

# The Clinical Application of a Positive Psychology Intervention Program—PEACE in Patients after Left Ventricular Assist Device Implementation

Konstantinos Kanellakis, Eirini Karakasidou\*, Anna Papadimitriou, Ioanna Voutoufianaki, Anastassios Stalikas

Department of Psychology, Panteion University of Social and Political Sciences, Athens, Greece  
Email: \*irenekarakasidou@yahoo.com

**How to cite this paper:** Kanellakis, K., Karakasidou, E., Papadimitriou, A., Voutoufianaki, I., & Stalikas, A. (2022). The Clinical Application of a Positive Psychology Intervention Program—PEACE in Patients after Left Ventricular Assist Device Implementation. *Psychology*, 13, 951-963. <https://doi.org/10.4236/psych.2022.137065>

**Received:** June 1, 2022

**Accepted:** July 8, 2022

**Published:** July 11, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0). <http://creativecommons.org/licenses/by/4.0/>



Open Access

---

## Abstract

The present study examines the effectiveness of the PEACE program in patients with Left Ventricular Assist Device (LVAD). According to the literature, LVAD patients experience anxiety and depression. The research involved 14 participants aged 22 to 66 years and was collected from a hospital in Attica. Eight by telephone meetings were held during which they engaged in positive psychology exercises on gratitude, kindness, and character strengths. The results of the intervention showed that participants experienced a reduction in stress, depression and negative emotions and an increase in life satisfaction and positive emotions. There were no statistically significant changes in stress. Follow-up measures are important to dole out to test the long-term benefits of the intervention.

## Keywords

LVAD, PPIs, PEACE, Cardiac Problems

---

## 1. Introduction

The current study aims to test the effectiveness of PEACE, a Positive Psychology Intervention on patients with Left Ventricular Assist Device (LVAD). Positive Psychology is a field of big interest as its effectiveness and practical implementation offers benefits to the receivers. Positive Psychology is carried out through exercises, techniques and interventions in a variety of domains, like Health. Positive Psychology Interventions (PPIs) are training programs that aim to improve the individual's quality of life and well-being through the cultivation of positive

components, such as gratitude and kindness (Meyers et al., 2013). PPIs not only enhance positive emotions, but also help reduce negative emotions such as anxiety, stress, and depression (Seligman et al., 2006). A recent meta-analysis of 347 studies found that PPIs help reduce stress, anxiety and depression while increasing wellbeing, quality of life and character strengths. The meta-analysis also showed that the benefits of PPIs are long-term and are maintained in the 3-month follow-up measure (Carr et al., 2021). Data from a systematic study and meta-analysis agree that PPIs reduce anxiety, stress and depression and increase wellbeing in patients with psychiatric disorders or physical problems (Chakhssi et al., 2018).

The benefits of PPIs on individuals' mental health explain why these interventions are applied in a wide range of fields and are addressed to individuals with different characteristics. Health is an area where PPIs are applied. In contrast to interventions performed in a clinical sample, in the case of health, the benefits of PPIs can be studied not only in mental health but also in physical health. Positive emotions are negatively related to morbidity, hypertension risk and mortality and it seems that people who experience positive emotions have longevity (Pressman & Cohen, 2005). The interest of PPIs focused on the Health field and on patients with health problems, as these patients have negative effects on their mental health and experience anxiety and depression (Pitman et al., 2018).

An important study examined the effects of positive and negative emotions on heart function based on Fredrickson (2004) Broaden and Build theory of positive emotions. Participants were exposed to films such as thrillers that evoke fear, funny films such as comedies that evoke joy and laugh and neutral films. Initially, all participants were exposed to negative content films and then one group watched a negative content film again, one group watched a neutral content film and the last group watched a pleasure film. The participants who watched the enjoyable film had a faster myocardial function recovery compared to the previous two groups (Fredrickson & Levenson, 1998). Therefore, it seems that experiencing positive emotions has significant benefits on heart function and may be beneficial in patients with heart problems. In contrast, patients with cardiovascular problems experience anxiety and depression, which exacerbates the condition's severity (Castillo-Mayén et al., 2021).

Heart problems occur mainly in middle-aged or elderly people, however they can also affect a younger population (Gaskin & Daniels, 2021). After a heart problem, the individual's life changes and they are called to make changes in their daily habits in order to protect their health. Especially in patients with heart failure, the application of LVAD is necessary. LVAD implementation has increased the last 15 years (Caro et al., 2016). LVAD is a mechanical pump implemented in the chest and helps the bottom left chamber to flow blood to the aorta and the full body (Prinzing et al., 2016). The specific population after the operation experiences and faces several mental health problems. In one study (N = 14) the most common disorders experienced by LVAD patients were adjustment disorders. They also had depression, psychotic and dissociative disorders and some devel-

oped delirium (Baba et al., 2006). Another studies also claimed that LVAD patients experience anxiety and depression (Brouwers et al., 2015; Modica et al., 2015; Shapiro et al., 1996), although their quality of life improved after the implementation (Grady et al., 2001; Modica et al., 2015). However, opposite findings have been observed in LVAD patients, as they did not experience anxiety, depression or any cognitive impairment (Grady et al., 2001; Mapelli et al., 2014). It is also interesting to note that although LVAD patients experience anxiety, a comparative study found that their relatives experience higher levels of anxiety and distress compared to themselves (Brouwers et al., 2015).

Surveys and PPIs have been performed in patients with heart problems, but no research has been performed specifically in LVAD patients. Positive emotions are associated with a reduced risk of myocardial infarction (Ostir et al., 2001) and are protective against mortality in patients with cardiovascular problems (Scherer & Herrmann-Lingen, 2009). PPIs have been performed in patients with various health problems and have shown positive results. In cancer patients, after PPIs' completion, patients reported an increase in positive emotions and a decrease in negative emotions (Baños et al., 2012), increased self-esteem, happiness, wellbeing, resilience and emotional intelligence (Cerezo et al., 2014). Similar results in increasing positive emotions and reducing negative ones have been shown in patients with type 2 diabetes (Cohn et al., 2014). PPIs have significant benefits in improving physical health, they increase positive emotions, life satisfaction (Müller et al., 2016), happiness and reduce anger in patients with chronic pain (Baxter et al., 2012).

Similar results have been observed in patients with cardiovascular problems who participated in PPIs. In one study, participants with cardiovascular disease were divided into three PPI groups and exercised in positive emotions, meaning in life, character strengths (Seligman program), optimism, gratitude, spirituality, coping strategies (Lyubomirsky), goal setting and positive personality traits (Fordyce). Although there were individual differences among the three groups, all participants noted an increase in happiness, hope, life satisfaction and a decrease in depression (Nikrahan et al., 2016). The increase in positive emotions is also confirmed by another PPI in patients with heart problems (Sultan et al., 2018). Another study in patients with acute coronary syndrome showed that after completing PPI they experienced an increase in positive emotions, they showed greater commitment to exercise (Duque et al., 2019) and reported a reduction in stress and depression (Huffman et al., 2016). A meta-analysis confirms the above that PPIs enhance optimism, improve quality of life and reduce depression, with long-term maintenance (Sin & Lyubomirsky, 2009).

PEACE (Positive Emotions After Acute Cardiac Events) is a PPI aimed at patients with heart problems (Huffman et al., 2011, 2017). The specific intervention has not been applied in the literature before but a similar protocol-PEACE-III has significant benefits, as it has improved wellbeing and increased commitment to exercise (Huffman et al., 2016). This intervention was applied to patients after an acute cardiac event and the benefits of the intervention helped in faster and

better cardiac function restoration (Huffman et al., 2016). A pilot study was conducted, where PEACE was applied and adapted in Greek to patients after a cardiovascular operation (Kanellakis et al., 2022). The study involved 15 patients aged 45 to 75 years. From the sample, 9 participated in the intervention group and 6 in the control group. Participants completed questionnaires before and after the intervention. In the pre measures, there were no differences between the two groups. In the post measures, the control group (where no intervention was carried out) did not have any statistically significant change in the research variables. Participants in the intervention group had lower rates of anxiety, depression, negative emotions, and an increase in life satisfaction compared to the pre measures. Positive emotions and stress did not change statistically significantly compared to the pre measures. The participants in the intervention group also had greater benefits for all research variables compared to the participants in the control group, except for positive emotions, where the difference was not statistically significant (Kanellakis et al., 2022).

The PPIs are carried out in order to help people manage their negative emotions and enhance their well-being. According to previous bibliography, the PPIs help people reduce their negative emotions (Baños et al., 2012; Cohn et al., 2014; Seligman et al., 2006), as well as anxiety, stress, and depression (Carr et al., 2021; Chakhssi et al., 2018; Seligman et al., 2006). The PPIs also enhance people's positive emotions (Baños et al., 2012; Baxter et al., 2012; Cerezo et al., 2014; Cohn et al., 2014; Seligman et al., 2006) and help them experience more life satisfaction (Müller et al., 2016). PEACE program as a PPI seems to have the same results, but its effectiveness has not been widely tested.

The PEACE program has only been carried out in patients after a cardiovascular operation and demonstrated significant benefits. However, it is the only population to which it has been applied and the results cannot be generalized to other patients with heart problems. In addition, although psychological function has been studied in patients with LVAD, it should be noted that no PPIs have been administered in this group before.

The purpose of this survey is to study the effectiveness of the PEACE program in increasing positive emotions and reducing negative ones in LVAD patients. The research seeks to answer the following research questions:

- 1) Is PEACE program effective in increasing positive affect and life satisfaction in LVAD patients?
- 2) Is PEACE program effective in decreasing negative emotions, depression, anxiety and stress in LVAD patients?

## 2. Methodology

### 2.1. Design

The present study follows a quasi-experiment method, since its purpose was to test the effectiveness and the impact of PEACE program on LVAD patients. The participants completed the questionnaires, then they took part in PEACE pro-

gram and after its completion, they filled out the same questionnaires again.

## 2.2. Participants

The study involved 14 participants-patients with LVAD, of whom 10 (71.4%) were men and 4 (28.6%) were women. Their age ranged from 22 to 66 years (Mean = 51.29, SD = 12.10). Half of the participants (50%) had university education, 6 had completed secondary education (42.9%) and one was a primary education graduate (7.1%). 11 (78.6%) of the participants were of Greek nationality and the three (21.4%) were Cypriot. The participants were approached through a hospital in Attica. Participants should have been adults and had a LVAD in order to meet the selection criteria.

## 2.3. Materials

Participants completed three questionnaires before and after the intervention and a demographic form including questions about their gender, age, educational background, nationality.

**Depression, Anxiety, Stress Scale (DASS-21; Lovibond & Lovibond, 1995; Lyrakos et al., 2011).**

The scale measures depression, anxiety and stress and the responses are given on a 4-point scale Likert (0: did not apply to me at all, 3: applied to me very much or most of the time). The scale consists of 21 items and it is adapted in Greek version. The scoring is extracted in three subscales about anxiety, depression and stress. The possible scores range from 0 to 21 and as much higher is the score, as much anxiety, depression and stress are. In the current survey, the reliability was high (pre measures: stress  $\alpha = .737$ , anxiety  $\alpha = .829$ , depression  $\alpha = .862$  and post measures: stress  $\alpha = .707$ , anxiety  $\alpha = .769$ , depression  $\alpha = .846$ ).

**Positive and Negative Affect Schedule (PANAS; Watson et al., 1988; Daskalou & Sigkollitou, 2012)**

The Greek version of PANAS was doled out to participants and measures the positive and negative affect. The scale consists of 20 items, half of them belong to the negative subscale and half of them to the positive subscale. The responses are given to 5-Likert scale ranges from 1: very slightly or not at all to 5: extremely. The possible score for each subscale ranges from 10 to 50 and as much higher the score is, then the participant experiences more positive and negative emotions respectively. In the current survey, the reliability was high (pre measures: negative emotions  $\alpha = .865$ , positive emotions  $\alpha = .872$  and post measures: negative emotions  $\alpha = .803$ , positive emotions  $\alpha = .768$ ).

**Satisfaction with Life Scale (Diener et al., 1985; Stalikas & Lakioti, 2012)**

The Greek version was doled out to the participants. The scale consists of 5 items and the responses are given on a 7-point scale Likert ranging from 1 = strongly disagree to 7 = strongly agree. The scale extracts a total score and as much higher is, then the participant experiences more life satisfaction. In the current survey, the reliability was high (pre measures  $\alpha = .843$  and post measures

$a = .869$ ).

## 2.4. Procedure

PEACE program was designed by Jeffery C. Huffman, who gave the license the program used in Greek patients, who deal with cardiovascular problems. The researcher followed a training program by Huffman in order to imply the program on LVAD patients. Since the protocol was in English, the forward-backwards translation was carried out by two English native independent translators. Then, PEACE program was examined in a pilot study and it was delivered to patients after a cardiovascular operation. In the pilot study, the participants were divided into two groups and completed at pre and post measures, the same scales they are used in the current study. The results in the pilot study showed that PEACE program was beneficial, since anxiety, depression and life satisfaction were decreased and life satisfaction was increased. So, the same program based on the same protocol was delivered to the current study. Like in the pilot study, the researcher approached the participants in a hospital in Athens. Initially, the participants studied the briefing form and completed the consent form in order to take part in the intervention. Then, the first session was started, the researcher gave details to the participants about Positive Psychology and he explained to them the aim and the procedure of the intervention. The first session was completed by assigning the first exercise. The next seven sessions were carried out through telephone. The duration of each session ranged from 15 to 30 minutes. In every session, the participants answered to short questions and the researcher talked with the participants about the exercises and a new exercise was assigned, except for the last two sessions, where the participants chose on their own their favorite exercise. Each exercise was related to hearth disease and LVAD and was based on positive psychology and concerned a positive component. All exercises were easy in order to facilitate the participants to commit to them and not exhaust them. During the exercises, the participants were asked to note their feelings. The first exercise focused on gratitude and the participants reported three events for which they feel gratitude. The second exercise focused on character strengths. The 14 participants found their own and applied them till the next session. The third session focused again on gratitude and the participants wrote a letter to somebody who benefitted them. The fourth exercise concerned activities and the participants took part in individual and group activities, which were both pleasant and meaningful. The fifth exercise was about positive memories and the participants were asked to recall past meaningful moments and events. The sixth exercise was based on kindness, the participants were asked to commit to three good actions during a day. In the last exercise, the participants chose their favorite exercise in order to experience more positive emotions. The exercises were carefully selected in order to avoid burden the participants. In the last session, the participants were called to complete the questionnaires again. Finally, the researcher tested the program's effectiveness using SPSS package by comparing the pre and post measures.

### 3. Results

Initially, the normality of variance was checked with the Shapiro-Wilk criterion, since the sample was <50 individuals. The test showed that the normality of variance is observed for all the research variables both in the pre and post measures, which allows the use of the parametric tests. The means and the standard deviation of the variables were checked (**Table 1**). Reliability was high for all survey variables. In the pre measures, Cronbach's alpha reliability was for stress  $\alpha = .737$ , anxiety  $\alpha = .829$ , depression  $\alpha = .862$ , negative emotions  $\alpha = .865$ , positive emotions  $\alpha = .872$  and life satisfaction  $\alpha = .843$ . In the post measures, Cronbach's alpha reliability was for stress  $\alpha = .707$ , anxiety  $\alpha = .769$ , depression  $\alpha = .846$ , negative emotions  $\alpha = .803$ , positive emotions  $\alpha = .768$  and life satisfaction  $\alpha = .896$ .

A two-tailed Paired Sample T Test was then performed to investigate whether there were any changes in the research variables' mean after the completion of the program. Statistically significant changes were observed in all research variables, except for anxiety. Although in the post measures (Mean = 6.36, SD = 4.81) the anxiety decreased compared to the pre measures (Mean = 8.07, SD = 5.74), the difference was not statistically significant,  $t(13) = 1.48$ ,  $p > .05$ , Cohen's  $d = 4.34$ . There was a statistically significant reduction in stress  $t(13) = 2.98$ ,  $p < .01$ , Cohen's  $d = 3.41$  and there was a reduction in stress in the post measures (Mean = 8.93, SD = 5.18) compared to the pre measures (Mean = 6.21, SD = 4.28). There was a statistically significant reduction in depression between the pre (Mean = 8.50, SD = 5.71) and post measures (Mean = 4.14, SD = 3.76),  $t(13) = 4.78$ ,  $p < .001$ , Cohen's  $d = 3.41$ . There was a statistically significant decrease in negative emotions between the pre (Mean = 22.29, SD = 8.12) and post measures (Mean = 18.43, SD = 6.79),  $t(13) = 2.28$ ,  $p < .05$ , Cohen's  $d = 6.33$ .

**Table 1.** Descriptive statistics among the research variables (N = 14).

| Variables              | Mean  | SD   | Cronbach's alpha |
|------------------------|-------|------|------------------|
| Stress_pre             | 8.93  | 5.18 | .737             |
| Anxiety_pre            | 8.07  | 5.74 | .829             |
| Depression_pre         | 8.50  | 5.71 | .862             |
| Negative emotions_pre  | 22.29 | 8.12 | .865             |
| Positive emotions_pre  | 32.50 | 8.00 | .872             |
| Life satisfaction_pre  | 22.43 | 7.14 | .843             |
| Stress_post            | 6.21  | 4.28 | .707             |
| Anxiety_post           | 6.36  | 4.81 | .769             |
| Depression_post        | 4.14  | 3.76 | .846             |
| Negative emotions_post | 18.43 | 6.79 | .803             |
| Positive emotions_post | 36.57 | 5.65 | .768             |
| Life satisfaction_post | 27.71 | 5.38 | .896             |

There was a statistically significant increase in positive emotions between the pre (Mean = 32.50, SD = 8.01) and post measures (Mean = 36.57, SD = 5.65),  $t(13) = -3.22$ ,  $p < .001$ , Cohen's  $d = 4.73$ . Finally, there was a statistically significant increase in life satisfaction between the pre (Mean = 22.43, SD = 7.14) and post measures (Mean = 27.71, SD = 5.38),  $t(13) = -3.14$ ,  $p < .001$ , Cohen's  $d = 6.31$  (Table 2).

#### 4. Discussion

The study examined the effectiveness of PEACE in patients with LVAD. Participants attended eight sessions during which they practiced exercises related to kindness, gratitude, meaning in life and character strengths cultivation. At every session, the participants talked about their experience with the exercise and the new exercise was given for the next time. In the last two sessions, participants chose the exercise they liked more. The effectiveness of the intervention was tested in terms of reducing anxiety, stress, depression and negative emotions, but also in terms of increasing positive emotions and life satisfaction.

The first research question examined whether PEACE was effective in increasing positive emotions and life satisfaction in LVAD patients. The participants scored higher on positive emotions and the increase was statistically significant. The increase in positive emotions is also confirmed by the previous literature in patients with cancer (Baños et al., 2012; Cerezo et al., 2014), type 2 diabetes (Cohn et al., 2014) and patients with chronic pain (Baxter et al., 2012; Müller et al., 2016). Also, participation in PPIs shows that positive emotions increase in patients with heart problems (Nikrahan et al., 2016; Sultan et al., 2018) and in patients with acute coronary syndrome (Duque et al., 2019). PEACE increased positive emotions in LVAD patients, whereas positive emotions did not improve in patients after cardiovascular operation (Kanellakis et al., 2022). One possible explanation can be attributed to the type of heart problem, as well as the fact that the participants in the present study experienced positive emotions from the pre measures, so PEACE may have reinforced them further. Importantly, experiencing positive emotions leads to faster cardiac function restoration and benefits people with heart problems (Castillo-Mayén et al., 2021; Fredrickson & Levenson, 1998).

**Table 2.** Pre and post measures among research variables (N = 14).

| Variables         | Pre test     | Post test    | t     | p     | Cohen's d |
|-------------------|--------------|--------------|-------|-------|-----------|
|                   | Mean (SD)    | Mean (SD)    |       |       |           |
| Stress            | 6.21 (4.28)  | 8.93 (5.18)  | 2.98  | <.01  | 3.41      |
| Depression        | 8.50 (5.71)  | 4.14 (3.76)  | 4.78  | <.001 | 3.41      |
| Negative emotions | 22.29 (8.12) | 18.43 (6.79) | 2.28  | <.05  | 6.33      |
| Positive emotions | 32.50 (8.01) | 36.57 (5.65) | -3.22 | <.001 | 4.73      |
| Life satisfaction | 22.43 (7.14) | 27.71 (5.38) | -3.14 | <.001 | 6.31      |
| Anxiety           | 8.07 (5.74)  | 6.36 (4.81)  | 1.48  | >.05  | 4.34      |



In continuation, the second part of the first research question studied the PEACE effectiveness in life satisfaction. The results of the study showed that LVAD patients scored higher in life satisfaction compared to the pre measures. In other words, it seems that practicing positive components, such as kindness and gratitude, increases the satisfaction they experience from their life. Previous studies with PPIs have shown the same results that participants report higher life satisfaction (Müller et al., 2016; Nikrahan et al., 2016). The pilot study of PEACE led to the same results, where patients after the cardiovascular operation reported greater satisfaction with their lives (Kanellakis et al., 2022).

The second research question examined the PEACE effectiveness in reducing negative emotions, anxiety, stress and depression. LVAD patients scored lower on the post measures in negative emotions. After the intervention, the experience of negative emotions was statistically significantly lower compared to the pre measures. According to previous research, negative emotions decrease after PPIs completion in patients with cancer (Baños et al., 2012) and type 2 diabetes (Cohn et al., 2014). PPIs also reduce anger in patients with chronic pain (Baxter et al., 2012). In the PEACE pilot study, participants also reported a reduction in negative emotions after the intervention.

Furthermore, statistically significant changes were observed only for stress and depression, but not for anxiety. Previous research has shown that PPIs help reduce stress and depression (Carr et al., 2021; Chakhssi et al., 2018; Seligman et al., 2006). PPIs also reduce depression in patients with heart problems (Nikrahan et al., 2016) and in patients with acute coronary syndrome (Huffman et al., 2016). A meta-analysis confirms the reduction of depression and long-term maintenance after the application of PPIs (Sin & Lyubomirsky, 2009). The PEACE program helps reduce depression and anxiety in patients after a cardiovascular operation, but not stress (Kanellakis et al., 2022). In the pilot study, patients on PEACE reported less anxiety and depression, but the reduction in stress was not statistically significant. In the present study, patients underwent LVAD implementation and as cardiac function improved, the biological stress response may be improved in combination with PEACE. On the other hand, in the PEACE pilot study there was a statistically significant reduction in anxiety, while in the present study the difference was not statistically significant. Previous research has confirmed that PPIs reduce anxiety (Carr et al., 2021; Chakhssi et al., 2018; Huffman et al., 2016; Seligman et al., 2006). In the present study, participants did not experience a reduction in anxiety. Previous literature suggests that LVAD patients experience anxiety (Brouwers et al., 2015; Modica et al., 2015; Shapiro et al., 1996), but it is important to note that these patients also experience dissatisfaction from socioeconomic issues caused by their health situation (Grady et al., 2001). The difficulties they face in other areas of their lives probably explain why the anxiety reduction was not statistically significant.

## 5. Implications

LVAD patients present mental health problems such as anxiety and depression

(Baba et al., 2006; Brouwers et al., 2015; Modica et al., 2015; Shapiro et al., 1996), disorders such as adjustment, psychotic, dissociative disorders (Baba et al., 2006), but also difficulties in socioeconomic areas (Grady et al., 2001). It is also a particularly aggravating condition for patients' relatives (Brouwers et al., 2015). The PEACE program benefited LVAD patients as in the post measures given after the intervention, stress, depression and negative emotions decreased and positive emotions and life satisfaction increased. These results are reinforced by the PEACE pilot study in patients who also had heart problems, as anxiety, depression and negative emotions were decreased and life satisfaction was increased. As LVAD patients experience negative emotions and their mental health is negatively affected, it seems that cultivating positive components such as gratitude, kindness, optimism and character strengths help them better and more effectively manage negative emotions, stress and depression and help them experience greater life satisfaction and positive emotions, which have significant health benefits (Fredrickson & Levenson, 1998; Ostir et al., 2001; Pressman & Cohen, 2005; Scherer & Herrmann-Lingen, 2009).

## 6. Limitations and Future Research Directions

A limitation of the research concerns the demographic characteristics, as the majority (71.4%) were men and 28.6% were women. The patients were approached from a hospital in Attica, although it is the only hospital specialized in LVAD implementation. Also, the follow-up measures were absent in the research. Based on the post measures (after the intervention), there are data on the PEACE effectiveness, but there are no valid data on the long-term benefits maintenance in LVAD patients.

In future research it is important to carry out follow-up measures in order to study whether the results are maintained in the long-term. Finally, the PEACE effectiveness concerns LVAD patients (current study) and patients after cardiovascular operation (pilot study; Kanellakis et al., 2022). More research is needed to study the effectiveness of PEACE in other patients with heart problems, such as after an acute coronary syndrome.

## 7. Practical Application

In conclusion, PEACE program could be part of the overall treatment of the patient in physical and psychological level. Since the PEACE program seems to benefit the patients who suffer from cardiovascular problems, the patients should take part in this program in order to enhance their well-being. In the current study, the PEACE program was delivered through telephone, but the session could be part of the patient's therapy in hospitals. For this purpose, training health professionals to treat patients with heart problems would be helpful in supporting these patients. All the professionals who interact with the patient, like doctors, nurses, health psychologists could implement the PEACE program in patients with cardiovascular problems in order to help, enhance and support

them. Then, patients could better manage the negative effects of the health problem, but also experience positive benefits, recognize an essential meaning for their lives, experience life satisfaction and better commit to behaviors that improve physical and mental health.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

### References

- Baba, A., Hirata, G., Yokoyama, F., Kenmoku, K., Tsuchiya, M., Kyo, S., & Toyoshima, R. (2006). Psychiatric Problems of Heart Transplant Candidates with Left Ventricular Assist Devices. *Journal of Artificial Organs*, *9*, 203-208. <https://doi.org/10.1007/s10047-006-0353-0>
- Baños, R. M., Espinoza, M., García-Palacios, A., Cervera, J. M., Esquerdo, G., Barraón, E., & Botella, C. (2012). A Positive Psychological Intervention Using Virtual Reality for Patients with Advanced Cancer in a Hospital Setting: A Pilot Study to Assess Feasibility. *Supportive Care in Cancer*, *21*, 263-270. <https://doi.org/10.1007/s00520-012-1520-x>
- Baxter, H. J., Johnson, M. H., & Bean, D. (2012). Efficacy of a Character Strengths and Gratitude Intervention for People with Chronic Back Pain. *The Australian Journal of Rehabilitation Counselling*, *18*, 135-147. <https://doi.org/10.1017/jrc.2012.14>
- Brouwers, C., Denollet, J., Caliskan, K., de Jonge, N., Constantinescu, A., Young, Q., Pedersen, S. S. et al. (2015). Psychological Distress in Patients with a Left Ventricular Assist Device and Their Partners: An Exploratory Study. *European Journal of Cardiovascular Nursing*, *14*, 53-62. <https://doi.org/10.1177/1474515113517607>
- Caro, M. A., Rosenthal, J. L., Kendall, K., Pozuelo, L., & Funk, M. C. (2016). What the Psychiatrist Needs to Know about Ventricular Assist Devices: A Comprehensive Review. *Psychosomatics*, *57*, 229-237. <https://doi.org/10.1016/j.psym.2016.01.002>
- Carr, A., Cullen, K., Keeney, C., Canning, C., Mooney, O., Chinsellaigh, E., & O'Dowd, A. (2021). Effectiveness of Positive Psychology Interventions: A Systematic Review and Meta-Analysis. *The Journal of Positive Psychology*, *16*, 749-769. <https://doi.org/10.1080/17439760.2020.1818807>
- Castillo-Mayén, R., Luque, B., Gutiérrez-Domingo, T., Cuadrado, E., Arenas, A., Rubio, S. et al. (2021). Emotion Regulation in Patients with Cardiovascular Disease: Development and Validation of the Stress and Anxiety Regulation Strategies Scale (Starts). *Anxiety, Stress, & Coping*, *34*, 349-364. <https://doi.org/10.1080/10615806.2020.1866173>
- Cerezo, M. V., Ortiz-Tallo, M., Cardenal, V., & De La Torre-Luque, A. (2014). Positive Psychology Group Intervention for Breast Cancer Patients: A Randomised Trial. *Psychological Reports*, *115*, 44-64. <https://doi.org/10.2466/15.20.PR0.115c17z7>
- Chakhssi, F., Kraiss, J. T., Sommers-Spijkerman, M., & Bohlmeijer, E. T. (2018). The Effect of Positive Psychology Interventions on Well-Being and Distress in Clinical Samples with Psychiatric or Somatic Disorders: A Systematic Review and Meta-Analysis. *BMC psychiatry*, *18*, Article No. 211. <https://doi.org/10.1186/s12888-018-1739-2>
- Cohn, M. A., Pietrucha, M. E., Saslow, L. R., Hult, J. R., & Moskowitz, J. T. (2014). An Online Positive Affect Skills Intervention Reduces Depression in Adults with Type 2 Diabetes. *The Journal of Positive Psychology*, *9*, 523-534. <https://doi.org/10.1080/17439760.2014.920410>
- Daskalou & Sigkollitou (2012). Positive and Negative Affect Scale (PANAS). In A. Stali-

- kas, S. Triliva, & P. Roussi (Eds.), *Psychometric Instruments in Greece* (2nd ed., p. 526). Pedio.
- Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, *49*, 71-75.  
[https://doi.org/10.1207/s15327752jpa4901\\_13](https://doi.org/10.1207/s15327752jpa4901_13)
- Duque, L., Brown, L., Celano, C. M., Healy, B., & Huffman, J. C. (2019). Is It Better to Cultivate Positive Affect or Optimism? Predicting Improvements in Medical Adherence Following a Positive Psychology Intervention in Patients with Acute Coronary Syndrome. *General Hospital Psychiatry*, *61*, 125-129.  
<https://doi.org/10.1016/j.genhosppsych.2019.06.001>
- Fredrickson, B. L. (2004). The Broaden-and-Build Theory of Positive Emotions. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, *359*, 1367-1377. <https://doi.org/10.1098/rstb.2004.1512>
- Fredrickson, B. L., & Levenson, R. W. (1998). Positive Emotions Speed Recovery from the Cardiovascular Sequelae of Negative Emotions. *Cognition and Emotion*, *12*, 191-220.  
<https://doi.org/10.1080/026999398379718>
- Gaskin, K. L., & Daniels, A. (2021). *Caring for Children and Young People with Cardiovascular Problems* (pp. 201-218). A Textbook of Children's and Young People's Nursing-E-Book.
- Grady, K. L., Meyer, P., Mattea, A., White-Williams, C., Ormazza, S., Kaan, A., Costanzo, M. R. et al. (2001). Improvement in Quality of Life Outcomes 2 Weeks after Left Ventricular Assist Device Implantation. *The Journal of Heart and Lung Transplantation*, *20*, 657-669. [https://doi.org/10.1016/S1053-2498\(01\)00253-4](https://doi.org/10.1016/S1053-2498(01)00253-4)
- Huffman, J. C., Albanese, A. M., Campbell, K. A., Celano, C. M., Millstein, R. A., Mastromauro, C. A. et al. (2017). The Positive Emotions after Acute Coronary Events Behavioral Health Intervention: Design, Rationale, and Preliminary Feasibility of a Factorial Design Study. *Clinical Trials*, *14*, 128-139.  
<https://doi.org/10.1177/1740774516673365>
- Huffman, J. C., Mastromauro, C. A., Boehm, J. K., Seabrook, R., Fricchione, G. L., Denninger, J. W., & Lyubomirsky, S. (2011). Development of a Positive Psychology Intervention for Patients with Acute Cardiovascular Disease. *Heart International*, *6*, 47-54.  
<https://doi.org/10.4081/2888>
- Huffman, J. C., Millstein, R. A., Mastromauro, C. A., Moore, S. V., Celano, C. M., Bedoya, C. A. et al. (2016). A Positive Psychology Intervention for Patients with an Acute Coronary Syndrome: Treatment Development and Proof-of-Concept Trial. *Journal of Happiness Studies*, *17*, 1985-2006. <https://doi.org/10.1007/s10902-015-9681-1>
- Kanellakis, K., Papadimitriou, A., Karakasidou, E., & Stalikas, A. (2022). The Clinical Application of a Positive Intervention Program in Patients Who Experienced a Cardiovascular Operation—Pilot Study. *Psychology*, *13*, 27-40.  
<https://doi.org/10.4236/psych.2022.131002>
- Lovibond, P. F., & Lovibond, S. H. (1995). The Structure of Negative Emotional States: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*, 335-343.  
[https://doi.org/10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U)
- Lyrakos, N. G., Arvaniti, C., Smyrnioti, M., & Kostopanagiotou, G. (2011). Translation and Validation Study of the Depression Anxiety Stress Scale in the Greek General Population and in a Psychiatric Patient's Sample. *European Psychiatry*, *26*, 1731.  
[https://doi.org/10.1016/S0924-9338\(11\)73435-6](https://doi.org/10.1016/S0924-9338(11)73435-6)
- Mapelli, D., Cavazzana, A., Cavalli, C., Bottio, T., Tarzia, V., Gerosa, G., & Volpe, B. R.

- (2014). Clinical Psychological and Neuropsychological Issues with Left Ventricular Assist Devices (LVADs). *Annals of Cardiothoracic Surgery*, 3, 480-489.
- Meyers, M., van Woerkom, M., & Bakker, A. (2013). The Added Value of the Positive: A Literature Review of Positive Psychology Interventions in Organizations. *European Journal of Work and Organizational Psychology*, 22, 618-632. <https://doi.org/10.1080/1359432X.2012.694689>
- Modica, M., Ferratini, M., Torri, A., Oliva, F., Martinelli, L., De Maria, R., & Frigerio, M. (2015). Quality of Life and Emotional Distress Early after Left Ventricular Assist Device Implant: A Mixed-Method Study. *Artificial Organs*, 39, 220-227. <https://doi.org/10.1111/aor.12362>
- Müller, R., Gertz, K. J., Molton, I. R., Terrill, A. L., Bombardier, C. H., Ehde, D. M., & Jensen, M. P. (2016). Effects of a Tailored Positive Psychology Intervention on Well-Being and Pain in Individuals with Chronic Pain and a Physical Disability. *The Clinical Journal of Pain*, 32, 32-44. <https://doi.org/10.1097/AJP.0000000000000225>
- Nikrahan, G. R., Suarez, L., Asgari, K., Beach, S. R., Celano, C. M., Kalantari, M., Abedi, M. R., Etesampour A., Abbas, R., & Huffman, J. C. (2016). Positive Psychology Interventions for Patients with Heart Disease: A Preliminary Randomized Trial. *Psychosomatics*, 57, 348-358. <https://doi.org/10.1016/j.psym.2016.03.003>
- Ostir, G. V., Markides, K. S., Peek, M. K., & Goodwin, J. S. (2001). The Association between Emotional Well-Being and the Incidence of Stroke in Older Adults. *Psychosomatic Medicine*, 63, 210-215. <https://doi.org/10.1097/00006842-200103000-00003>
- Pitman, A., Suleman, S., Hyde, N., & Hodgkiss, A. (2018). Depression and Anxiety in Patients with Cancer. *BMJ*, 361, k1415. <https://doi.org/10.1136/bmj.k1415>
- Pressman, S. D., & Cohen, S. (2005). Does Positive Affect Influence Health? *Psychological Bulletin*, 131, 925-971. <https://doi.org/10.1037/0033-2909.131.6.925>
- Prinzing, A., Herold, U., Berkefeld, A., Krane, M., Lange, R., & Voss, B. (2016). Left Ventricular Assist Devices—Current State and Perspectives. *Journal of Thoracic Disease*, 8, 660-666. <https://doi.org/10.21037/jtd.2016.07.13>
- Scherer, M., & Herrmann-Lingen, C. (2009). Single Item on Positive Affect Is Associated with 1-Year Survival in Consecutive Medical Inpatients. *General Hospital Psychiatry*, 31, 8-13. <https://doi.org/10.1016/j.genhosppsych.2008.09.020>
- Seligman, M. E., Rashid, T., & Parks, A. C. (2006). Positive Psychotherapy. *American Psychologist*, 61, 774-788. <https://doi.org/10.1037/0003-066X.61.8.774>
- Shapiro, P. A., Levin, H. R., & Oz, M. C. (1996). Left Ventricular Assist Devices Psychosocial Burden and Implications for Heart Transplant Programs. *General Hospital Psychiatry*, 18, 30-35. [https://doi.org/10.1016/S0163-8343\(96\)00076-X](https://doi.org/10.1016/S0163-8343(96)00076-X)
- Sin, N. L., & Lyubomirsky, S. (2009). Enhancing Well-Being and Alleviating Depressive Symptoms with Positive Psychology Interventions: A Practice-Friendly Meta-Analysis. *Journal of Clinical Psychology*, 65, 467-487. <https://doi.org/10.1002/jclp.20593>
- Stalikas, A., & Lakioti, A. (2012). Satisfaction with Life Scale (SWLS). In A. Stalikas, S. Triliva, & P. Roussi (Eds.), *Psychometric Instruments in Greece* (2nd ed., p. 752). Pedro.
- Sultan, S., Fatima, S., & Kanwal, F. (2018). Treating Heart Patients by Enhancing Positive Emotions through Positive Psychology Intervention. *Pakistan Heart Journal*, 51, 303-308.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and Validation of Brief Measures of Positive and Negative Affect: The PANAS Scales. *Journal of Personality and Social Psychology*, 54, 1063-1070. <https://doi.org/10.1037/0022-3514.54.6.1063>