSR	202		
March, 2021	15 months after hospital discharge				62.0	112/78	72	NSR	19	64	37

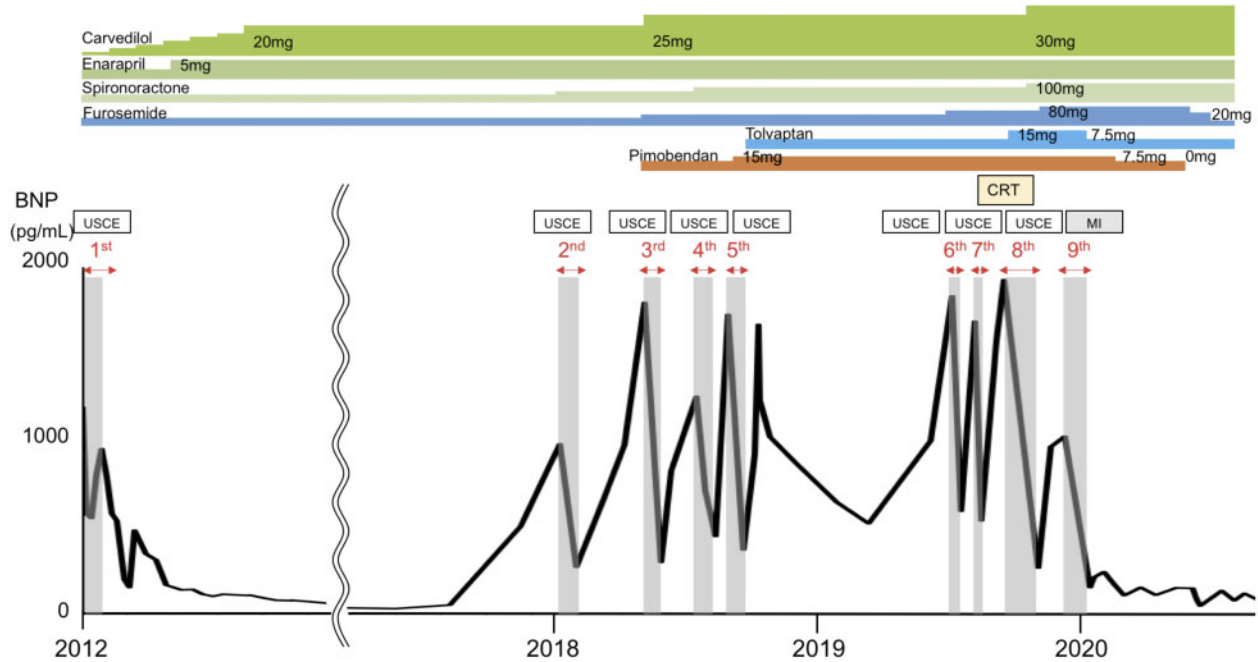


Figure 1 B-type natriuretic peptide trend from first admission for heart failure. Significant improvement in B-type natriuretic peptide was achieved after motivational interviewing. BNP, B-type natriuretic peptide; CRT, cardiac resynchronization therapy; MI, motivational interviewing; USCE, usual self-care education.

Electrocardiogram revealed sinus tachycardia with biventricular pacing. His vital signs included blood pressure of 85/53 mmHg, heart rate of 114 beats/min, respiratory rate of 18 breaths/min, and oxygen saturation of 98% on room air. On physical examination, his jugular vein was distended at 45°. Mild lower extremity oedema was noted. Laboratory testing revealed that his haemoglobin and creatinine levels were 10.7 g/dL and 1.37 mg/dL, respectively. His B-type natriuretic peptide (BNP) level was elevated at 987.8 pg/mL. Chest X-ray revealed a cardiothoracic ratio (CTR) of 57% with mild pulmonary congestion (Figure 2A). Transthoracic echocardiography disclosed a severely dilated left ventricular (LV) chamber size with severe LV dysfunction and mitral regurgitation [left ventricular end-diastolic volume index (LVEDVI) of 182 mL/m², LVEF of 18%] (Figure 2B and C and Video 1).

During a previous hospitalization, he underwent right heart catheterization and cardiopulmonary exercise testing in a clinically compensated status after conventional HF treatment. Right heart catheterization revealed low cardiac output and compensated haemodynamic data; pulmonary capillary wedge pressure of 15 mmHg, mean pulmonary artery pressure of 22 mmHg, mean right atrial pressure of 4 mmHg, and a cardiac index of 2.10 L/min/m². Cardiopulmonary exercise testing disclosed markedly reduced functional capacity (peak VO₂ of 10.7 mL/min/kg and % predicted peak VO₂ of 34.7%) and increased ventilatory response (VE-VCO₂ slope of 35.2). The MECKI risk score, which is identified the risk of cardiovascular death or urgent cardiac transplantation within 2 years, was 45.10%.

He experienced rapid and repetitive exacerbation of HF symptoms early after discharge despite compensated haemodynamics and optimal guideline-based HF treatment.

In this case, poor adherence to self-care such as excessive fluid intake and excessive daily activities after hospital discharge was the main cause of recurrent hospitalization for HF. During all previous HF hospitalizations, USCE about lifestyle advice was provided by multidisciplinary HF team to prevent HF readmission. Despite repeated patient education to correct his diet and lifestyle, he could not change his lifestyle behaviour. He drank large amounts of juice, ate salty foods, and overworked after discharge despite USCE regarding lifestyle habits.

A detailed medical interview by the clinical psychologist revealed that the patient was ambivalent about HF self-care. In this case, he had a strong desire to consume more fluids and a strong desire to quit drinking to prevent HF hospitalization. He was perfectly aware that he should avoid excessive fluid intake and excessive daily activity, but his motives conflicted with behavioural modification.

Motivational interviewing emphasized the need for behavioural changes by the patient rather than advising why he should change his lifestyle (Figure 3). He received weekly counselling from a clinical psychologist (~60 min in duration) and daily counselling from a doctor, nurse, and physical therapist (~15 min in duration) during hospitalization. To create a specific plan for behavioural modification, multidisciplinary HF team discussed his negative behaviours that resulted in worsening HF. For example, when he walked up to the second floor, his heart rate increased with an excess response from 80/min to 108/min based on the daily rehabilitation record. The recommended changes included restricting stair climbing to three times a day, and taking a rest after stair climbing when pulse rate recovery was poor. We also stressed the importance of self-assessments of

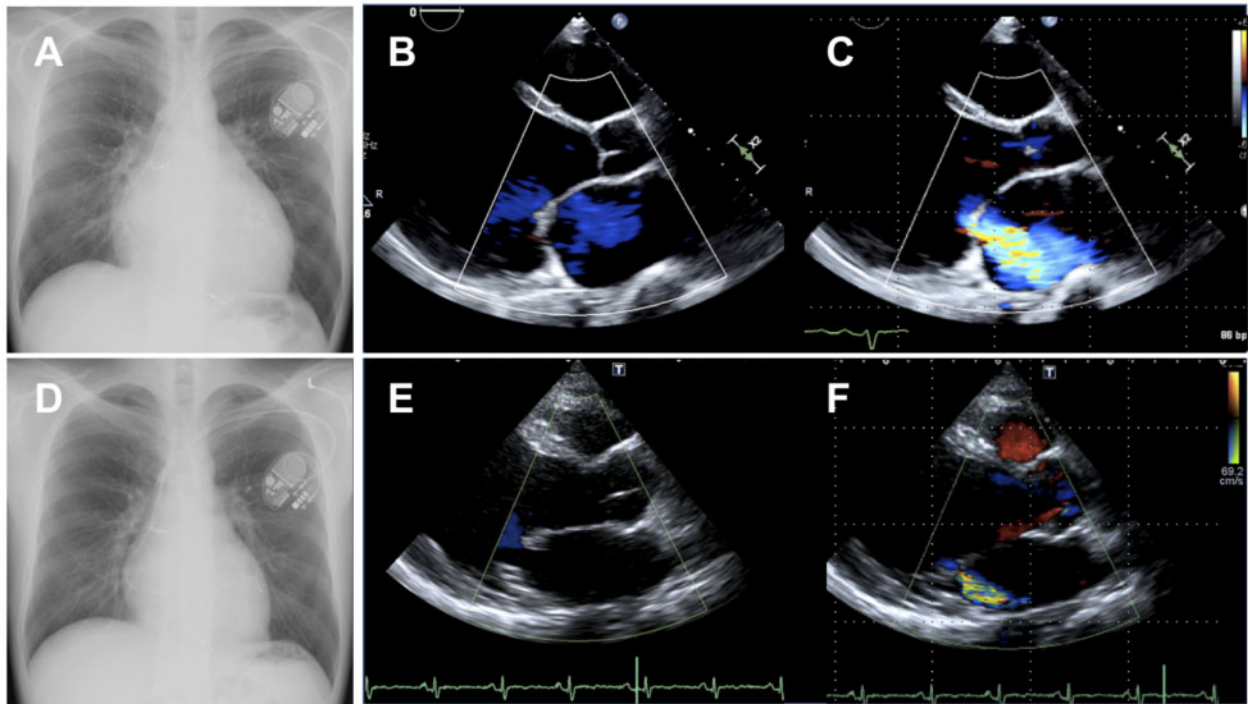
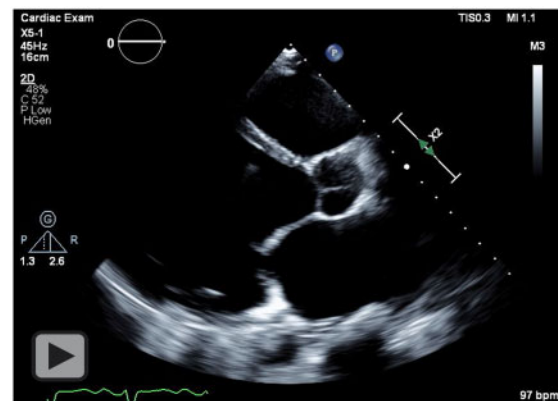


Figure 2 Chronological changes on the radiograph (A and D) and echocardiography of parasternal long-axis views in diastole (B and E) and systole (C and F) before (December 2019) and 10 months after (October 2020) motivational interviewing. Significant improvements in terms of cardiomegaly, left ventricular function, and mitral regurgitation after 10 months of motivational interviewing.



Video 1 Transthoracic echocardiography (before motivational interviewing).

pulse rate to prevent HF exacerbation. Moreover, the multidisciplinary HF team explained the importance of fluid and salt restriction with a conscious awareness of collaborating and engaging with the patient.

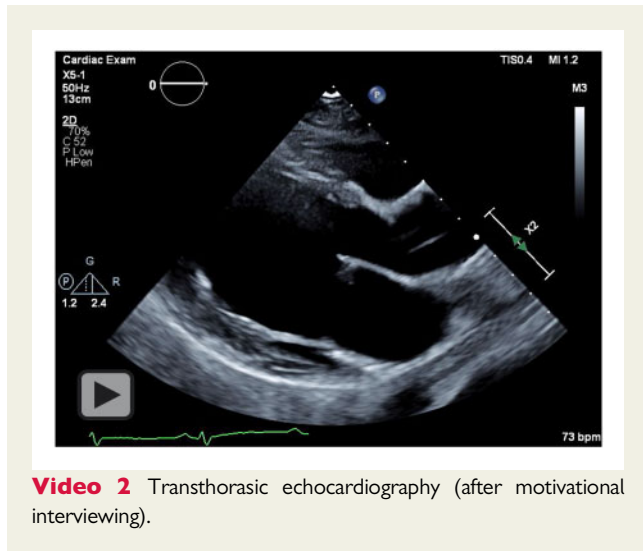
After discharge, counsellors (doctor and nurse) trained in motivational interviewing met with the patient twice a month (approximately each 15 min per session). After 10 months, his self-care behaviour had gradually changed. He started checking his pulse and

Motivational Interviewing

- Expressing empathy
- Accepting the patient's resistance to change
- Enhancing the patient's self-efficacy
- Helping the patient identify discrepancies between the patient's problematic behaviors and broader, personal values

Figure 3 Motivational interviewing as a counselling style based on the following assumption.

bought a smartwatch equipped with pulse monitoring. He paid attention to his daily fluid consumption and weighed himself regularly. Self-care scale scores, as evaluated by the Self-Care of HF Index v.6.2 (SCHFI v.6.2),¹⁰ were improved (self-care maintenance scale scores, 46.7–69.9; self-care confidence scale scores, 33.4–66.7). Cardiac size, mitral regurgitation, LV function, and functional capacity were also improved without deterioration of HF (CTR 46.6%; LVEDVI, 90 mL/m²; LVEF, 37%; peak VO₂, 15.2 mL/min/kg; predicted peak VO₂, 50.0%; and VE/VCO₂ slope, 32.3) (Figure 2D–F and Video 2). Furthermore, the MECKI risk score improved from 45.10% to 3.13%. Currently, the patient has no HF symptoms, and his BNP level has remained low despite tapering HF therapy (Figure 1). The patient was gradually tapered off pimobendan, whereas diuretic therapy (furosemide) was gradually reduced. This patient gave us a message about his perspective and experience (Figure 4).



Video 2 Transthoracic echocardiography (after motivational interviewing).

Discussion

We have described the case of a patient with advanced HF and reduced ejection fraction, wherein self-care education using motivational interviewing could help stabilize the patient's condition and prevent HF re-hospitalization. In general, patients with advanced HF and reduced ejection fraction despite optimal pharmacological and device therapy should be evaluated to assess their eligibility for alternative treatment options such as cardiac transplantation or palliative care.

Self-care management is considered a key part of the successful management of HF treatment.^{3,11} However, self-care behaviour changes can be difficult to enact despite the importance of HF self-care.^{3,12} Thus, it is critical for medical staff to both provide lifestyle advice and promote lifestyle behaviour changes. Usual self-care education as used to correct our patient's diet and lifestyle, known as the 'righting reflex', can increase patient resistance by eliciting more arguments against behaviour changes.¹³ Our previous education (USCE) might be created resistance to behavioural modification. Recently, motivational interviewing has proven effective for facilitating behaviour changes in patients with chronic diseases or conditions. Moreover, motivational interviewing improved the self-care behaviour, which could be a strong factor influencing the occurrence of HF.¹⁴ However, it is controversial whether motivational interviewing prevented HF hospitalization in HF patients,¹⁴ particularly in advanced HF patients. This patient could be a possible candidate for cardiac transplantation in the future (the MECKI risk score, which is identified as a risk factor for cardiovascular death or urgent cardiac transplantation within 2 years, was extremely high in 45.10%). We attempted motivational interviewing in this advanced HF patient for repeated HF hospitalization because of inadequate self-care behaviours.

We used basic interaction techniques and skills such as open questions, affirming, reflecting, and summarizing in the motivational interviewing approach to increase motivation to change. We established a good relationship and built rapport (engaging), explored and clarified

the patient's target behaviour (focusing), elicited and reinforced the patient's desire for change (evoking), and engaged in action planning (planning). These four overlapping processes help patients to increase self-efficacy and overcome ambivalence to change.¹⁵ Therefore, techniques that promote behavioural changes in patients with HF might be important for preventing HF hospitalization. The patient's LV function and functional capacity were improved dramatically through self-care behavioural changes after motivational interviewing without the intensification of therapy.

In summary, motivational interviewing might represent a new therapeutic approach for stabilizing and preventing HF through self-care behavioural changes, even in patients with advanced HF and severely reduced ejection fraction.

Lead author biography



Kazushi Sakane is a general cardiologist with an interest in heart failure, cardiovascular physiology, and interventional cardiology. He is currently working at Osaka Medical and Pharmaceutical University.

Supplementary material

[Supplementary material](#) is available at *European Heart Journal - Case Reports* online.

Acknowledgements

We would like to thank all the members of the heart failure multidisciplinary team who provided lifestyle advice to this patient, including Dr Hitomi Takayama, Dr Hitomi Hasegawa, Ms Saki Seyama (nurse), Ms Risa Kojima (nurse), Mr Hideya Yanamoto (physical therapist), Ms Chika Harada (physical therapist), Mr Yasuaki Harada (physical therapist), Ms Ayaka Tanaka (nutritionist), Ms Yumiko Hirazawa (nutritionist), and Ms Atsuko Wakabayashi (clinical psychologist). We would also like to acknowledge our patient, Mr Hayato Kubo, who was the centre of our heart failure multidisciplinary team (who gave the patient's message for the reader of this manuscript and motivated our heart failure multidisciplinary team to work).

Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as [Supplementary data](#).

Consent: The authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: None declared.

Funding: None declared.

Patient's Message

July 9, 2021

Dear readers of this manuscript

I believed I was out of luck. I have always had diarrhea from Crohn's disease since I was young. In addition, I suffered from heart failure. I had a strong desire to eat a regular meal, drink water, and work normally, similar to the people of my generation. Of course, I did not hope to worsen my heart failure. I always hoped that I could get better whenever the doctors changed and increased my medications and whenever I received cardiac resynchronization therapy. However, my condition immediately worsened every time, leading to hospital readmission for heart failure. I felt deep self-abandonment because I believed my illness would never improve anyway. Therefore, even if I tried to limit consuming water for a few days, I did not expect to last long.

Today, my doctor (K.S.) explained the motivational interviewing process to me. I was completely unaware of the motivational interviewing approach. I look back to the time when this approach was started. I felt that my healthcare team paid more attention to me. Then, I gradually started believing that I had to change to respond to their enthusiasm by preventing my readmission. I was able to consult with the nurses and the physiotherapists by myself on how to avoid drinking water. We had frequent discussions; it was concluded that it is better to change my room from the third floor to the first floor of my house to avoid overwork and to keep a distance from the refrigerator to control water intake. It was initially very tough for me to adjust to these changes, but they gradually became less painful. In addition, I felt happy because I could gradually move longer distances by improving my dyspnea. I become more confident of myself. Furthermore, I was glad to talk regarding my efforts to the medical staff. I am surprised because I did not expect that my heart failure would improve so much. Now, I want to say to the old me: "You do not give up."

I am also surprised to receive the opportunity to publish this message today. I am very proud to have my name listed with my medical staff, and I feel a part of the team. Finally, I recommend this approach to the patients and medical staff who are facing conditions similar to mine.

Sincerely,

The 34-year-old male patient

Figure 4 Patient's message.

References

1. Crespo-Leiro MG, Metra M, Lund LH, Milicic D, Costanzo MR, Filippatos G et al. Advanced heart failure: a position statement of the Heart Failure Association of the European Society of Cardiology. *Eur J Heart Fail* 2018;**20**:1505–1535.
2. McAlister FA, Stewart S, Ferrua S, McMurray JJV. Multidisciplinary strategies for the management of heart failure patients at high risk for admission. *J Am Coll Cardiol* 2004;**44**:810–819.
3. Lainscak M, Blue L, Clark AL, Dahlström U, Dickstein K, Ekman I et al. Self-care management of heart failure: practical recommendations from the Patient Care Committee of the Heart Failure Association of the European Society of Cardiology. *Eur J Heart Fail* 2011;**13**:115–126.
4. Miller WR, Rose GS. Toward a theory of motivational interviewing. *Am Psychol* 2009;**64**:527–537.
5. Hettema J, Steele J, Miller WR. Motivational interviewing. *Annu Rev Clin Psychol* 2005;**1**:91–111.
6. Armstrong MJ, Mottershead TA, Ronksley PE, Sigal RJ, Campbell TS, Hemmelgarn BR. Motivational interviewing to improve weight loss in overweight and/or obese patients: a systematic review and meta-analysis of randomized controlled trials. *Obes Rev* 2011;**12**:709–723.
7. Ekong G, Kavookjian J. Motivational interviewing and outcomes in adults with type 2 diabetes: a systematic review. *Patient Educ Couns* 2016;**99**:944–952.

8. Vellone E, Reborá P, Ausili D, Zeffiro V, Pucciarelli G, Caggianelli G et al. Motivational interviewing to improve self-care in heart failure patients (MOTIVATE-HF): a randomized controlled trial. *ESC Heart Fail* 2020;**7**:1309–1318.
9. Jaarsma T, Hill L, Bayes-Genis A, La Rocca HB, Castiello T, Celutkienė J et al. Self-care of heart failure patients: practical management recommendations from the Heart Failure Association of the European Society of Cardiology. *Eur J Heart Fail* 2021;**23**:157–174.
10. Riegel B, Lee CS, Dickson VV, Carlson B. An update on the self-care of heart failure index. *J Cardiovasc Nurs* 2009;**24**:485–497.
11. Kato N, Kinugawa K, Nakayama E, Tsuji T, Kumagai Y, Imamura T et al. Insufficient self-care is an independent risk factor for adverse clinical outcomes in Japanese patients with heart failure. *Int Heart J* 2013;**54**:382–389.
12. Sedlar N, Lainscak M, Mártensson J, Strömberg A, Jaarsma T, Farkas J. Factors related to self-care behaviours in heart failure: a systematic review of European Heart Failure Self-Care Behaviour Scale studies. *Eur J Cardiovasc Nurs* 2017;**16**: 272–282.
13. Levensky ER, Forcehimes A, O'Donohue WT, Beitz K. Motivational interviewing: an evidence-based approach to counseling helps patients follow treatment recommendations. *Am J Nurs* 2007;**107**:50–58; quiz 58–59.
14. Poudel N, Kavookjian J, Scalese MJ. Motivational interviewing as a strategy to impact outcomes in heart failure patients: a systematic review. *Patient* 2020;**13**: 43–55.
15. Miller W, Rollnick W. *Motivational Interviewing: Helping People Change*. New York: The Guilford Press; 2013.