

The Role of Structured Telephone Support in the Development of Self-care in Comorbid Patients with Chronic Heart Failure

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Aim. To research the effect of structured telephone support on the self-care in comorbid patients with chronic heart failure (CHF) over 12 months of follow-up.

Material and methods. Self-care was assessed using The Self-care of Heart Failure Index (SCHFI, version 6.2) in 130 patients with CHF II-IV functional class according to NYHA, mean age 63.2 ± 9.6 years old, left ventricular ejection fraction averaged $47.1 \pm 11.6\%$, men (70.8%) and patients with ischemic etiology of CHF (78.5%) prevailed. After fixed simple randomization by the envelope method, the patients were divided into groups of standard (control) and active outpatient follow-up (additional telephone contacts or correspondence using available messengers – structured telephone support). All patients received CHF therapy in accordance with the current Russian clinical guidelines. The indicators evaluated initially and after 12 months of follow-up.

Results. Over 12 months, total SCHFI scores increased significantly by 62% in the telephone support group and by 34.7% in the comparison group ($p < 0.001$). A significant maximum improvement in the score was noted in section B of this scale (self-care management) in patients in the telephone support group (by 100%; $p < 0.001$). There was an improvement in the clinical condition and an increase in exercise tolerance in both groups, somewhat more in the telephone support group ($p > 0.05$). However, there were no statistically significant differences in the intake of the main groups of drugs and the achievement of their target dosages ($p > 0.05$).

Conclusion. The study found a positive effect of structured telephone support on the self-care and the clinical condition of patients with CHF, although it did not reach the maximum possible acceptable values. Further studies are need to assess the self-care in patients with CHF.

Key words: self-care, heart failure, chronic heart failure.

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Introduction

Chronic heart failure (CHF) today remains one of the most significant problems of modern health care [1-3]. The number of patients with CHF continues to grow steadily despite significant advances in the diagnosis and treatment of CHF [1-3].

Obviously, improving and maintaining a good level of self-control and self-care indicators, regular monitoring and timely seeking medical help are important components that increase the effectiveness of CHF management. These issues are given much attention in current recommendations on heart failure [1-4].

The main strategy for reducing mortality from CHF is the appointment of disease-modifying medications with proven efficacy and the achievement of their target doses [1,2,5]. According to various registries, the actual use of these drugs and their dosages differ significantly from those required according to the recommendations and are often unreasonable [6-8]. In addition, the success of therapy lies in the continuity of the work of the hospital and outpatient healthcare, dynamic monitoring of patients and cooperation with doctors of other specialties [3,8], which helps prevent readmissions and improve clinical outcomes [5]. Low adherence to the treatment of patients with CHF is associated with an unfavorable course of the disease, a decrease in the level of physical activity, a deterioration in the quality of life, a high risk of hospitalizations and mortality [4,5,8].

There are different models of training and monitoring for patients with CHF, including the use of various printed and video materials, Internet resources, and additional telephone or face-to-face contact with healthcare professionals. Several authors have previously demonstrated in their work the effectiveness of various interventions (including training, telephone monitoring, and others) in terms of improving individual outcomes (quality of life, frequency and duration of hospitalizations, mortality) [9,10]. However, the results of these studies didn't demonstrate the effect of active outpatient monitoring on self-care during long-term follow-up. In this regard, the aim of our study was to study the effect of active outpatient monitoring (including structured telephone support) on the self-care in comorbid patients with CHF over a 12-month period.

Material and methods

Patients with NYHA class II-IV CHF (n=130) with at least one concomitant disease were consecutively

included in the study in accordance with the inclusion criteria and provided that there were no exclusion criteria. Inclusion criteria: age from 18 to 80 years, the presence of NYHA class II-IV CHF, voluntary consent to participate in the study. Exclusion criteria: acute coronary syndrome, history of cardiac surgery or percutaneous coronary intervention <30 days before inclusion in the study, inability to read and understand the Russian language, disorientation. The study was conducted in accordance with Good Clinical Practice standards, the principles of the Declaration of Helsinki, and was approved by the regional research ethics committee. All study participants gave written informed consent to participate.

Patients were randomized by the envelope method into two groups of 65 people: active (main group) and standard outpatient follow-up (control group). Verification of CHF was carried out taking into account the presence of clinical symptoms and signs, as well as echocardiography data. N-terminal natriuretic hormone (B-type) propeptide (NT-proBNP) was not detected in all patients and was not included in the final calculations. All patients received CHF therapy in accordance with current Russian clinical guidelines [1]. Patients of both groups were given training sessions, they were given training materials developed by the Society of CHF Specialists of the Russian Federation, and they were also recommended to visit the pan-European website for patients with CHF www.heartfailurematters.org in Russian. Mandatory follow-up visits were provided after 3, 6 and 12 months. In the active follow-up group, additional telephone contacts or correspondence using modern available instant messengers (Viber, WhatsApp) were made with patients, that is, structured telephone support, at least once a month (between scheduled visits), and more often if necessary. During a telephone contact or correspondence, the patient was asked questions (from a structured telephone questionnaire) [11] regarding their well-being, the severity of CHF symptoms, the implementation of treatment recommendations, and hospitalizations. If necessary, the patient was given additional recommendations or he was invited to an early visit.

The self-care was assessed using the previously validated Russian version of The Self-care of Heart Failure Index (SCHFI, version 6.2), which consists of three sections: A – self-care maintenance,

B – management, C – confidence [12]. Analysis of the clinical manifestations of HF was carried out using the Scale for Assessing the Clinical Condition

(SACC) for the CHF patient [1], and exercise tolerance was assessed according to the results of a six-minute walk test [1].

Statistical processing of the results was carried out using Statistica 16.0 software (Statsoft Inc., USA). Data are presented as mean (M) and standard deviation (SD) or median (Me) and interquartile range (25%; 75%), and as percentages. Mann-Whitney's test (for independent variables), Wilcoxon's test (for dependent variables), Pearson's chi-square and contingency tables were used for comparative analysis of variables. Differences in indicators were considered statistically significant at $p < 0.05$

Results

Initially, according to socio-demographic, etiological and clinical characteristics, as well as therapy, patients of both groups didn't differ significantly ($p > 0.05$). In the telephone support group [45 men and 20 women; age was 63.4 ± 8.8 years; ejection fraction (LV EF) was $45.8 \pm 12.2\%$] patients with NYHA class II CHF prevailed ($n = 43$; 66.1%). In the control group (47 men and 18 women; age was 63.0 ± 10.3 years; LV EF was $48.3 \pm 11.0\%$), most patients had NYHA class II CHF ($n = 47$; 72.3%). In the main group, 21

(32.3%) patients with CHF had a moderately reduced LV EF (40-49%), and 19 (29.2%) patients had a reduced LV EF ($< 40\%$). In the control group, a moderately reduced LV EF was in 20 (30.8%) patients, a reduced LV EF was in 12 (18.4%) patients.

There were no statistically significant differences between the baseline total scores and indicators of sections of the SCHFI scale in both groups (Table 1). During the follow-up period, there was an increase in the total score, indicating an improvement in the ability to self-care. In the telephone support group, this indicator increased by 62%, in the control group, this indicator increased by 34.7%, and the differences in the final results of both groups were statistically significant. In the telephone support group, the number of patients with a good level of self-care (210 scores was taken as a conditional level, 70 scores for each section of the scale) increased by 25 times, and in the control group the number of such patients increased by 4.3 times compared to the initial value.

We noted an increase in the median scores for section A over the year in both the telephone support group (by 34%) and in the control group (by 50%), while the differences in the group scores were significant ($p = 0.004$). A good level of self-care main-

Table 1. Changes in the studied parameters in groups

Parameter	Telephone support group (n=65)			Control group (n=65)		
	Initially	After 12 months	p	Initially	After 12 months	p
SCHFI scale, scores	137 (108; 167)	222 (212; 230)	$< 0.001^*$	134 (112; 154)	181 (159; 207)	$< 0.001^*$ $< 0.001^+$
• section A	50 (33; 57)	67 (60; 70)	$< 0.001^*$	40 (33; 53)	60 (47; 67)	$< 0.001^*$ 0.004^+
• section B	45 (35; 70)	90 (80; 95)	$< 0.001^*$	50 (30; 60)	70 (55; 80)	$< 0.001^*$ $< 0.001^+$
• section C	39 (28; 50)	67 (67; 72)	$< 0.001^*$	44 (33; 61)	56 (44; 67)	$< 0.001^*$ $< 0.001^+$
LV EF, %	45.8 ± 12.2	48.0 ± 11.9	$< 0.001^*$	48.3 ± 11.0	49.8 ± 9.4	$> 0.05^*$
SACC, scores	5 (4; 7)	4 (3; 5)	$< 0.001^*$	5 (4; 6)	4 (3; 6)	$< 0.001^*$
6MWT, m	280.3 ± 99.7	314.8 ± 85.6	$< 0.001^*$	291.6 ± 75.2	312.7 ± 65.6	$< 0.001^*$ $> 0.05^+$
Pharmacotherapy						
ACEi, n (%)	44 (67,7)	37 (56,9)	$> 0.05^*$	36 (55,4)	35 (54,7)	$> 0.05^*$
ARB, n (%)	12 (18,5)	23 (35,4)	0.030^*	14 (21,5)	22 (34,4)	$> 0.05^*$
Beta-blockers, n (%)	54 (83,1)	63 (96,9)	0.009^*	54 (83,1)	60 (93,8)	$> 0.05^*$
Loop diuretics, n (%)	34 (52,3)	40 (61,5)	$> 0.05^*$	30 (46,2)	36 (56,3)	$> 0.05^*$
MRA, n (%)	35 (53,8)	49 (75,4)	0.010^*	26 (40)	42 (65,6)	0.002^*
Anticoagulants, n (%)	21 (32,3)	30 (46,2)	$> 0.05^*$	11 (16,9)	18 (28,1)	$> 0.05^*$

SCHFI – The Self-Care of Heart Failure Index, LV EF – left ventricular ejection fraction, SACC – Scale for Assessing the Clinical Condition, 6MWT – 6-minute walking test, ACEi – angiotensin-converting enzyme inhibitors, ARB – angiotensin II receptor blockers, MRA – mineralocorticoid receptor antagonists

tenance by the end of the study was detected 6 times more often in patients of the main group, and 2.2 times in the control group.

In section B, we noted an increase in the score by the end of follow-up in the active group by 100%, and less in the control group (by 40%), and the differences in the final indicators of both groups were significant ($p < 0.001$). Good self-care management after a year was demonstrated by 3.3 times more patients of the main group and 4.1 times more patients from the control group, but the percentage of increase in the total score and the initial number of patients with good self-care management were higher in the first group.

A significant increase in section C scores after 12 months was noted in patients in the active follow-up group by 71.8%, and to a lesser extent in the control group (by 27.3). The results at the end of the follow-up period differed statistically significantly ($p < 0.001$). Confidence in self-care at a good level initially was almost the same number of patients in both groups, which increased during the study in the main group by 6.4 times, and in the control group only by 1.8 times.

Initially, only 31 (23.9%) patients controlled body weight, but after 12 months of follow-up, the number of patients increased to 108 (83.7%), most of whom were from the telephone support group ($n=63$; 58.3%). The number of patients controlling swelling of the lower extremities increased from 60 (46.2%) to 120 (93%), and amounted to 63 (97%) patients in the active group. 58 (44.6%) patients were on a diet at the beginning of the study, and by the end of the study 113 (87.6%) patients were on a diet, among which the majority ($n=63$; 55.8%) were again from the main group. The number of patients adhering to the recommended physical activity changed slightly over the year from 44 (33.8%) to 49 (38%), and was almost equal in both groups. In general, the number of patients adherent to medical recommendations was initially impressive and increased during the study period from 119 (91.5%) to 127 (98.4%), and amounted to 65 (100%) in the telephone support group. In addition, during the study, the number of patients confident in the control of CHF symptoms increased significantly, from 26 (20.0%) to 101 (78.3%), more pronounced in the telephone support group ($n=62$; 95.4%).

During the study, we didn't find statistically significant differences between the groups in terms of the frequency of taking the main groups of medica-

tions and achieving their target dosages. The use of angiotensin-converting enzyme inhibitors decreased by 15.9% in patients in the telephone support group and by 2.8% in the control group (see Table 1). On the contrary, the use of angiotensin II receptor blockers increased by 91.7% in the main group and by 57.1% in the control group. Initially, only 1 patient in both groups took an angiotensin receptor inhibitor and neprilysin, and 12 months later, 5 patients in the active group ($p > 0.05$) and 1 patient in the control group ($p > 0.05$) took it. The intake of beta-blockers increased by 16.7% in patients in the group with telephone support, and by 11.1% without it.

An increase in the use of loop diuretics was observed in the active follow-up group by 17.6%, and in the control group by 20%. Also, the frequency of prescribing mineralocorticoid receptor antagonists (MRA) after 12 months increased by 40% in the main group and by 61.5% in the control group. The intake of medications of the MRA groups and loop diuretics simultaneously increased by 22.2% in the telephone support group (from 27 to 33; $p > 0.05$), and by 66.7% in the control group (from 15 to 25; $p = 0.05$).

The frequency of anticoagulant prescription increased in patients in both groups: by 42.9% in the telephone support group and by 63.6% in the control group.

Improvement the self-care observed in both groups, in turn, was reflected in a significant positive change in the following clinical and instrumental characteristics, more pronounced in the telephone support group. We noted an increase in patients with NYHA class II CHF by 14% in the telephone support group (from 43 to 49; $p > 0.05$) and by 12.8% in the control group (from 47 to 53; $p > 0.05$). During the study period, we noted a significant increase in LV EF in the active group (by 4.8%), in contrast to insignificant dynamics in the control group (by 3.1%). The median sum of scores on the scale for assessing the clinical condition of a patient with CHF for 12 months significantly decreased by 20% in the first and second groups. According to the six-minute walk test, the average value of the distance passed during the study increased significantly by 12.3% in patients in the telephone support group and by 7.2% in the control group. However, the differences between the groups were not significant.

Discussion

Patients of both groups in this study demonstrated an initially low level of self-care in general and in

sections of the SCHFI scale, which subsequently underwent positive changes, similar to the results of studies in China (follow-up period up to 6 months) [10]. A more significant improvement in self-care scores was seen in patients in the telephone support group, as in the above-mentioned study using a specialized medical Internet platform and a survey of nurses [10].

According to our study, the maximum improvement in the score was observed in section B (self-care management) in patients in both groups, but it was expected to be better in the telephone support group. We also observed a significant improvement in the self-care maintenance (section A) in both groups, with its good level being detected 6 times more often in patients from the telephone support group compared to the control group (only 2.2 times). Most likely, this is due to both the presence of the initial level of basic knowledge of patients about the symptoms of CHF and the adoption of additional measures when the state of health worsens, and the consolidation of the acquired knowledge during training and dynamic observation. In addition, self-care confidence (Section C) increased significantly in the telephone support group compared to the control group. Most likely, this is due to the presence of an additional opportunity for patients of this group to communicate with the doctor and discuss issues of interest. Over 12 months, we found a significant increase in the number of patients with a good level of self-care in general and in individual components, more pronounced in the telephone support group. The percentage of patients who control body weight, swelling of the lower extremities and adhere to the recommendations has increased.

Against the background of training and additional telephone support, we managed to achieve an improvement in self-care in both groups (more pronounced in the telephone support group), which had a positive effect on NYHA class, LV EF, clinical condition and exercise tolerance.

During the study, we didn't find statistically significant differences in the intake of the main groups of medications and the achievement of their target dosages. At the same time, the proportion of patients taking medications at a dose of 75-100% of the target by the end of the study varied in the group of angiotensin-converting enzyme inhibitors from 40 to 46%, angiotensin II receptor blockers from 18.2 to 21.7%, beta-blockers from 10 to 15.8%, MRA

from 35.7 to 55.1%, loop diuretics from 50 to 72.5%. The medication of the group of angiotensin receptor-neprilysin inhibitor was used in all cases at dosages of 50% of the target. In the first group, only 2 patients initially and 1 a year later took an anticoagulant at a dosage of 50% of the target, the rest of the patients took an anticoagulant at the target dosages. In the control group, 2 patients independently reduced the dose of the anticoagulant by 50% by the 12th month of follow-up, the rest of the patients continued to take the medication at the same dose. These results confirm the need for further development of measures to increase adherence to therapy and achieve target doses of medications.

This study is the first to prove that the addition of telephone contact or correspondence using modern accessible messengers to the standard treatment of patients with CHF significantly improved the ability to self-care and other indicators over 12 months of follow-up. Undoubtedly, the level of self-care ability that we managed to achieve during the study period was sufficient to improve the condition and prognosis of patients, although there remains a reserve for achieving the maximum possible indicators.

We need to continue searching for the most effective methods for optimizing the treatment of patients with CHF, which will help to correct lifestyle, improve the condition and quality of life, self-care skills, increase adherence to non-drug and drug treatment, prevent CHF decompensation, as well as improve the interaction of medical professionals with patients.

Study limitations. It's possible that the level of self-care could be higher if more patients participated in the study within several centers. We don't exclude the effect on the final indicators of the fact that part of the patients from both groups included in this study had already been seen at the center before and had some knowledge of heart failure. We also note that patients' assessment of their well-being and ability to self-care is subjective.

Conclusion

During this study, we found a positive effect of structured telephone support on self-care, adherence to recommendations, and the clinical status of patients with CHF, although the indicators didn't reach the maximum possible acceptable values. Of course, we need to conduct additional studies on the assessment of self-care in patients with CHF, including a larger

number of patients, with a longer follow-up period, to study the long-term effect on self-care of various factors, long-term consequences and changes in the behavior of patients with CHF.

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