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Meaning-making and quality of life in heart failure interventions: a systematic review

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Abstract

Purpose Heart failure (HF) patients often report high levels of psychological distress and diminished quality of life (QoL). As such, interventions aimed at improving their QoL and other positive psychosocial outcomes are needed. Some interventions have shown promise, but results are mixed. Interventions directed toward physical well-being (e.g., self-care behaviors, medical adherence) may be less effective at improving QoL than those aimed at improving psychological well-being (e.g., stress reduction, coping strategies). We systematically reviewed recent HF interventions and compared results of those emphasizing coping strategies related to meaning-making to those lacking meaning-making components as a possible factor in QoL discrepancies.

Methods A systematic review of four databases produced 439 studies for potential inclusion, of which 25 qualified for review. These were coded into substantial or minimal meaning focus.

Results Forty percent of all studies ($n=10$) reported improved QoL due to intervention effects, while 60% reported no significant change in QoL (60%; $n=15$). Fewer than one-third of minimal meaning focus studies demonstrated significant improvements in QoL (30.8%; $n=4$). In contrast, half of substantial meaning focus studies demonstrated significant improvements in QoL (50%; $n=6$).

Conclusions By clarifying the potential importance of promoting meaning-making in improving QoL of HF patients, we highlight its potential value in future interventions directed to this underserved, high-risk patient population.

Keywords Meaning-making · Quality of life · Heart failure · Psychosocial interventions

Introduction

Heart failure (HF) is a severe, life-limiting disease affecting over 5 million individuals in the United States alone [1]. Clinical definitions of HF focus on the significant impairment in the heart's ability to circulate blood [2]. HF can result from a variety of cardiovascular conditions, including cardiomyopathy, past myocardial infarction, and hypertension. Commonly, HF patients experience fatigue, shortness of breath, and swelling of the limbs [2]. Following a progressive yet unpredictable trajectory [3] that often leads to death [1], HF patients often experience serious depressive symptoms and diminished quality of life (QoL) [4].

Interventions for HF usually involve medication regimens to reduce blood pressure and fluid-related swelling and often include recommended lifestyle changes to improve diet and physical activity [1]. Moreover, many HF patients are prescribed selective serotonin reuptake inhibiters (SSRIs) to minimize their depressive symptoms [5]. In some more severe cases, surgical procedures are performed (e.g., installing a pacemaker or repairing valve function) [1]. However, in practice, many of these intervention options are lengthy, expensive, and not highly predictive of positive patient outcomes such as maintained symptom management after leaving the hospital or rehabilitation facility [6] or improved QoL [3].

Thus, interventions have been developed that are aimed more specifically at improving HF patients' QoL and other positive psychosocial outcomes. These interventions include various components (e.g., self-care counseling, diet regimens, cognitive behavioral therapy) and delivery styles (e.g., on-site, telecommunication, computer, and

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tablet applications). However, while these interventions have shown some promise insofar as their primary end-points, such as improving self-care or reducing hospitalization, their ability to substantially improve HF patients' QoL is highly variable [7–10].

As a possible explanation, many of the mentioned interventions primarily aim to enhance behaviors directed toward physical well-being like medication adherence [8, 11] and physical fitness [12], while far fewer focus upon improving aspects of psychological well-being like depressive symptoms [13]. Given that many HF patients report high levels of psychological distress and diminished QoL [1, 3], interventions for stress reduction and for learning more effective coping strategies that help patients to make meaning and reduce stress related to their condition may be particularly important [14]. Meaning-making refers to coping processes that align situational meaning (e.g., receiving a HF diagnosis, hospitalization, decreasing physical functionality) and global meaning (e.g., the desire for a full, healthy life, a sense of purpose, religious/spiritual beliefs) [15]. While some meaning-making is posited to occur automatically, it primarily occurs through significant coping efforts [16], such as by meaningfully processing the cognitive and emotional aspects of stressful situations [15].

Studies have reported not only high levels of attempted meaning-making in HF patients, but also significant links between successful meaning-making and increased QoL [14, 17]. Because of these links, researchers have urged healthcare professionals to promote meaning-making in HF patients to bring about positive outcomes such as higher QoL [18]. Surprisingly, only two intervention studies have focused directly on positive coping and meaning-making in HF patients [19, 20].

Because HF interventions studies, like those mentioned above, often include QoL as an outcome, yet findings related to QoL appear mixed, it is important to determine whether meaning-making, a potentially important component in HF patients' coping, may play a role in achieving higher QoL within HF interventions. The present review intended to systematically assess recent HF interventions that emphasize identified coping strategies related to meaning-making (e.g., emotional education and coping, coping training, cognitive behavioral therapy) and compare their results to those of other recent HF interventions that appear to lack meaning-making components. We hypothesized that HF interventions that included substantial efforts to increase meaning-making may help patients buffer the negative emotional circumstances related to HF, and subsequently, improve their reported QoL. By clarifying the potential importance of promoting meaning-making in improving QoL of HF patients, we aimed to determine its potential value in future interventions directed to this underserved and important patient population.

Method

Search procedures

The present review prescreened and identified relevant articles using a carefully deliberated set of inclusion/exclusion criteria and search codes developed by a research assistant in coordination with a senior researcher. Included articles focused solely on HF patients ("Heart failure," CHF, HF, and HF mesh keywords), contained QoL as an outcome ("Quality of life," QoL, HR-QoL, HRQOL, and QoL mesh keywords), and had aspects of coping or meaning (cognitive, coping, cope, behavioral, positive, and meaning) in the intervention (intervene*). Studies with a focus on significant comorbidities (transplant[ti], cancer, diabetic, diabetes, obese, obesity, pain[ti]), and cardiovascular diseases not related to HF ("cardiovascular disease," "heart disease"), were excluded. As HF is frequently linked to increased depression [1], it was exempted from exclusion. Literature reviews (review[ti], synthesis[ti], meta[ti], meta-analysis, metasynthesis) and caregiver studies (caregiv*, family, families) were also excluded.

As most HF patients are older adults [1], results were filtered to only include studies with a minimum participant age of 45 years. To maintain a focus on more current issues, results were filtered to only include studies from 2008 onward. Studies were reviewed to include only randomized clinical trials or their pilot studies.

Based upon the above criteria, a search code was created for use with PubMed. Once the search code was confirmed for effectiveness in PubMed, it was then modified for use with other databases. All applicable research databases were searched (PubMed, PsycINFO, CINAHL, Scopus), carefully utilizing their individual database keyword systems and filters to ensure search quality. Once qualifying articles were chosen, research articles cited within these articles were also reviewed for possible inclusion.

Study coding

All reviewed studies were coded utilizing a detailed coding form. Details including article title, authors, journal, publication year, country of origin, and written language were coded, as well as average age, minority, gender, ischemic etiology, HF severity via New York Heart Association (NYHA) classes, ejection fraction, alpha and beta blocker medication use, QoL measures, other outcomes, and QoL findings.

Meaning focus of interventions was coded as (1) minimal meaning focus, in which interventions only provide some counseling or motivational techniques to help meet physical well-being goals (e.g., self-care, medication adherence), or (2) substantial meaning focus, in which interventions strove to enhance psychological well-being via meaning-focused coping components. Studies were coded by identifying elements of cognitive and emotional processing as per the meaning-making framework [15]. Meaning focus was assessed by coding for the presence of stress or emotion management, coping or mindfulness training, and/or cognitive behavioral therapy (CBT). Two research assistants coded studies for meaning focus separately and then met to resolve any coding discrepancies. Initial independent inter-rater reliability was 0.80, which was then reconciled to full agreement.

Quality of life findings were coded insofar as differences between intervention and control groups. Studies were coded as a "1" if there were significant differences between the intervention and control group, such that, the intervention group outperformed the control group in improving QoL ($p \leq 0.05$). Studies were coded as a "0" if the difference was non-significant ($p > 0.05$).

Analysis plan

A series of statistical analyses were conducted to test study hypotheses. First, means and standard deviations were calculated using study-reported mean participant ages, and percentages of males, white participants, ischemic etiologies, NYHA classes (HF severity), ejection fractions, and alpha and beta blocker medication usages. Percentages were also calculated for study-reported QoL measurements, other outcomes (e.g., depression, self-care knowledge, medical adherence), and QoL findings. To help determine how meaning focus may impact QoL findings, the proportion of significant QoL findings for each meaning focus group were calculated and compared. Categorical data analysis was considered to test if group proportions were statistically different.

To decide which, if any, statistical test was appropriate for use, assumptions of independence and sample size were assessed. Independence was determined by comparing study designs and targeted variables across groups. If groups were not heavily homogeneous, we accepted the assumption of independence. The assumption of sample size was determined by the success/failure condition, testing for the minimal number of expected events and non-events required for normal approximation. If both expected values were above five, the condition was met and we accepted the assumption of sample size.

If both assumptions were met, a Chi-square test was chosen for analysis. If independence was met but sample size was not, Fisher's exact test was chosen, accounting for small sample size. If sample size was met but independence was not, McNemar's test was chosen, accounting for related groups. If neither assumption was met, proportions were only interpreted at a comprehensive level. Alpha was set at 0.05.

Results

Descriptive information

Four hundred and thirty-nine results were initially produced from the search of PubMed, PsycINFO, CINAHL, and Scopus; a PRISMA diagram is shown in Fig. 1. When articles were filtered for publication dates, 2008–2016, 298 studies were removed. In filtering for duplicate articles, 138 studies were removed. Lastly, as per inclusion and exclusion criteria, 160 studies were removed. A final total of 25 studies qualified for review. Upon coding included studies for meaning focus, a final result of 13 minimal meaning focus studies and 12 substantial meaning focus studies qualified for review.

Sample description

Studies ranged greatly in sample size (from 24 to 902 participants). Over two-thirds of studies were conducted in the United States ($n = 16$). Few articles were pilot studies ($n = 4$). Summarized results are provided in Table 1; study-specific details are provided in Tables 2 and 3.

Demographic information

On average, participants were 66 years old, 64% male, and 67% white; 10 studies did not report race or ethnicity. Most participants had a HF severity of NYHA Class II (52%) or Class III (43%), with far fewer being Class I (6%) or Class

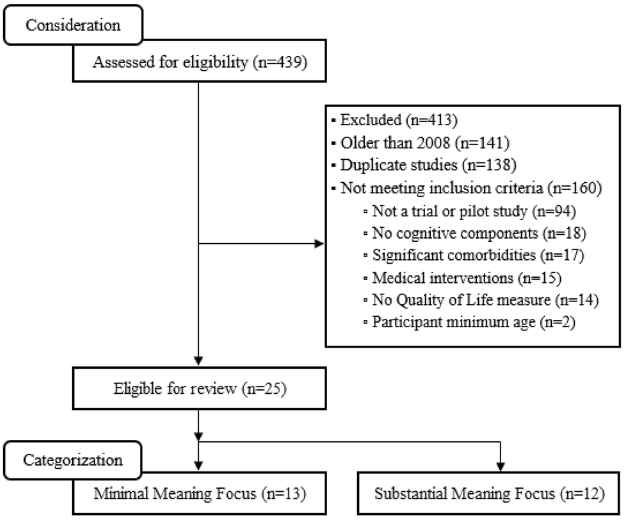

Fig. 1 Descriptive pathway of the article review progress

Table 1 Demographic information of reviewed studies by intervention and control groups

Study attributes	Total ($n=25$)	Minimal meaning focus		Substantial meaning focus	
		Intervention ($n=13$)	Control ($n=13$)	Intervention ($n=12$)	Control ($n=12$)
Mean age	65.9 ± 6.1 years (22)	67.2 ± 7.1 years (13)	66.7 ± 5.9 years (13)	65.2 ± 6.3 years (9)	63.6 ± 5.0 years (9)
Male	61.4 ± 12.9% (22)	59.8 ± 11.2% (12)	60.2 ± 13.7% (12)	60.4 ± 14.9% (10)	64.5 ± 14.8% (10)
Caucasian	69.5 ± 23.6% (13)	62.1 ± 26.2% (7)	60.2 ± 30.7% (7)	76.2 ± 14.8% (6)	82.2 ± 13.1% (6)
Ischemic etiology	44.8 ± 10.7% (11)	42.0 ± 11.0% (6)	45.1 ± 16.2% (6)	44.2 ± 10.9% (6)	48.4 ± 8.8% (5)
Ejection fraction	34.8 ± 5.9% (13)	35.1 ± 5.6% (9)	35.7 ± 5.9% (9)	34.3 ± 6.8% (5)	32.7 ± 6.3% (4)
HF severity (NYHA class)[a]					
I	6.1 ± 7.9% (13)	4.3 ± 6.7% (8)	6.3 ± 8.8% (7)	7.5 ± 11.9% (8)	6.3 ± 7.4% (6)
II	52.7 ± 19.0% (14)	56.5 ± 18.3% (9)	53.0 ± 19.3% (8)	50.5 ± 17.4% (8)	44.5 ± 25.7% (6)
III	43.0 ± 21.4% (15)	41.1 ± 20.5% (9)	38.6 ± 23.2% (8)	43.4 ± 24.4% (10)	49.9 ± 23.4% (8)
IV	3.6 ± 4.6% (15)	3.8 ± 5.6% (8)	3.7 ± 6.3% (7)	3.5 ± 6.4% (10)	3.9 ± 4.7% (8)
Medications					
Alpha blocker (ACE)	69.0 ± 9.8% (14)	69.0 ± 8.5% (9)	69.4 ± 11.2% (9)	67.9 ± 14.1% (5)	69.4 ± 9.8% (5)
Beta blocker	82.2 ± 13.0% (15)	78.4 ± 14.7% (9)	80.5 ± 15.0% (9)	85.4 ± 10.1% (6)	87.2 ± 10.9% (6)

NYHA New York Heart Association

[a] Each class percentage was averaged separately, as reported by studies

IV (4%). About half of patients had HF due to an ischemic etiology (45%), and participants had, on average, a 35% ejection fraction. A large percentage of participants were on an alpha or beta blocker medication (69 and 82%, respectively). All variances were low to moderate, in exception of race and NYHA classes II and III, which were considerably high.

Quality of life measures and other outcomes

The Kansas City Cardiomyopathy Questionnaire (44%; $n=11$) and the Minnesota Living with Heart Failure Questionnaire (36%; $n=9$) were most often used to measure QoL. Few studies used variations of the Short Form Survey (24%; $n=6$) or other measures (16%; $n=4$). Some studies used multiple measures (24%; $n=6$). Other primary measures in the reviewed studies included depressive symptoms (44%; $n=11$) and self-care behaviors (40%; $n=10$). Fewer studies examined measures like hospitalization (32%; $n=8$), mortality (24%; $n=6$), self-efficacy (24%; $n=6$), physical functioning (20%; $n=5$), anxious symptoms (16%; $n=4$), knowledge (16%; $n=4$), and medication adherence (12%; $n=3$).

Effects on quality of life

Overall, 40% of studies ($n=10$) reported improved QoL due to intervention effects [20–29], while 60% ($n=15$) reported no significant change in QoL [7, 8, 11, 19, 30–40]. Among studies with non-significant intervention effects, 40% of studies ($n=6$) found QoL significantly increased in both groups over time [8, 11, 19, 31, 33, 38].

Meaning focus of interventions

We then compared the effects of meaning focus on improved quality of life. In studies with minimal meaning focus, fewer than one-third demonstrated significant improvements in QoL (30.8%; $n=4$). In contrast, among studies with substantial meaning focus, half demonstrated significant improvements in QoL compared to control interventions (50%; $n=6$).

Statistical significance of the difference between groups could not be assessed, as both assumptions of independence and sample size were not met. Independence was not met, given studies in both groups contained intervention components which may improve QoL aside from meaning focus (e.g., promoting self-care behaviors and medication adherence). Sample size was not met, given the success/failure condition test produced an expected number of events below five (4.8). With this, proportions were only interpreted at a comprehensive level.

Discussion

The present systematic review explored the varying degrees of meaning focus which may exist within HF intervention studies, as well as the potential impact that a meaning focus may have on patient quality of life. Past HF literature has emphasized the importance of coping and meaning in patients and their multidimensional well-being [14, 17]. With this in mind, it was not surprising that only one-third of studies with minimal meaning focus led to significant improvements in patient QoL, while studies

Table 2 Demographic information, intervention components, and quality of life significance of minimal meaning focus studies

1st author (year)	Study location	*N*	Age (M)	Male (%)	White (%)	Intervention group	Control group	QoL measure	Non-QoL outcomes	QoL results
Balk (2008)	Netherlands	214	66	60	NR	Educational TV channel	Usual care	MLHFQ, SF-36	Hospitalization, SC, mortality, & HF knowledge	NS
Brodie (2008)	UK	60	79	63.3	NR	MI & usual care	MI or usual care	MLHFQ, SF-36	Motivational readiness for physical activity	NS
Smeulders (2009)	Netherlands	317	66.7	72.5	NR	Group self-care program & usual care	Usual care	KCCQ, RAND36	Psychosocial well-being, self-care, & self-efficacy	SIG
Copeland (2010)	US	458	70	99	50	Tele-counseling & education	Usual care	SF-8	Hospitalization, mortality, cost, physical activity, & adherence	NS
Pozehl (2010)	US	42	59.9	54.5	97.6	Group PA, counseling, & education	Group counseling & education	KCCQ	Physical symptoms & activity self-efficacy, & depression	NS
Baker (2011)	US	605	60.7	52	39	Counseling & tele-counseling	Usual education	HFSS	Self-care, self-efficacy, & HF knowledge	SIG
Lee (2013)	US	44	60	52.3	61.4	Self-care counseling & symptom diary	Usual care	MLHFQ	SC & morality	NS
Tsuchihashi (2013)	Japan	161	76.4	56.5	NR	Home self-care counseling & education	Usual care	SF-8	Hospitalization, mortality, depression, & anxiety	SIG
Grady (2014)	US	902	63.6	52.7	59.9	Self-care counseling & education	Usual education	QoL Index, SF-36	–	NS
Dickson (2014)	US	75	69.9	47	27	Community counseling & education	Waitlist	KCCQ	SC & HF knowledge	NS
Koberich (2015)	Germany	110	61.7	82.7	NR	Self-care education & phone counseling	Usual education	KCCQ	SC & care dependency	NS
Hagglund (2015)	Sweden	72	75	68	NR	Self-care & monitoring tablet	Usual education	KCCQ	SC & medical adherence	SIG
Creber (2016)	US	67	62	70.2	46.3	MI & usual care	Usual care	KCCQ	SC, confidence, & physical symptoms	NS

QoL quality of life, *MLHFQ* Minnesota Living with Heart Failure Questionnaire, *KCCQ* Kansas City Cardiomyopathy Questionnaire, *SF* Short Form Health Questionnaire, *MI* motivational interviewing, *SC* self-care, *SIG* significant findings, *NS* non-significant findings

Table 3 Demographic information, intervention components, and quality of life significance of substantial meaning focus studies

1st author (year)	Study location	*N*	Age (M)	Male (%)	White (%)	Intervention group	Control group	QoL measure	Non-QoL outcomes	QoL results
Sullivan (2009)	US	208	61	70	63	Group mindfulness & coping education	Usual care	KCCQ	Psychosocial distress & depression	SIG
Gary (2010)	US	74	65.8	41.9	71.6	Combined PA & CBT	PA ,CBT, or usual care	MLHFQ	Physical symptoms & depression	NS
Delaney (2010)	US	24	79	58.3	84	Self-care education, CBT, & tele-counseling	Tele-counseling & usual care	MLHFQ	Hospitalization & depression	SIG
Dekker (2012)	US	41	66	55	90	Brief cognitive therapy	Usual care	MLHFQ	Hospitalization & depression	NS
Bekelman (2015)	US	384	67.6	96.6	82.8	Inter-disciplinary care & CBT	Usual care	KCCQ	Hospitalization, mortality, & depression	NS
Smith (2015)	US	198	62.3	62	NR	Inter-disciplinary care & CBT	Usual care	KCCQ	SC, hospitalization, & HF knowledge	NS
Freedland (2015)	US	118	55.8	53.8	63.3	CBT & usual care	Usual care	KCCQ, SF-12	SC, confidence, depression, & anxiety	SIG
Sidebottom (2015)	US	232	73.4	52.6	93.9	Inter-disciplinary palliative care	Usual care	MLHFQ	Hospitalization, mortality, HF burden, & depression	SIG
Yu (2015)	China	160	59.4	65.7	NR	Health booklet & tele-counseling	Usual care	MLHFQ	Overall health status & medical adherence	SIG
Lundgren (2016)	Sweden	50	63	59	NR	Web-based CBT	Web-based discussion forum	MLHFQ	Depression & anxiety	NS
Nahlen (2016)	Sweden	85	70.4	67.5	NR	Coping effective training	Usual education	RAND-36	Coping, social support, affect, & anxiety	NS
Hooker (2016)	US	33	61.6	81.8	75.8	Mail-based psychospiritual education	Repeated measures	KCCQ	Physical symptoms & life meaning	SIG

QoL quality of life, *MLHFQ* Minnesota Living with Heart Failure Questionnaire, *KCCQ* Kansas City Cardiomyopathy Questionnaire, *SF* Short Form Health Questionnaire, *MI* motivational interviewing, *SC* self-care, *SIG* significant findings, *NS* non-significant findings with substantial meaning focus exceeded predictions, with half of studies reporting significant QoL results. While not statistically confirmed, studies with a substantial focus appeared to be more often associated with positive effects on QoL compared to studies with a minimal focus.

The importance of coping and meaning-making has been suggested to heighten as individuals age [41], as well as when serious illnesses progress [42]. As HF patients are generally older, and HF is considered a severe and progressive disease [1], it is understandable why coping efforts to create positive meaning may be particularly important to many HF patients. Many of these HF patients report facing struggles with life meaning [41], and HF patients who report positive life meaning have been shown to have reported higher QoL [14, 17].

While generally comprehensive, the current review leads us to implore HF researchers and healthcare professionals alike to better account for meaning in patients' lives, beyond the circumstances of end-of-life care. With this, the need to incorporate coping and meaning into HF-related care is not novel [14, 43], even spanning back almost 3 decades, pressing the need for positive meaning in cardiovascular interventions (e.g., [44]). Enhancing a patients' coping repertoire to include more positive meaning-making may be potentially critical within most, if not all, HF interventions and care regimens.

The present review contains some limitations. First, the validity of results may have improved by the use of statistical testing and/or meta-analysis. However, observed assumption violations, as well as, differences in study variables (e.g., race and beta blocker use), may indicate that statistical analysis and/or meta-analysis may not be appropriate [45]. Generalizability issues may be noted given present findings did not control for possible covariates. With this, gender [46] and race [47] are both considered to significantly influence HF characteristics and outcomes. Moreover, use of coping and meaning-making is thought to vary across race as well [35]. Subsequently, differences in QoL findings may have been specifically influenced by gender and/or race in an unseen manner. The present review also excluded studies focusing upon significant comorbidities. Given many HF patients are diagnosed with comorbid conditions such as diabetes [1], it is likely that comorbidities were present in reviewed studies, even if researchers did not report them. It is not clear how more accurately accounting for patient comorbidity may have influenced the present findings. Lastly, the present review excluded studies published earlier than 2008. Continuing advances in treatment [48] and public policy [49, 50] since 2008 likely provided greater opportunities to improve HF patient QoL within reviewed studies, as compared to those excluded by publication date. Subsequently, presently reported rates of improved QoL may have been higher overall due to the exclusion of studies published before 2008.

Future research is urged to continue exploring meaning within the context of HF interventions. It is hoped that from the current findings and from future investigations, researchers and healthcare professionals alike further consider the importance of HF patients' life meaning. If new HF interventions incorporate meaning-making, or even if healthcare professionals merely acknowledge meaning-making in their patients, it may potentially improve their QoL and could impact their overall health and well-being.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval For this type of study, ethical approval is not required.

Informed consent For this type of study, formal consent is not required.

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