

Psychoeducational Intervention for Reducing Heart Failure Patients' Rehospitalizations and Promoting Their Quality of Life and Posttraumatic Growth at the 1-Year Follow-Up: A Randomized Clinical Trial

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ABSTRACT

Objective: This study's aim was to verify whether a psychoeducational intervention, with a brief expressive posttraumatic growth (PTG) component, could reduce heart failure (HF) patients' hospital readmissions and promote their quality of life (QoL) and PTG.

Methods: It adopted a parallel randomized clinical trial design, and its participants comprised HF patients from a hospital in Southern Brazil. All the participants completed the World Health Organization Quality of Life Assessment and Posttraumatic Growth Inventory questionnaires at the pre (T1: baseline) and post (T2) assessments of the intervention. Although patients in the control group (CG) underwent only regular outpatient consultations, those in the intervention group (IG) supplemented their regular consultations, with two additional individual visits to promote health and psychological education. At the 1-year follow-up, hospital readmissions were assessed.

Results: Of the 142 patients recruited at baseline (72 and 70 in the CG and IG, respectively), as 19 dropped out at follow-up, only 123 (63 and 60 in the CG and IG, respectively) were reassessed after approximately 378 days. They included 65% men aged 64 (11) years, 58% had low incomes, and 67% had less than high school education. The IG participants' risk of readmission got reduced by 52% ($p = .023$), and they also showed significant improvements in their total QoL and positive psychological growth at the 6-month follow-up assessment.

Conclusions: The two-session psychoeducational intervention proved to be protective for Southern Brazilian HF patients in the IG, as it effectively reduced their hospital readmission rates by half compared with the CG, as well as improved their QoL and promoted their positive psychological growth.

Trial Registration: ClinicalTrials.gov identifier: NCT04870918.

Key words: heart failure, hospitalization, psychoeducation, psychology, quality of life, posttraumatic psychological growth, self-care.

INTRODUCTION

Heart failure (HF) is a systemic multifactorial condition resulting from a heart syndrome characterized by the deterioration of the heart's functions (1). Blood flow and the rate of oxygen delivery do not meet the body's metabolic and tissue requirements resulting in signs and symptoms of systemic and pulmonary congestion (2). Consequently, fluid accumulates in the legs, lungs, and other bodily tissues. The common causes of HF include the following: ischemic heart disease, myocardial infarction, hypertension, and valvular heart disease (3).

The American College of Cardiology/American Heart Association's stages of HF emphasize the development and progression of the disease, with stage A patients being at risk for HF but without symptoms and stage B patients having no symptoms or signs of HF except for the presence of one of the characteristics of structural disease. Stages C and D patients are those with HF disease development. In stage C, patients have structural heart disease with

current or previous symptoms of HF, and in stage D, they have advanced HF marked symptoms that interfere with daily life and experience recurrent hospitalizations. The New York Heart Association's (NYHA) classification is used to characterize symptoms and functional capacities of patients with symptomatic (stage C) or advanced (stage D) HF. Although symptomatic stage C HF patients may become asymptomatic with treatment (NYHA class I), they would still be categorized as having stage C HF (3).

HF is associated with poor long-term prognosis, hospital readmissions, and increased morbidity and mortality. Despite improvements in HF management and survival rates, approximately 50%

CKD = chronic kidney disease, **COPD** = chronic obstructive pulmonary disease, **HF** = heart failure, **NYHA** = New York Heart Association functional class, **PTG** = posttraumatic growth, **PTGI** = Posttraumatic Growth Inventory, **SUS** = Sistema Único de Saúde, **WHOQoL-BREF** = World Health Organization Quality of Life Assessment

SDC Supplemental Digital Content

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Received for publication January 11, 2022; revision received December 2, 2022.

DOI: 10.1097/PSY.0000000000001180

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of individuals with HF still die worldwide within 5 years of diagnosis (4). International Heart Associations have stressed the importance of effective self-care approaches to reduce HF-related readmissions (5,6). Psychoeducation can help in preventing acute events and improving adherence to treatment, as its purpose is to teach patients about their physical and psychological pathologies as well as about their treatment, thereby promoting health awareness and disease prevention (7). Patients can gain control over their own health by preventing disease exacerbation, self-managing undesirable physiological events, and reducing hospital care (8).

In a meta-analysis of nurse-led self-care interventions, Son et al. (9) found reductions of 40% and 25% in HF-related hospital admissions and the risk of readmissions for all causes, respectively. However, these reductions were not associated with the patients' HF knowledge levels or their improved quality of life (QoL). Another meta-analysis—published in the *Circulation Journal* by Jonkman et al. (5), which reviewed 5624 patients' data, showed that HF self-care interventions reduced the risk of hospital readmissions, death from all causes, and time between HF-related rehospitalizations by 20%. A common feature of these interventions was that they focused on the disease's clinical management.

Although most research has focused on health education, clinical management, and self-care (5,9–11), few clinical trials on HF management have included interventions addressing patients' psychological factors. It was observed that of the seven studies included in the systematic review by Rice et al. (12), only one addressed patients' coping skills, in addition to traditional guidance (13).

Trauma is a highly stressful event that uproots a person's pretrauma assumptive world (14). The chronic nature of heart diseases is associated with patients' progressive decline, several negative health outcomes (15), worsening of moods (16), and poorer QoL (17,18). Existing literature has shown the deleterious effects of life stressors, such as a cardiac disease diagnosis, on psychological and physiological functioning (19,20). For instance, HF patients are at an increased risk of developing psychosocial stress (e.g., depression and anxiety) due to clinical deterioration (16). Furthermore, living with HF and its severe adversities can be analogous to a traumatic experience in that it challenges a person's sense of identity and feelings about justice or fairness (19) and can therefore be a life-changing event (20). The American Psychiatric Association (21) classified the following events as potentially traumatic: exposure to an event that involves death, threat of death, serious injuries, sexual violence, or other threats to physical integrity. Based on the concept of exposed trauma, a study by Magid et al. (22) revealed that 75% of individuals who experienced a cardiac event classified it as traumatic. Admissions to intensive care units, whether resulting from injury or illness, are disruptive in nature and are sudden and unplanned, and pose potentially serious health risks (14).

A study by Sloan et al. (20) described how patients with life-threatening illnesses reported experiences of increased positive psychological, social, and spiritual changes during the diagnosis and treatment of their illness. In recent years, researchers have identified a positive change in heart disease outcomes, indicating that patients have grown or changed in positive ways, because of cardiac diseases or events (23). The concept of posttraumatic growth (PTG) posits that people who endure psychological struggles after adversities, such as a new or worsening health condition, may subsequently experience positive growth and change their

way of viewing themselves and relating to the world (24). Such personal growth can make patients feel that life is worth living. Qualitative and retrospective studies that have explored PTG in cardiac patients have shown that this population segment views cardiac events as a traumatic experience (25,26) and are likely to enhance their self-care through improved healthcare usage (27), family relationships, lifestyle, and QoL (28,29).

This study aimed to assess whether an HF-related psychoeducational intervention involving a component of nurse-led expressive PTG-related self-disclosure questioning could reduce hospital readmissions, improve QoL, and promote PTG in HF patients. Therefore, its intervention was designed to address not only clinical management but also the positive psychological aspects of self-disclosure to boost patients' inner strength amid the difficulties and sufferings associated with HF. It aimed to help patients value the positive aspects of their lives, create a different vision for the future, and play a central role in their care.

METHODS

Study Design

We conducted a randomized, open, controlled, parallel, clinical trial in accordance with the Declaration of Helsinki's principles. It was approved by the local institutional ethics committee of the Institute of Cardiology of Rio Grande do Sul/University Cardiology Foundation and registered on ClinicalTrials.gov (NCT 04870918).

Participants

Patients diagnosed with congestive HF and treated at a general hospital between July 2019 and October 2020 were invited to participate in this study. They were admitted to the same hospital's HF outpatient clinic 30 days after discharge. Their inclusion criteria were ages between 18 and 85 years, diagnosis of American Heart Association's HF stages C and D in the electronic medical records, and signing of an informed consent form.

Their exclusion criteria comprised the following: inability to understand the questions in the assessment tools, diagnosis of dementia or Alzheimer disease, unavailability of discharge notes, or inability to participate in both the intervention sessions.

Study Procedures

Patients were invited to participate in the study during their first visit to the HF outpatient clinic 30 days after discharge. The recruited participants signed an informed consent form; completed a baseline interview, during which, sociodemographic data were collected; and completed the first World Health Organization Quality of Life Assessment (WHOQOL-BREF) and Posttraumatic Growth Inventory (PTGI) evaluations.

Randomization was performed using a computer-generated list obtained by means of an online random integer generator (<https://www.random.org>). Randomization envelopes were opened after each baseline interview, and participants were allocated to either an intervention group (IG) or a control group (CG). After the baseline assessment, participants in the IG were asked to attend two nurse-led 60-minute visits, scheduled at 1-week intervals from the baseline interview and each of the visits. This procedure was performed between July 2019 and March 2020. After March 2020, on account of the COVID-19 pandemic, to avoid exposure of an extra hospital visit, the first intervention session was carried

out on the same day as the baseline interview and took place immediately after group randomization. The participants were then asked to return for the second session, a week later, to complete the final intervention session.

The participants were invited to attend the reassessment interviews that were conducted 6 months after the initial interview, using the WHOQoL-BREF and PTGI assessment scales. The reason for starting after 6 months was due to the time taken to complete the reassessments. Initially, there were 142 participants, considering that the HF outpatient clinic attends to patients only once a week.

A nurse specialist (F.W.O.) conducted all the interviews and intervention sessions, whereas another nurse (B.P.N.) blinded the group assignments and reviewed all the medical records for hospital readmissions and mortality rates within approximately 1 year of the study's commencement.

Assessment Tools

Brazilian-Portuguese Version of the WHOQoL-BREF

The questionnaire contained 24 questions within four domains: physical health, psychological health, social relationships, and environment (30). It used a 5-point Likert scale. The higher the scores, the better the QoL. Percentages were converted according to the WHOQoL domain criteria (31).

Posttraumatic Growth Inventory

It is a self-report scale consisting of five subscales: relating to others (seven items; e.g., I now understand more clearly that I can count on people in times of trouble), new possibilities (five items; e.g., I developed new interests), personal strength (four items; e.g., I know that I can handle difficulties better), spiritual change (two items; e.g., I have a better understanding of spiritual matters), and appreciation of life (three items; e.g., I can better appreciate each day). All the responses were scored on a 5-point Likert scale (0 = I did not experience this change as a result of my crisis; 5 = I experienced this change to a very great degree as a result of my crisis) (32,33).

Psychoeducation Intervention for HF

Intervention Group

Its participants made quarterly visits and also attended two additional health education sessions, comprising two 60-minute visits, 7 days apart. A registered nurse (F.W.O.) under the supervision of a psychologist, administered the psychoeducational intervention to promote a better understanding of HF, self-care, and self-reflection on PTG topics, using an illustrated practical guide developed for the study. The guide was written for fifth-grade reader levels in Brazil. The self-monitoring practices were based on resources easily found in Brazilian homes, and the medicines and medical guidelines were based on their availability to the entire Brazilian population through its public health system, the Sistema Único de Saúde (SUS).

Session 1

The educator discussed HF, the ejection fraction classification, identification of warning signs and symptoms of acute exacerbation, and management of water and salt intake. The participants

were given a folder with information about the different levels of health services and when they should seek help through a color-coded (green-yellow-red light) guide to action (a self-check plan for tracking HF symptoms using heart.org). It also included guidance on the following: diabetes (testing of blood glucose, neutral protamine Hagedorn, regular insulin, orally administered diabetes drugs commonly prescribed by the SUS, and self-monitoring of dietary glucose intake), hypertension (general description of normal blood pressure values and antihypertensive drugs commonly prescribed by the SUS), and treatment and use of diuretics and β -blockers commonly prescribed by the SUS. The participants were also given a booklet to note down the medications being used, their dosage, detailed drug descriptions, and self-care reminders and had to maintain a diary of their daily fluid and medication intake along with body weight.

Session 2

The educators reviewed the previous week's diary of daily medications, fluid intake, and body weight. Guidance was provided regarding salt consumption and the types of foods that must be avoided. In addition, the importance of getting vaccinated against respiratory infections (influenza and pneumonia) was discussed. This session included building of rapport with the participants, who were then encouraged to reflect and self-disclose their feelings on their HF diagnosis and its impact on their lives, and to think about the negative and positive aspects of their illness and potentially positive changes in their beliefs and habits. For example, they were asked: "In life, as different events can have positive or negative impacts, please mention how HF has impacted your life. What level of stress did you experience after your CHF diagnosis?" The participants were invited to read several questions about their lives and choose the statement that best described their current feelings, using a 5-point Likert scale, with scores ranging from "not at all" to "quite a lot." For example, "Only after the HF diagnosis, I seriously examined how much I actually believed, that the things that happen to people are fair"; "Because of the HF diagnosis, I seriously examined my beliefs about my relationships with other people"; and "Because of the HF diagnosis, I seriously examined my beliefs about the meaning of my life."

In addition, the participants were asked to reflect on their QoL and social relationships (Who am I? How do I fit into my social groups? [family, work, and friends]; What are my expectations and goals regarding my personal growth in life?).

The participants were encouraged by the investigators to respond by candidly expressing their feelings, as well as to change their habits, adhere, and reflect on positive events in their lives, both in the first and second meetings. No psychotherapy or reframing of emotions was provided during the interventions.

CG: Its participants attended quarterly routine medical visits at the hospital's HF outpatient clinic.

Outcomes

Primary Outcome

This study's primary outcome was a 1-year rehospitalization-related follow-up. Hospital readmission was defined as any admission after the first discharge owing to three major causes: congestion, target organ damage, and comorbidities (34). A major cause of hospital admissions for HF (34,35) is congestion—the

accumulation of fluid in a target organ resulting from health dysfunctions. According to the Brazilian Heart Association, this imbalance initially begins with shortness of breath, followed by blood pressure fluctuations, cardiovascular events, edema in the lower limbs, and weight gain due to fluid retention (7). Congestion is associated with damage to target organs, such as the heart, lungs, kidneys, liver, and brain (34). Cardiovascular comorbidities include myocardial ischemia, arrhythmias (such as atrial fibrillation), and uncontrolled arterial hypertension (35).

Secondary Outcomes

The secondary outcomes were the differences between the WHOQoL-BREF and PTGI scores before the intervention and 6 months after it.

Blinding

A nurse (B.P.N.) blinded the group allocation, reviewed all electronic medical records, and made telephone calls.

Statistical Analysis

The sample size was calculated using 142 participants, with 80% power at a significance level of 5%. The proportions of readmissions in the IG and CG were expected to be 22% and 44%, respectively, with a 0.50 risk reduction, as reported in a meta-analysis by Jovicic et al. (36).

All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS 27.0). For the primary analyses, to compare the participants' clinical characteristics and medical history, as well as to verify the variables associated with their rehospitalization, the Students *t* test was used for continuous variables and χ^2 test for categorical variables. In addition, it performed the variance inflation factor to verify the variables' multicollinearity and Cox regression analysis for analyzing rehospitalization. Adjustments for known prognostic variables are recommended for the analysis of randomized controlled trials (RCTs) in moderate or large sample sizes, which can lead to substantial increases in power (37). A Kaplan-Meier event-free survival curve was performed for comparing hospital readmissions between the IG and CG. In addition, secondary analyses were performed to compare the PTG and QoL scores using analysis of covariance, taking the baseline values as covariates and using a 5% significance level for the two-tailed tests.

RESULTS

For this study, 142 patients were enrolled between July 2019 and October 2020. Ten dropped out of the study, and nine died before the reassessment. The study flowchart (Figure 1) shows that the follow-up interviews were completed by 123 participants, who hailed from cities in a mountainous region of Southern Brazil. Although 72.1% of the patients were admitted for HF exacerbations, with the most common symptoms being shortness of breath, swelling of the feet and legs, lack of energy, tiredness, enlarged abdomen, and coughing up "frothy" mucus; the remaining 27.9% developed HF after an acute coronary syndrome episode. Approximately 21% of the patients were diagnosed after hospitalization.

Both groups showed similar characteristics in terms of cardiovascular risk factors and medical history (Table S1, Supplemental Digital Content 1, <http://links.lww.com/PSYMED/A909>). Of the

participants, 65% were male with a mean age of 65 years, and 74% were identified as White (based on the racial classification of the Brazilian Institute of Geography and Statistics) (38). Most were of European-Brazilian descent, 60% were married, 64% were retired, and 58% were from a low-income background based on income earnings relative to the current Brazilian economy. In relation to NYHA's functional classes, 22%, 47%, 29%, and 2% were in classes I, II, III, and IV, respectively. The percent ejection fraction mean was 34% (10%).

During the 1-year clinical follow-up, although the overall rate of hospital readmissions was 24%, it was 32% and 15% in the CG and IG, respectively ($p = .018$). The in-hospital mortality rate was 10% in the CG versus 3% in the IG ($p = .09$) with a 27% morbimortality rate that differed significantly between the two groups (35% versus 16%; $p = .015$). The time to the first event/contact date for those without any events was 378 (112–503) days.

In addition, the clinical characteristics, risk factors, and medical history of the readmitted participants were compared. For instance, sex, smoking, chronic obstructive pulmonary disease (COPD), NYHA's functional classes, chronic kidney disease (CKD), smoking, and coronary artery bypass grafts were associated with readmissions by a correlation of ≤ 0.10 or higher. The COPD and CKD were unified as chronic diseases for Cox regression; myocardial infarction and coronary artery bypass graft were unified as a "history of coronary artery diseases"; and NYHA's functional classes were unified into two classes: I and II, and III and IV. Table 1 shows that for chronic diseases, a relative risk of 2.97 and $p < .001$ were predictors of readmission. However, being male, smoking, having a history of coronary artery diseases (myocardial infarction or coronary artery bypass graft), and having an assigned NYHA class were not associated with an increase in readmission rates. This study's intervention proved effective in bringing about a 52% reduction in the risk of readmissions (relative risk = 0.48; $p = .023$). The free-event survival time shown in Figure S1, Supplemental Digital Content 1, <http://links.lww.com/PSYMED/A909>, was 70% in the CG and 85% in the IG that received the psychoeducational intervention ($p = .001$).

Regarding secondary outcomes, all the participants underwent a second assessment approximately 6 months or an average of 182 (180–189) days after the baseline using the WHOQoL and PTGI. Cronbach α coefficient was applied to examine the internal consistency of the WHOQoL-BREF and PTGI scales. The two scales' individual Cronbach α values were 0.77 and 0.86, and 0.88 and 0.89 in the first and second assessments, respectively, showing strong internal consistency for both scales. Although the overall QoL improved in the IG (61.23 [23.35] CG versus 65.67 [11.58] IG; $p = .031$), the results for the individual domains were not significant. Only the environment domain's scores showed a significant and opposite association, with a lower reduction of scores in the IG (Table S2, Supplemental Digital Content 1, <http://links.lww.com/PSYMED/A909>).

With regard to PTGI, the IG showed significant improvements in the "relating to others," "new possibilities," "personal strength," and "appreciation of life" domains, which indicates an overall positive growth (67.02 [13.26] CG versus 72.60 [10.18] IG; $p < .001$). Only the "spiritual change" domain's results did not differ significantly between the groups (Table S3, Supplemental Digital Content 1, <http://links.lww.com/PSYMED/A909>). Notably, although the scores for "appreciation of life," "personal strength,"

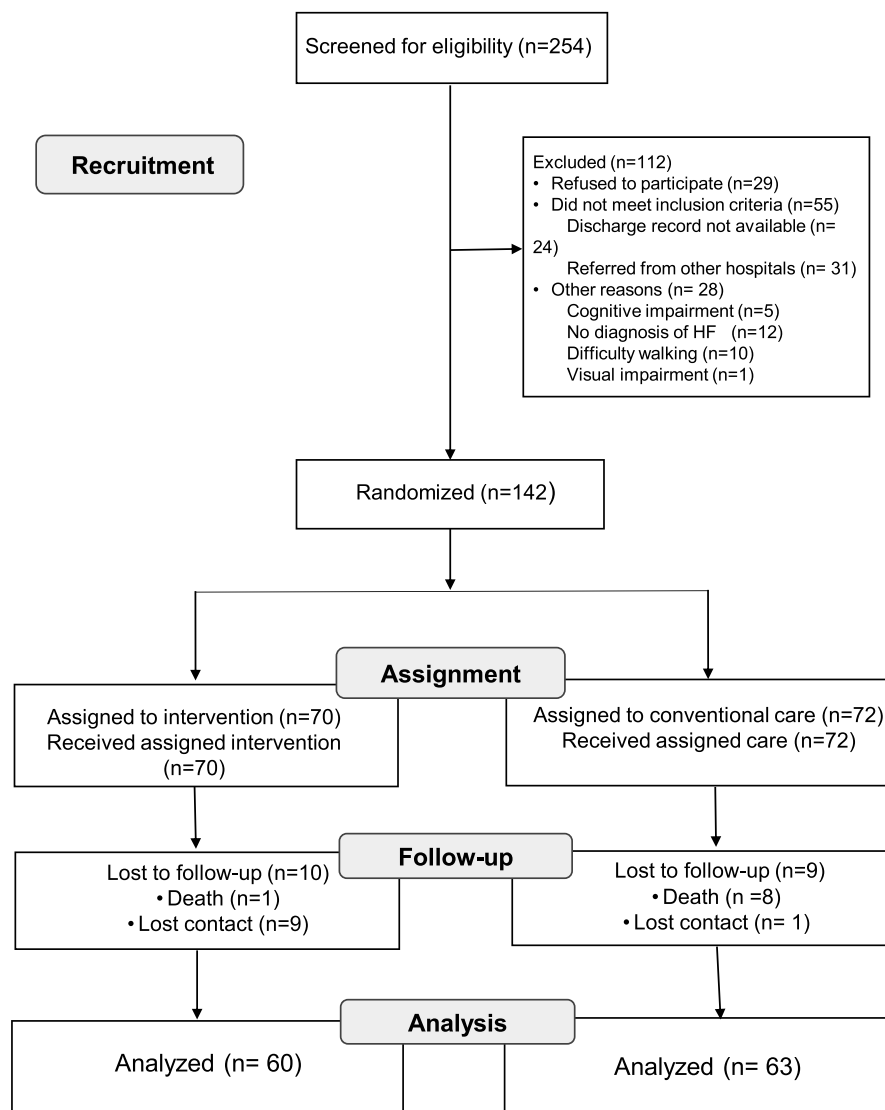


FIGURE 1. Study flowchart.

and “new possibilities” increased in the IG over time, they decreased in the CG.

DISCUSSION

Our psychoeducational intervention raised patients’ understanding of HF critical factors and helped them detect the early signs and symptoms of its exacerbation. It also enabled the patients to play a central role in their care and prompted them to verbally express their feelings about the disease and reflect on who they were, how they related to others, and their social support. This intervention also encouraged them to have positive expectations about living with a chronic condition by changing their lifestyle habits and indirectly improved their overall QoL and PTG.

A comparison of different interventions’ percentage reductions (4,8,11,12,16) showed that this intervention resulted in a higher percentage reduction in readmissions and was associated with longer readmission-free survival rates in the IG, over an average follow-up period of 378 days. These results demonstrated a longer

treatment effect than what was reported by Smith et al., whose intervention effect lasted only up to 7 months (11).

TABLE 1. Cox Regression Analysis for Hospital Readmission

Variables	RR	95% CI	p
Male	1.10	0.64–1.92	.72
Chronic disease	2.97	1.64–5.38	<.001
Smoking	1.30	0.68–2.48	.42
CAD history	0.28	0.04–1.84	.18
NYHA classification			
Classes I and II	0		.10
Classes III and IV	1.69	0.94–3.05	.80
Intervention group	0.48	0.25–0.90	.023

RR = relative risk; CI = confidence interval; Chronic diseases = chronic kidney disease and chronic obstructive pulmonary disease; CAD history = prior coronary artery bypass surgery or myocardial infarction; NYHA = New York Heart Association functional classification of heart failure.

The reduction in readmissions in this study could be attributed to the intervention's uniqueness of combining psychoeducation on physical management and HF with psychosocial and PTG factors, which may have elicited cognitive and emotional awareness for supporting a sense of self-efficacy, improving vision of the future, and engaging in self-care. Thus, people with chronic diseases may benefit from psychoeducational interventions (39) that focus on PTG expressive self-disclosures and psychosocial components (18).

We assumed that chronic illnesses, such as HF, owing to their very nature and comorbidities, can be analogous to traumatic experiences, as they challenge patients' sense of identity and lead to profound changes in everyday life and self-perceptions and may therefore require significant life adaptations (20). As was observed, the risk of readmission was much higher in patients, who, in addition to HF, had CKD or COPD.

The possibility exists that emotional distress could be a trigger for patients to reevaluate and reformulate their worldview, so as to make sense of their traumatic experiences (14). This study reported significant improvements in the patients' overall QoL after the intervention, despite the chronic nature of heart diseases being related to a decline (24). It also found a significant increase in scores in the PTGI domains—appreciation of life, new possibilities, personal strength, and appreciation of life—which indicates that the intervention may help patients to take a proactive role in managing their daily habits, early signs, and symptom exacerbation. As existing literature shows that PTG has consistently been related to adaptive coping strategies (40) and positive health behaviors (14,25,28), patients may become more engaged in their daily activities and experience less fatigue and discomfort. This set of changes favors psychoactivation and a positive outlook on life and may help patients to become more independent, as well as improve their psychological state and social life with family and friends.

To our knowledge, this study is the first RCT to describe positive psychological growth in HF patients through a psychoeducational and brief expressive PTG intervention. The IG participants showed improvements in all domains of this scale 6 months later, suggesting that the expressive intervention was effective in improving these aspects. The results were not significant only for “spiritual changes,” such as increased spirituality, religious and existential concerns, and involvement given that religious practices and beliefs were not assessed or included in this intervention (see Supplemental Digital Content 2, <http://links.lww.com/PSYMED/A910>, for a description of the study intervention and handbooks).

The present study had some limitations. First, it did not use a self-care assessment tool to measure the actual improvements in self-care but only assumed that participants in the IG whose readmissions were fewer compared with those in the CG developed better self-care. Second, it did not investigate whether there was a relationship between the participants' HF and trauma at baseline but assumed that a link existed between HF and a traumatic experience in the lives of this study's participants. Third, given that the principal investigator F.W.O., who conducted all the outcome interviews, was unblinded to the patients' condition, the WHOQOL and PTGI responses may have been biased. Finally, this study was conducted in a small community in Southern Brazil among a group of patients who were very homogeneous in terms of cultural practices and habits and had easy access to follow-up and support from the outpatient clinic's nursing staff.

This intervention could be culturally sensitive as it was developed in the Brazilian context for a population with a basic level of education in a specific region of Southern Brazil. Therefore, this study's protocol should be used to conduct further studies to test the effectiveness of this intervention in large urban centers.

This study is innovative in that it assesses HF patients using a PTG within an RCT consisting of psychoeducation and an expressive intervention. The intervention proved to be effective in reducing readmissions by 52%, and improving self-reported QoL and psychological growth. The protocol developed through this intervention is an effective tool and can be easily implemented in other care settings and hospitals with HF patients.

CONCLUSIONS

The intervention proved to be protective for HF patients at a regional hospital in Southern Brazil. A two-session psychoeducational and brief expressive PTG intervention effectively reduced the IG's readmission rates by half compared with the CG and improved patients' self-reported QoL and positive psychological growth. In the future, brief culturally sensitive psychoeducation programs should be implemented worldwide to improve patients' knowledge about HF and self-care practices. Such interventions should emphasize PTG awareness and emotional expression, which could help minimize the burden on healthcare systems created by HF.

Source of Funding and Conflicts of Interest:

There are no conflicts of interests to disclose and no external sources of funding.

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