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Optimism and quality of life in patients with heart failure

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Abstract

Objectives. Health-related quality of life (HR-QoL) of patients with heart failure (HF) is low despite the aim of HF treatment to improve HR-QoL. To date, most studies have focused on medical and physical factors in relation to HR-QoL, few data are available on the role of emotional factors such as dispositional optimism. This study examines the prevalence of optimism and pessimism in HF patients and investigates how optimism and pessimism are associated with different patient characteristics and HR-QoL.

Methods. Dispositional optimism was assessed in 86 HF patients (mean age 70 ± 9 years, 28% female, mean left ventricular ejection fraction 33%) with the Revised Life Orientation Test (LOT-R). HR-QoL was assessed with the Minnesota Living with Heart Failure Questionnaire and the EuroQol.

Results. The (mean ± SD) total score on the LOT-R was 14.6 ± 2.9 (theoretical range 0–24) and the scores on the subscales optimism and pessimism were 8.1 ± 1.9 and 5.5 ± 2.5, respectively. Higher age was related to more optimism ($r = 0.22$, $p < 0.05$), and optimism was associated with higher generic HR-QoL ($B = 0.04$, $p < 0.05$).

Significance of results. The association found between optimism and generic HR-QoL of HF patients can lead to promising strategies to improve HF patients' HR-QoL, particularly because the literature has indicated that optimism is a modifiable condition.

Introduction

Important objectives of heart failure (HF) treatment are symptom relief and improvement of health-related quality of life (HR-QoL) (McMurray et al., 2012). Despite these objectives, HR-QoL of HF patients is seriously reduced compared with both a normative population (Lesman-Leegte et al., 2009a) and patients suffering from other diseases (Juenger et al., 2002). Because of an increasing body of research on HR-QoL, more knowledge of how to improve HR-QoL is available. Previous research has focused mainly on medical and physical factors related to HR-QoL (Flynn et al., 2009; Mommersteeg et al., 2009; Rahimi et al., 2010; Hoekstra et al., 2011; Kraai et al., 2012; Hoekstra et al., 2013); however, emotional factors (Guyatt et al., 1993) such as depressive symptoms are also highly prevalent in patients with HF (Lesman-Leegte et al., 2006; Lesman-Leegte et al., 2009b) and are related to HR-QoL (Schowalter et al., 2013). HF patients with a comorbid depressive disorder, for example, have a lower HR-QoL compared with HF patients without a comorbid depressive disorder. Interventions that aim to improve the depressive disorder are able to increase HR-QoL of these HF patients (Schowalter et al., 2013). Psychosocial and existential concerns are important aspects of the lives of patients suffering from HF (Leeming et al., 2014). Personality factors, including dispositional optimism, can therefore affect how patients report on their health status (Steptoe et al., 2006) and HR-QoL (Steel et al., 2008). Dispositional optimism can be defined as the tendency to expect positive outcomes across a variety of life domains (Steptoe et al., 2006). Common definitions indicate that pessimism is an antonym for optimism. Some investigators agree with this view, and tend to adopt optimism as a unidimensional, classifying pessimism as the opposite end of optimism (Scheier & Carver, 1985). Within this context, the measure of optimism is constructed so that an optimistic outlook necessarily precludes a pessimistic outlook, and vice versa (Kubzansky et al., 2004). However, other researchers suggest that endorsing items reflecting an optimistic perspective is substantively different from disagreeing with items that reflect a pessimistic outlook (Chang et al., 1994). If this is true, then optimism and pessimism would not represent opposite ends of a single continuum, but should be considered separate and, to some meaningful extent, independent constructs. Until today, there has been little consensus on the issue of pessimism being the opposite of optimism or being an independent construct (Kubzansky et al., 2004).

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Optimism has been associated with favorable health outcomes and quality of life (Scheier & Carver, 1992). Pessimism, on the other hand, has shown to be prospectively related to poor self-rated health and impaired psychological well-being (Robinson-Whelen et al., 1997). In addition, a recent study showed that optimism is associated with a lower risk of developing HF (Kim et al., 2014). The relation between optimism and pessimism and HR-QoL has not yet been examined in HF patients, however.

Although dispositional optimism is supposed to be a relatively stable construct, several studies have found that dispositional optimism is a modifiable condition (Chang et al., 1994; Scheier & Carver, 1992; Kubzansky et al., 2004). Higher levels of dispositional optimism can be achieved by means of psychological interventions (Epping-Jordan et al., 1999; Lee et al., 2006; Tusaie & Patterson, 2006), and such interventions may also improve HR-QoL of HF patients. In addition, there is a considerable amount of data on dispositional optimism in cancer patients showing that optimists have a better global HR-QoL than pessimists (Carver et al., 1994, 2006; Epping-Jordan et al., 1999; Allison et al., 2000). Several studies that examined how patients cope with a life-threatening disease such as cancer found remarkable differences between individuals regarding health outcomes and HR-QoL, depending on their psychological adjustment to stress (Schou et al., 2005; Blank & Bellizzi, 2006). Older HF patients, for example, were found to be able to adapt their personal expectations to such an extent that they positively influenced their HR-QoL (Moser et al., 2013).

To develop new interventions to improve HR-QoL of HF patients, it is important to examine the relationship between optimism and pessimism and HR-QoL of HF patients. Therefore, the present study aims to (1) describe the prevalence of optimism and pessimism in HF patients, (2) examine the association between clinical and demographic patient characteristics and optimism and pessimism, and (3) describe the relationship between optimism and pessimism and HR-QoL of HF patients.

Methods

Study Population

A descriptive cross-sectional study was performed. In total, 159 outpatients who visited the HF clinic of the University Medical Center Groningen in the Netherlands between January 2012 and July 2012 were asked to participate in the study. Inclusion criteria were having a diagnosis of HF (independent of left ventricular ejection fraction [LVEF]) New York Heart Association functional (NYHA) classification I-IV and being age 50 or older. Patients with impaired cognition, inability to speak the Dutch language, or inability to understand informed consent as determined by the HF nurse were excluded from participation. Fifty-six patients declined participation in the study. Of the enrolled patients, a further three patients were excluded from the analysis because they were not able to pass a test question necessary to complete a study assessment on patients' preferences that was also part of the data collection (Kraai et al., 2013). The study activities were combined with routine visits to the HF outpatient clinic; questionnaires were administrated by trained researchers who were not involved in the treatment of the included patients. The study was part of a larger study on HF patients' preferences (Kraai et al., 2013) and conforms to the principles outlined in the Declaration of Helsinki. The Medical Ethics Committee approved the study protocol, and all enrolled patients provided their written informed consent.

Measurements

Dispositional Optimism

Dispositional optimism was assessed with the Revised Life Orientation Test (LOT-R) (Scheier et al., 1994), which is a widely used instrument in psychological research and which has good psychometric properties (e.g., Cronbach alpha of .71 for the total score and of .64 and .77 for the optimism and pessimism subscale scores) (Scheier et al., 1994; Herzberg et al., 2006; Steptoe et al., 2006). The LOT-R consists of 10 items: three items are positively worded, three items are negatively worded, and four items are filler items. The respondents are asked to indicate their agreement on a 5-point Likert scale with response categories ranging from strongly agree to strongly disagree. Although originally composed as a unidimensional scale, some studies suggest a bidimensionality of two independent factors: optimism and pessimism (Robinson-Whelen et al., 1997; Herzberg et al., 2006; Zenger et al., 2010; Sulkers et al., 2013). Therefore, in this study, both the total score and the subscale scores on optimism and pessimism were used. The total score was calculated by summing the three positively worded items and the reverse-coded, negatively worded items. Scores on the LOT-R range from 0 to 24, with higher scores indicating more optimism. The optimism subscale score was calculated by summing the three positively worded items; the pessimism subscale score was calculated by summing the raw scores on the negatively worded items. Both subscales have a scoring range of 0 to 12, with higher scores indicating more optimism or more pessimism. Norm scores are not available for the LOT-R. The Cronbach alpha in our study sample was .33 for the total score, .40 for the optimism subscale score, and .60 for the pessimism subscale score.

HR-QoL

HR-QoL was assessed with a disease-specific (the Minnesota Living with Heart Failure Questionnaire [MLHFQ]) and a generic instrument (EuroQol [EQ-5D]). The MLHFQ is a widely used disease-specific questionnaire in HF research (Johansson et al., 2004; Garin et al., 2009) with good psychometric properties (Garin et al., 2009). The MLHFQ has a total score ranging from 0 to a maximum of 105 and consists of two domains: a physical component and an emotional component, with 40 and 25 as maximum possible scores, respectively. Lower scores on the MLFHQ reflect better HR-QoL (Rector & Cohn, 1992). Norm scores are not available for the MLHFQ.

The EQ-5D is designed for use across a wide range of health interventions (Brooks, 1996) and is frequently used in cardiovascular trials (Dyer et al., 2010). The EQ-5D consists of five domains: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each domain has three levels: no problems, some problems, and severe problems. The scoring is based on the British tariff (Dolan & Gudex, 1995) and values theoretically fall on the 0.0 (dead) to 1.0 (perfect health) value scale. Negative scores may occur, meaning that a particular health state is valued as worse than dead (from a societal perspective). Norm scores are available for the EQ-5D: male (70–74 years) +0.77 and female + 0.75 (Kind et al., 1999). Higher scores reflect better HR-QoL. In addition to the five domains, the EQ-5D contains an EQ visual analog scale (EQ VAS) that records the respondent's self-rated health on a vertical scale from 0 to 100. Norm scores for the EQ VAS are 77.70 for males and 74.05 for females (Kind et al., 1999).

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Background Characteristics

Demographic (age, gender, education) and clinical (medical history, disease state) data were collected from patient interviews and patients' medical charts.

Statistical Analyses

Descriptive analyses were used to characterize the patient sample. Data are presented as means ± standard deviations or frequencies (percentages). Bivariate analyses, Mann-Whitney U test, and Spearman correlation coefficient, as appropriate, were performed to evaluate the relationship between background characteristics and the LOT-R (total and subscale) scores. Linear multiple regression analyses per subscale and total score were performed to determine whether the total score of the LOT-R, the optimism subscale, and the pessimism subscale as independent variables were associated with quality of life as a dependent variable. In the first block, only the LOT-R (total or subscale) score and HR-QoL scores were entered using the enter method. Based on univariate associations with $p < 0.10$ between the background characteristics and the LOT-R (total and subscale) scores, background characteristic variables were inserted in the final adjusted regression model in addition to the HR-QoL scores. This resulted in adding the variables "living alone" and "being religious" in the adjusted model for the LOT-R total score, the variables "age" and "having had a resuscitation in the past" in the adjusted model for the LOT-R optimism subscale score and the variables "COPD" (chronic obstructive pulmonary disease) and "hypertension" in the adjusted model for the LOT-R pessimism subscale score.

Analyses were performed using SPSS, version 18.0.3, for Windows. Outcomes were considered statistically significant when $p < 0.05$.

Results

Patient Characteristics

A total of 100 patients were included in this study. Fourteen patients were excluded from the analysis because they could not complete the questionnaire in time during the interview. The mean age of the patients was 70 ± 9 years, and 28% ($n = 24$) of the patients were female (Table 1). Patients had a mean LVEF of 33% ± 12%, and 35% ($n = 30$) of the patients were classified as NYHA functional class III-IV.

Dispositional Optimism and HRQoL

The mean total score on the LOT-R was 14.6 ± 2.9. The mean scores on the LOT-R optimism subscale and pessimism subscale were 8.1 ± 1.9 and 5.5 ± 2.5, respectively (Table 2).

The mean total score on the MLHFQ was 30 ± 23. The mean scores on the physical and emotional components were 14 ± 12 and 6 ± 6, respectively. The mean score on the EQ-5D was 0.66 ± 0.28 and the EQ VAS was 68 ± 46 (Table 2).

Relationship Between Dispositional Optimism and Pessimism and Demographic and Clinical Variables

None of the independent variables were significantly related to the LOT-R total score ($p < 0.05$); however, there was a nonsignificant trend that not living alone and being religious were related to more dispositional optimism (patients who live alone [mean score 13.7] vs. patients who do not live alone [mean score 14.9] $U = 533$, $p < 0.10$ and patients who are religious [mean score 15.2] vs. patients who are not religious [mean score 14.2] $U = 704$, $p < 0.10$). Regarding the optimism subscale, having a higher age

Table 1. Demographic characteristics and clinical characteristics of the study population ($N = 86$)

Demographics	
Age (years)	70 ± 9
Gender (female)	24 (28%)
Living alone	22 (26%)
Being religious	36 (42%)
Clinical characteristics	
LVEF %	33 ± 12
NYHA III-IV	30 (35%)
Ischemic heart failure	50 (58%)
Myocardial infarction	44 (51%)
ICD implantation	35 (41%)
Resuscitation in the past	9 (11%)
Duration of HF (years)	2.6 ± 3.4
HF readmission in last 6 months	27 (31%)
Laboratory	
Hemoglobin (mmol/l)	8.6 ± 1.1
eGFR (ml/min*1.73 m^2)	53.6 ± 20.0
NT-pro-BNP (µg/l) median (IQR)	1055 (421–3,082)
Comorbidities	
COPD	22 (26%)
Diabetes mellitus	24 (28%)
Stroke	10 (12%)
Hypertension	47 (55%)
Cancer	5 (6%)

eGFR = estimated globular filtration rate; ICD = internal cardiac defibrillator; IQR = interquartile range NT-pro-BNP = N-terminal prohormone of brain natriuretic peptide.

Table 2. Optimism and HR-QoL scores of the study population ($N = 86$)

Optimism	
LOT-R total score	14.6 ± 2.9
LOT-R optimism subscale score	8.1 ± 1.9
LOT-R pessimism subscale score	5.5 ± 2.5
HRQoL	
MLHFQ total score	30 ± 23
MLHFQ physical component	14 ± 12
MLHFQ emotional component	6 ± 6
EQ-5D	0.66 ± 0.28
EQ VAS	68 ± 46

Optimism total score/optimism subscale/pessimism subscale: higher scores reflecting more dispositional optimism/optimism/pessimism.
MLHFQ total score and subscales: lower scores reflecting better HR-QoL.
EQ-5D and EQ VAS: higher score reflecting better HR-QoL.

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Table 3. Univariate associations between optimism and pessimism and demographic and clinical characteristics ($N = 86$)

	LOT-R		
	Total	Optimism	Pessimism
Demographics			
Age (years)	0.02	0.22**	0.13
Gender	659	714	675
Living alone	533*	611	579
Being religious	704*	812	751
Clinical characteristics			
LVEF %	−0.01	−0.08	−0.10
NYHA III-IV	783	839	804
Ischemic heart failure	839	793	862
Myocardial infarction	882	862	900
ICD implantation	769	815	767
Resuscitation in the past	267	232*	346
Duration of HF (years)	−0.01	0.04	0.04
HF readmission in past 6 months	752	710	767
Laboratory			
eGFR (ml/min*1.73 m^2)	−0.02	0.02	0.05
NT-pro-BNP (µg/l)	−0.02	0.02	0.06
Comorbidities			
COPD	553	668	461**
Diabetes mellitus	692	675	631
Stroke	379	352	361
Hypertension	730	885	690**
Cancer	145	141	117

Data are presented as U for categorical independent variables and r for continues independent variables.
*$p < 0.10$, **$p < 0.05$.
ICD = internal cardiac defibrillator; eGFR = estimated globular filtration rate; NT-pro-BNP = N-terminal prohormone of brain natriuretic peptide.

was related to more optimism ($r = 0.22$, $p < 0.05$). Regarding the pessimism subscale, having COPD or hypertension as a comorbidity was associated with more pessimism (having COPD [mean score 6.6] vs. not having COPD [mean score 5.1], $U = 461$, $p < 0.05$ and having hypertension (mean score 6.0) vs. not having hypertension [mean score 5.0], $U = 690$, $p < 0.05$) (Table 3).

Relationship Between Dispositional Optimism and Pessimism and HRQoL

The optimism subscale of the LOT-R was significantly associated with HR-QoL when measured with the generic EQ-5D, but it was not significantly associated with HRQL when measured with the disease-specific MLHFQ. In the adjusted model (adjusted for variables associated with the LOT-R scores with a p value <0.10), the optimism subscale score remained significantly associated with the dimensions of the EQ-5D and the EQ-VAS score. The score on the pessimism subscale and total score on the LOT-R were not associated with the EQ-5D or the MLHFQ (Table 4).

Discussion

This is the first study to examine the relationship between dispositional optimism and HR-QoL of outpatients with HF. We found that higher age was associated with more optimism and that having COPD or hypertension was associated with more pessimism, as measured with the subscales of the LOT-R. In addition, we found independent associations between optimism and generic HR-QoL and between optimism and EQ-VAS, indicating that being more optimistic is related to a better HR-QoL. Independent associations were only found between generic HR-QoL and optimism, not between disease-specific HR-QoL and optimism. It could be that the MLFHQ was not sensitive enough in this population because of the small sample size of the study population (Sneed et al., 2001).

The scores on the LOT-R of our study population are difficult to compare with the scores reported in other studies because only one study has used the LOT-R in HF patients (Giardini et al., 2012). The levels of optimism in our study population were lower than those found in the study of Giardini et al. (2012), which might be explained by the higher age of the patients in our study. The HF patients in our study were slightly less optimistic compared with coronary bypass surgery (Scheier et al., 1994) patients and urogenital cancer patients (Zenger et al. 2010); however, they were less pessimistic compared with patients with urogenital cancer.

Optimism is related to quality of life, which may be useful for future interventions. Because HF has a poor prognosis and causes severe symptoms, alternative ways to improve the HR-QoL of HF patients need to be further explored. Several studies in cancer patients found that optimists had a better global HR-QoL than pessimists (Carver et al., 1994, 2006; Epping-Jordan et al., 1999; Allison et al., 2000). A systematic review on psychosocial interventions for cancer patients (Tamagawa et al., 2012) found two intervention studies with a moderating effect on dispositional optimism. After a cognitive-behavioral stress management intervention, women who showed lower levels of optimism before the intervention reported enhanced optimism relative to those who had higher levels of optimism before the intervention (Antoni et al., 2001). Another study (Scheier et al., 2007) found the moderating effect of psychosocial factors, including dispositional optimism, after a nutrition-focused psychoeducation program.

Healthcare providers may wish to identify those patients who are at risk of being pessimistic since this may affect their HR-QoL. We found that the comorbidities COPD or hypertension were associated with more pessimism. The literature suggests that comorbidities also affect HR-QoL of patients with HF (Lesman-Leegte et al., 2009a). The comorbidities COPD and hypertension are frequently found in HF patients and treatments are needed that target both these comorbidities and HF (Dahlstrom, 2005). Furthermore, more research is necessary to explore the association between hypertension and pessimism in depth because hypertension is usually a diagnosis with relatively low complaints compared with a COPD diagnosis.

However, we also realize that interventions aimed directly at improving optimism are scarce, which makes it difficult to indicate what psychological care for patients with lower levels of optimism should look like. Applebaum et al. (2014) speculate that the incorporation of screening for optimism, among other variables, into routine clinical care will allow for the prompt identification and referral of patients with low levels of optimism and social support to psychosocial programs that either directly provide

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Table 4. Multivariate associations between optimism, pessimism, and HR-QoL ($N = 86$)

	LOT-R								
	Total			Optimism			Pessimism		
	B	SE	*p* value	B	SE	*p* value	B	SE	*p* value
MLHFQ									
Total score	−0.05	0.90	0.95	−1.81	1.40	0.20	−0.94	1.05	0.38
Total score adjusted model*	0.62	0.86	0.48	−0.79	1.28	0.54	−1.15	0.98	0.24
Physical component	−0.16	0.44	0.71	−0.78	0.70	0.27	−0.20	0.52	0.71
Physical component adjusted model*	0.01	0.42	0.99	−0.51	0.63	0.43	−0.31	0.50	0.54
Emotional component	−0.04	0.21	0.85	−0.62	0.32	0.06	−0.30	0.24	0.23
Emotional component adjusted model*	−0.05	0.19	0.81	−0.45	0.29	0.13	−0.08	0.23	0.73
EQ-5D									
Dimensions	0.01	0.01	0.22	**0.04**	**0.02**	**0.03**	0.00	0.01	0.82
Dimensions adjusted model*	0.02	0.01	0.09	**0.04**	**0.02**	**0.02**	0.00	0.01	0.86
EQ VAS	0.55	0.61	0.37	**2.92**	**0.90**	**<0.01**	0.90	0.71	0.21
EQ VAS adjusted model*	0.33	0.61	0.59	**2.50**	**0.92**	**<0.01**	0.85	0.77	0.27

*Adjusted for demographical and clinical characteristics significantly ($p < 0.010$) associated with the specific HR-QOL score or LOT-R score.

(e.g., through group psychotherapy) or facilitate social support and promote the recognition of the possibility of the benefit and growth despite suffering. This may serve as a protective factor against psychopathology. A recent systematic review of the influence of psychological factors on HR-QoL after a stroke also confirms the need for more research on optimism (van Mierlo et al., 2014).

Because our study is one of the first to address dispositional optimism and HR-QoL, more research is needed to be able to develop promising psychological interventions and to identify those patients who will benefit from these interventions.

Limitations of this study are its cross-sectional nature and small sample size. More noninterventional research on a larger population of patients in routine care is indicated and would strengthen the results of future studies. Furthermore, the independent association between optimism and general HR-QoL could be refined further in a larger study population when the patients are assigned to different groups depending on for example there LVEF and/or severity of HF symptoms (NYHA classification). We could not compare the clinical characteristics of the patients who participated with those who refused to participate because we did not have the latter group's signed informed consent. Nevertheless, the demographic and clinical parameters of our study population are comparable with those of the population in our HF patient clinic and other main studies (Bruggink-Andre de la Porte et al., 2005; Jaarsma et al., 2008). In our study, we did not collect information about whether the patients underwent previous coronary artery bypass graft treatment or whether they suffered from dyslipidemia; these factors might also have an impact on the scores of the used instruments and would be a suggestion for further studies on optimism in patients with HF.

Conclusion

This study provides new insights into dispositional optimism in patients with HF and is, to our knowledge, the first study to explore the relationship between dispositional optimism and HR-QoL of patients with HF. This study found a relationship between optimism and HR-QoL of patients with HF. Given that the literature has suggested that optimism is a modifiable condition, improving optimism may be a promising way to improve HR-QoL of HF patients. However, more research is needed to assess which patients may benefit from psychological care and which specific psychological interventions are needed to improve their HR-QoL.

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Conflicts of interest. None declared.

References

Allison PJ, Guichard C and Gilain L (2000) A prospective investigation of dispositional optimism as a predictor of health-related quality of life in head and neck cancer patients. *Quality of Life Research* **9**(8), 951–960.

Antoni MH, Lehman JM, Kilbourn KM *et al.* (2001) Cognitive-behavioral stress management intervention decreases the prevalence of depression and enhances benefit finding among women under treatment for early-stage breast cancer. *Health Psychology* **20**(1), 20–32.

Applebaum AJ, Stein EM, Lord-Bessen J *et al.* (2014) Optimism, social support, and mental health outcomes in patients with advanced cancer. *Psychooncology* **23**(3), 299–306.

Blank TO and Bellizzi KM (2006) After prostate cancer: Predictors of well-being among long-term prostate cancer survivors. *Cancer* **106**(10), 2128–2135.

Brooks R (1996) EuroQol: The current state of play. *Health Policy* **37**(1), 53–72.

Bruggink-Andre de la Porte PW, Lok DJ, van Wijngaarden J *et al.* (2005) Heart failure programmes in countries with a primary care-based health care system. Are additional trials necessary? Design of the DEAL-HF study. *European Journal of Heart Failure* **7**(5), 910–920.

Carver CS, Smith RG, Petronis VM and Antoni MH (2006) Quality of life among long-term survivors of breast cancer: Different types of antecedents predict different classes of outcomes. *Psychooncology* **15**(9), 749–758.

https://doi.org/10.1017/S1478951517001055 Published online by Cambridge University Press

Carver CS, Pozo-Kaderman C, Harris SD *et al.* (1994) Optimism versus pessimism predicts the quality of women's adjustment to early stage breast cancer. *Cancer* **73**(4), 1213–1220.

Chang EC, D'Zurilla TJ and Maydey-Olivares A (1994) Assessing the dimensionality of optimism and pessimism using a multimeasure approach. *Cognitive Therapy and Research* **18**(2), 143–160.

Dahlstrom U (2005) Frequent non-cardiac comorbidities in patients with chronic heart failure. *European Journal of Heart Failure* **7**(3), 309–316.

Dolan P and Gudex C (1995) Time preference, duration and health state valuations. *Health Economics* **4**(4), 289–299.

Dyer MT, Goldsmith KA, Sharples LS and Buxton MJ (2010) A review of health utilities using the EQ-5D in studies of cardiovascular disease. *Health and Quality of Life Outcomes* **8**, 13.

Epping-Jordan JE, Compas BE, Osowiecki DM *et al.* (1999) Psychological adjustment in breast cancer: Processes of emotional distress. *Health Psychology* **18**(4), 315–326.

Flynn KE, Lin L, Ellis SJ *et al.* (2009) Outcomes, health policy, and managed care: Relationships between patient-reported outcome measures and clinical measures in outpatients with heart failure. *American Heart Journal* **158**(4 Suppl), S64–S71.

Garin O, Ferrer M, Pont A *et al.* (2009) Disease-specific health-related quality of life questionnaires for heart failure: A systematic review with meta-analyses. *Quality of Life Research* **18**(1), 71–85.

Giardini A, Pierobon A, Majani G *et al.* (2012) Perception of illness and dispositional optimism in a sample of patients with chronic heart failure. *Giornale Italiano di Medicina del Lavoro ed Ergonomia* **34**(2 Suppl B), B38–B44.

Guyatt GH, Feeny DH and Patrick DL (1993) Measuring health-related quality of life. *Annals of Internal Medicine* **118**(8), 622–629.

Herzberg PY, Glaesmer H and Hoyer J (2006) Separating optimism and pessimism: A robust psychometric analysis of the revised life orientation test (LOT-R). *Psychological Assessments* **18**(4), 433–438.

Hoekstra T, Lesman-Leegte I, van Veldhuisen DJ, Sanderman R and Jaarsma T (2011) Quality of life is impaired similarly in heart failure patients with preserved and reduced ejection fraction. *European Journal of Heart Failure* **13**(9), 1013–1018.

Hoekstra T, Jaarsma T, van Veldhuisen DJ *et al.* (2013) Quality of life and survival in patients with heart failure. *European Journal of Heart Failure* **15**(1), 94–102.

Jaarsma T, van der Wal MH, Lesman-Leegte I *et al.* (2008) Effect of moderate or intensive disease management program on outcome in patients with heart failure: Coordinating study evaluating outcomes of advising and counseling in heart failure (COACH). *Archives of Internal Medicine* **168**(3), 316–324.

Johansson P, Agnebrink M, Dahlstrom U and Brostrom A (2004) Measurement of health-related quality of life in chronic heart failure, from a nursing perspective-a review of the literature. *European Journal of Cardiovascular Nursing* **3**(1), 7–20.

Juenger J, Schellberg D, Kraemer S *et al.* (2002) Health related quality of life in patients with congestive heart failure: Comparison with other chronic diseases and relation to functional variables. *Heart* **87**(3), 235–241.

Kim ES, Smith J and Kubzansky LD (2014) Prospective study of the association between dispositional optimism and incident heart failure. *Circulation: Heart Failure* **7**(3), 394–400.

Kind P, Hardman G and Macran S (1999) UK population norms for the EQ-5D. Centre for Health Economics, University of York. Working papers.

Kraai IH, Vermeulen KM, Luttik ML *et al.* (2013) Preferences of heart failure patients in daily clinical practice: Quality of life or longevity? *European Journal of Heart Failure* **15**(10), 1113–1121.

Kraai IH, Luttik ML, Johansson P *et al.* (2012) Health-related quality of life and anemia in hospitalized patients with heart failure. *International Journal of Cardiology* **161**(3), 151–155.

Kubzansky LD, Kubzansky PE and Maselko J (2004) Optimism and pessimism in the context of health: Bipolar opposites or separate constructs? *Personality and Social Psychology Bulletin* **30**(8), 943–956.

Lee V, Robin Cohen S, Edgar L, Laizner AM and Gagnon AJ (2006) Meaning-making intervention during breast or colorectal cancer treatment improves self-esteem, optimism, and self-efficacy. *Social Science & Medicine* **62**(12), 3133–3145.

Leeming A, Murray SA and Kendall M (2014) The impact of advanced heart failure on social, psychological and existential aspects and personhood. *European Journal of Cardiovascular Nursing* **13**(2), 162–167.

Lesman-Leegte I, Jaarsma T, Sanderman R, Linssen G and van Veldhuisen DJ (2006) Depressive symptoms are prominent among elderly hospitalised heart failure patients. *European Journal of Heart Failure* **8**(6), 634–640.

Lesman-Leegte I, Jaarsma T, Coyne JC *et al.* (2009a) Quality of life and depressive symptoms in the elderly: A comparison between patients with heart failure and age- and gender-matched community controls. *Journal of Cardiac Failure* **15**(1), 17–23.

Lesman-Leegte I, van Veldhuisen DJ, Hillege HL *et al.* (2009b) Depressive symptoms and outcomes in patients with heart failure: Data from the COACH study. *European Journal of Heart Failure* **11**(12), 1202–1207.

McMurray JJ, Adamopoulos S, Anker SD *et al.* (2012) ESC guidelines for the diagnosis and treatment of acute and chronic heart failure 2012: The Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2012 of the European Society of Cardiology. Developed in collaboration with the heart failure association (HFA) of the ESC. *European Journal of Heart Failure* **14**(8), 803–869.

Mommersteeg PM, Denollet J, Spertus JA and Pedersen SS (2009) Health status as a risk factor in cardiovascular disease: A systematic review of current evidence. *American Heart Journal* **157**(2), 208–218.

Moser DK, Heo S, Lee KS *et al.* (2013) 'It could be worse … lots worse!' why health-related quality of life is better in older compared with younger individuals with heart failure. *Age and Ageing* **42**(5), 626–632.

Rahimi K, Malhotra A, Banning AP and Jenkinson C (2010) Outcome selection and role of patient reported outcomes in contemporary cardiovascular trials: Systematic review. *British Medical Journal* **341**, c5707.

Rector TS and Cohn JN (1992) Assessment of patient outcome with the minnesota living with heart failure questionnaire: Reliability and validity during a randomized, double-blind, placebo-controlled trial of pimobendan. pimobendan multicenter research group. *American Heart Journal* **124**(4), 1017–1025.

Robinson-Whelen S, Kim C, MacCallum RC and Kiecolt-Glaser JK (1997) Distinguishing optimism from pessimism in older adults: Is it more important to be optimistic or not to be pessimistic? *Journal of Personality and Social Psychology* **73**(6), 1345–1353.

Scheier MF and Carver CS (1992) Effects of optimism on psychological and physical well-being: Theoretical overview and empirical update. *Cognitive Therapy and Research* **16**(2), 201–228.

Scheier MF and Carver CS (1985) Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology* **4**(3), 219–247.

Scheier MF, Carver CS and Bridges MW (1994) Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the life orientation test. *Journal of Personality and Social Psychology* **67**(6), 1063–1078.

Scheier MF, Helgeson VS, Schulz R *et al.* (2007) Moderators of interventions designed to enhance physical and psychological functioning among younger women with early-stage breast cancer. *Journal of Clinical Oncology* **25**(36), 5710–5714.

Schou I, Ekeberg O, Sandvik L, Hjermstad MJ and Ruland CM (2005) Multiple predictors of health-related quality of life in early stage breast cancer. data from a year follow-up study compared with the general population. *Quality of Life Research* **14**(8), 1813–1823.

Schowalter M, Gelbrich G, Stork S *et al.* (2013) Generic and disease-specific health-related quality of life in patients with chronic systolic heart failure: Impact of depression. *Clinical Research in Cardiology* **102**(4), 269–278.

Sneed NV, Paul S, Michel Y, Vanbakel A and Hendrix G (2001) Evaluation of 3 quality of life measurement tools in patients with chronic heart failure. *Heart and Lung* **30**(5), 332–340.

Steel P, Schmidt J and Shultz J (2008) Refining the relationship between personality and subjective well-being. *Psychological Bulletin* **134**(1), 138–161.

Steptoe A, Wright C, Kunz-Ebrecht SR and Iliffe S (2006) Dispositional optimism and health behaviour in community-dwelling older people: Associations with healthy ageing. Br J *Health Psychology* **11**(Pt 1), 71–84.

Sulkers E, Fleer J, Brinksma A *et al.* (2013) Dispositional optimism in adolescents with cancer: Differential associations of optimism and pessimism with positive and negative aspects of well-being. *British Journal of Health Psychology* **18**(3), 474–489.

Tamagawa R, Garland S, Vaska M and Carlson LE (2012) Who benefits from psychosocial interventions in oncology? A systematic review of psychological moderators of treatment outcome. *Journal of Behavioral Medicine* **35**(6), 658–673.

Tusaie KR and Patterson K (2006) Relationships among trait, situational, and comparative optimism: Clarifying concepts for a theoretically consistent and evidence-based intervention to maximize resilience. *Archives of Psychiatric Nursing* **20**(3), 144–150.

van Mierlo ML, Schroder C, van Heugten CM *et al.* (2014) The influence of psychological factors on health-related quality of life after stroke: A systematic review. *International Journal of Stroke* **9**(3), 341–348.

Zenger M, Brix C, Borowski J, Stolzenburg JU and Hinz A (2010) The impact of optimism on anxiety, depression and quality of life in urogenital cancer patients. *Psychooncology* **19**(8), 879–886.

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