

Symptom Burden and Quality of Life Among Patients With Heart Failure

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Abstract

Introduction: Heart failure is a debilitating condition that is associated with several burdensome symptoms that impede patients' quality of life. However, patients' experience of distressing symptoms and their impacts on their quality of life is not studied in Jordan.

Objectives: To assess the severity of distressing symptoms and to assess the relationships between these symptoms and the quality of life among patients with heart failure in Jordan.

Methods: A descriptive cross-sectional design was used. A convenience sampling approach was used to recruit the participants. Heart failure patients (n = 167) who visited the outpatient clinics in three hospitals in Amman between July and November 2021 were included. The Edmonton Symptom Assessment System and Short-Form 36 tool were used.

Results: Participants were more likely males with a mean age of 55.2 years (SD = 13.7). The most distressing symptoms among patients with heart failure were tiredness (M = 4.56, SD = 3.24), worse well-being (M = 4.34, SD = 2.52), and drowsiness (M = 3.5, SD = 3.06), respectively. Symptoms burden were negatively associated with the physical and the mental components summary of the quality of life. Pain, tiredness, nausea, loss of appetite, anxiety, and poor well-being were significant predictors of the physical components. The predictors of the mental components were tiredness, nausea, loss of appetite, and anxiety.

Conclusions: This study revealed that patients with heart failure facing significant symptom burden. The patients showed inadequate quality of life in both physical and mental components that were inversely associated with symptom burden. Given the debilitating effects of symptom burden on heart failure patients' quality of life, therefore, symptom assessment and management have to be a priority.

Keywords

heart failure, symptom burden, quality of life

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Introduction

The American Heart Association defined heart failure (HF) as a clinical syndrome caused by impairment in the structure and functions of the ventricles and is characterized by the inability of the heart to pump blood effectively (Heidenreich et al., 2022). Heart failure is clinically classified based on the left ventricular ejection fraction (LVEF) or according to the symptom's impacts on patients' functional capacity using the New York Heart Association (NYHA) functional classification system which classified patients into four classes (Class I: no symptoms, Class II: slight symptoms of HF with ordinary activity, Class III: symptoms of HF with less than ordinary activity, and Class IV: symptoms of HF at rest) (Heidenreich et al., 2022).

Heart failure is one of the most prevalent cardiovascular diseases worldwide. Approximately 64.3 million people are living with HF worldwide (Global Burden of Disease Collaborative Network [GBD], 2017). The prevalence of HF is expected to witness a 50% increment in low and middle-income countries by the year 2030 (Lippi &

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Sanchis-Gomar, 2020). This will increase hospitalization rates and consequently increase healthcare costs (Savarese & Lund, 2017). In the Middle East where Jordan is located, there is a dearth of information regarding the prevalence of HF. Nevertheless, it was estimated that 3.75 million patients are living with HF in the Middle East Arab region (Elasfar et al., 2020). In Jordan, the exact prevalence of HF is not available, however, according to the World Health Organization (WHO) statistics, cardiovascular diseases contributed to 42% of total deaths among Jordanians (WHO, 2024). In addition, evidence revealed that HF risk factors are growing in Jordan as well as in the Middle East region including diabetes mellitus, obesity, hypertension, and sedentary lifestyles (Elasfar et al., 2020; Ministry of Health, 2019). As the risk factors of HF are rising, it is anticipated to witness an increasing number of HF patients in Jordan as well as in the Middle East countries in the few coming years.

Review of Literature

Heart failure is a debilitating condition that is associated with several burdensome symptoms that occur as a result of impaired cardiac function and treatment effects (Austin et al., 2019). Stockdill et al. (2019) defined symptom burden among patients with HF in a concept analysis study as “the total subjective experience (including symptom prevalence, frequency, and severity) of HF symptom(s) that produce a negative impact on the patient or the patient’s family and is a fluid phenomenon which can be measured over the course of their disease” (p. 1441). As HF patients suffer from a significant symptom burden, it is important to further understand patients’ experiences from their perspectives.

In patients with HF, symptoms such as fatigue, shortness of breath, cough, edema, depression, and anxiety were found to negatively influence patients’ quality of life (QoL) (AbuRuz, 2018; Hayeah et al., 2017). QoL is defined by the WHO as “an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns” (WHO, 2012, p. 11). Enhancing QoL is increasingly being recognized as an ultimate goal of HF management (Ferreira et al., 2019). Further, it is an indicator of patients’ clinical status and disease progression (Lawson et al., 2023). Poor QoL in patients with HF increases the risk of death and recurrent hospital admissions (Johansson et al., 2021).

In addition to the apparent consequences on QoL, symptoms experienced by patients with HF are the main reasons for emergency department visits, recurrent hospitalizations, and deaths (Jering et al., 2021). Moreover, symptoms negatively influence patients’ functional performance (Conley et al., 2015) and impede their engagement in self-care behaviors (Austin et al., 2021). Given the negative impacts of

symptoms on HF patients’ overall health status and their QoL, it is important to effectively assess and manage these symptoms. The first step in effective symptom management is to assess the multiple dimensions of symptoms rather than just counting them (Alpert et al., 2017). However, studies assessing symptom burden and their impacts on QoL among patients with HF are largely based on studies undertaken in developed countries (Ferreira et al., 2019). As a result of the growing number of patients with HF in Jordan, there is a need to provide culturally sensitive care which involves embracing cultural differences and tailoring the patient-centered approach taking into consideration patients’ cultural background, religion, and origin (Claeys et al., 2021). This requires understanding patients’ experiences of symptoms and their effects on QoL. Thus, the aims of the current study were to assess the severity of distressing symptoms and to assess the relationships between these symptoms and QoL among patients with HF in Jordan. A better understanding of the symptom burden and its association with QoL will assist in the development of interventions to decrease symptom burden and improve HF patients’ QoL.

Methods

Design

A descriptive cross-sectional design was performed using self-report questionnaires and reviewing patients’ medical records.

Research Questions

- (i) What are the levels of distressing symptoms among patients with HF?
- (ii) What are the relationships between distressing symptoms and the QoL in patients with HF?

Sample

A convenience sampling approach was used to recruit the participants. This approach is cost-effective, easily accessible, and readily obtainable for data collection (Polit & Beck, 2017). The required sample size was calculated using G* power 3.1.9.7 software (Faul et al., 2007). Using a power level of 95%, an alpha level of 0.05, and a medium effect size of 0.3 for the Pearson correlation coefficient to identify the correlations between the distressing symptoms, the physical component summary, the mental component summary, and the total score of the Short Form-36 (SF-36). The required sample size was 138 participants. To compensate for the expected missing data, the researchers added up to 20% to the estimated sample size. Thus, a total of 167 participants had been included in the study.

In Jordan, the healthcare system is comprised of four main sectors; private, educational, governmental, and military. It was decided to recruit participants from hospitals with the largest capacity of patients; one hospital from each sector. However, permission from the military sector was not guaranteed, accordingly, one governmental hospital (500 beds capacity), one educational hospital (550 beds capacity), and one private hospital (300 beds capacity) were selected. The included hospitals are not specialized hospitals; though, they include specialized cardiac care units and general medical floors with an average admission number of 55 patients per hospital monthly. Patients in the outpatients' clinics were asked to fill out self-reported questionnaires as it was more convenient for them while they were waiting for their turn in the clinic. Patients who attended the outpatient clinics between July and November 2021 were approached and were invited to participate in the study.

Inclusion and Exclusion Criteria

Patients who met the following inclusion criteria were recruited: (1) Jordanian patients who were diagnosed with chronic HF with reduced left ventricular ejection fraction (LVEF \leq 40%) by the attending cardiologists and documented in the patient's medical records; (2) had Classes II–IV according to the NYHA functional classification; (3) age 18 years or older. Patients were excluded if they have cognitive impairment, acute illness, or general frailty as these conditions could influence patients' QoL.

Measurements

Participants' sociodemographic and clinical data were obtained from patients' medical records. Participants' sociodemographic data collected were age, gender, marital status, level of education, monthly income (below and above 500 Jordan Dinars [JD]; the poverty line), type of medical insurance, comorbidity status, and employment status. Clinical data collected were NYHA functional classification, LVEF, and most recent hospital admissions.

The Edmonton Symptom Assessment System (ESAS) was used to assess the severity of symptoms. It was originally developed by Bruera et al. (1991) to evaluate symptom burden in cancer patients and has since been used in patients with several diseases (Hui & Bruera, 2017). The ESAS consists of nine items that assess the severity of the following symptoms: pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, well-being, and shortness of breath. Each participant was asked to rate each symptom over the past 24 hours using a numeric scale that ranges from 0 to 10; where 0 means (*no symptom*) and 10 means (*worst possible severity of the symptom*). The Arabic ESAS has been demonstrated to be psychometrically sound, with good internal consistency reliability ($\alpha = 0.844$), discriminant validity was 87.8%, and convergent validity was more than 0.40 (100%) (Shamiah et al., 2018). In

the current study, the internal consistency reliability of the ESAS was satisfactory ($\alpha = 0.77$). According to the authors of the Arabic version, no changes were made to the original ESAS (Shamiah et al., 2018).

The SF-36 is a validated questionnaire that has been originally designed as part of the Medical Outcomes Study to be a generic measure of QoL (Coons et al., 1998). It consists of eight dimensions, namely, physical functioning (10 items), role limitations due to physical problems (four items), role limitations due to emotional problems (three items), mental health (five items), energy/vitality (four items), bodily pain (two items), social functioning (two items), and general health perception (five items).

For the purpose of this study, the Arabic version of SF-36 called RAND-36 was used. It was translated and validated in Saudi Arabia (Coons et al., 1998). Arabic version of the SF-36 was used in this study because Jordan has similar traditions, and culture, and uses the same language as Saudi Arabia. According to the developers' guidelines, the scoring of the SF-36 is a two-step process. In the first step, the precoded numeric values were recoded per the scoring key. In the second step, items in the same scale were averaged together to create the eight dimensions' score (RAND health care, n.d.). The scoring and averaging of the scale items are illustrated (Appendix 1). Further, the scales were summated to produce the physical component summary (PCS) which includes the scales of the physical functioning, the role limitation due to physical health, bodily pain, and general health. Similarly, the mental component summary (MCS) was produced by summating the scales of vitality, social functioning, role limitation due to emotional problems, and emotional well-being.

The SF-36 questions asked patients to rate the various dimensions of QoL for the last month. The SF-36 has demonstrated adequate psychometric properties. The Arabic version of the SF-36 was found to have good reliability Cronbach alpha (0.8), test–retest reliability revealed a strong direct relationship between prescores and postscores (PCC = 0.873) (El-Kalla et al., 2016). In the current study, the Cronbach alpha for the SF-36 questionnaire was 0.82.

Ethical Consideration

Before conducting the study, ethical approvals were obtained from the Academic Research Committee at the School of Nursing (IRB#: 11.21), and from the Institutional Review Board of the participating hospitals. Written consent forms were signed by the participants after a full disclosure about; research purposes, participation is anonymous, the participant's right to refuse the participation, and the right to withdraw at any time.

Statistical Analysis

Data analyses were conducted using IBM SPSS software version 21 (IBM Corp., Armonk, NY, USA). Descriptive

statistics including means, standard deviations (SD), frequencies, and percentages were used to describe participants' demographic and clinical characteristics. To answer the first research question, the scores for the ESAS questionnaire were analyzed using descriptive statistics (mean and SD). Further, distressing symptoms were described and summarized in frequencies and percentages.

To answer the second research question, the total score of each subscale of the SF-36 was calculated according to the scoring guideline (Appendix 1). The descriptive statistics (mean and SD) were used to describe each subscale of the SF-36, the PCS, the MCS, and the total SF-36 score. Pearson correlation coefficient (r) was used to assess the association between each symptom burden and the PCS, the MCS, and the total SF-36 score. In order to identify the predictors of the QoL, multiple linear regression was performed. Symptoms burdens were entered in the model as the independent variables, while the PCS and the MCS were the dependent variables. All tests were conducted using a two-tail test, and $\alpha = 0.05$.

Table 1. Description of the Sample Characteristics (N = 167).

| Variable | N (%) |
|--|-------------|
| Gender | |
| Male | 109 (65.3%) |
| Female | 58 (34.7%) |
| Marital status | |
| Married | 140 (83.8%) |
| Not married (single, divorced, or widowed) | 27 (16.2%) |
| Education status | |
| Elementary education or below | 40 (24.0%) |
| Secondary | 72 (43.1%) |
| Diploma | 22 (13.1%) |
| Bachelor or higher | 33 (19.8%) |
| Employment status | |
| Working | 54 (32.3%) |
| Not working | 73 (43.7%) |
| Retired | 40 (24.0%) |
| Smoking status | |
| Yes | 57 (34.1%) |
| No | 95 (56.9%) |
| Quit | 15 (9.0%) |
| Insurance type | |
| Private | 19 (11.4%) |
| Governmental | 116 (69.5%) |
| Exemption (exemption from paying treatment fees) | 15 (9.0%) |
| No health insurance | 17 (10.1%) |
| Monthly income | |
| 500 Jordan Dinar or less | 140 (83.8%) |
| More than 500 Jordan Dinar | 27 (16.2%) |
| Comorbidity status | |
| With other comorbid disease | 97 (58.1%) |
| Without other comorbid disease | 70 (41.9%) |

Results

Sample Characteristics

A total sample of 167 patients with HF was enrolled in the study. More than one-third of the participants were recruited from the governmental hospital ($n = 61$, 36.5%) and from the educational hospital ($n = 63$, 37.7%), while ($n = 43$, 25.7%) were from the private hospital. The mean age of the participants was 55.2 years ($SD = 13.7$), ranging from 19 to 79 years. The sample included 109 (65.3%) males and 58 (34.7%) females. Of the sample, 40 (24%) participants had elementary education or below and 33 (19.8%) had university degrees. The majority of the participants (83.8%) were married and were not working or retired (67.7%). More than one-third of the participants ($n = 57$) were smokers. The demographic characteristics of the participants are presented in Table 1. Regarding the clinical characteristics, the mean LVEF was 27.1 ($SD = 4.43$). According to the NYHA functional classification of HF, 36.5% of the participants ($n = 61$) were in NYHA class II, 41.3% of the participants ($n = 69$) were in NYHA class III, and 22.2% ($n = 37$) were in class IV.

Severity of Distressing Symptoms Among Patients With HF

Results showed that symptoms reported as highest intensity were tiredness ($M = 4.56$, $SD = 3.24$), worse well-being ($M = 4.34$, $SD = 2.52$), and drowsiness ($M = 3.5$, $SD = 3.06$) respectively. On the other hand, the lowest mean of distressing symptoms was for nausea ($M = 0.81$, $SD = 1.79$) followed by loss of appetite ($M = 1.88$, $SD = 2.69$). Descriptive statistics for other symptoms are presented in Table 2.

QoL Among Patients With HF

The total score of the overall SF-36 questionnaire was calculated using the average score of all eight scales. The mean

Table 2. Distressing Symptoms Severity Using the ESAS Questionnaire (N = 167).

| Distressing symptoms | N (%) | Mean | (SD) |
|----------------------|-------------|------|------|
| Pain | 94 (56.3%) | 3.05 | 3.26 |
| Tiredness | 130 (77.8%) | 4.56 | 3.24 |
| Drowsiness | 112 (67.1%) | 3.50 | 3.06 |
| Nausea | 37 (22.2%) | 0.81 | 1.79 |
| Loss of appetite | 71 (42.5%) | 1.88 | 2.69 |
| Shortness of breath | 91 (54.5%) | 3.11 | 3.45 |
| Depression | 94 (56.3%) | 3.02 | 3.24 |
| Anxiety | 110 (65.9%) | 3.35 | 3.11 |
| Worse well-being | 146 (87.4%) | 4.34 | 2.52 |
| Other symptoms | 57 (43.1%) | 2.07 | 3.19 |

total score of the SF-36 was 50.47 (SD \pm 21.29). The highest mean scores for the SF-36 scales were for bodily pain 67.86 out of 100 (SD \pm 32.63) followed by the social functioning scale 65.66 (SD \pm 32.08). The lowest mean score was for the role limitation due to physical functioning 29.34 out of 100 (SD \pm 39.38). The mean score of the PCS is 51.27 (SD = 18.48), while the mean score of the MCS is 54.01 (SD = 24.75). Based on SF-36 scoring guidelines, the highest score of the subscale indicates the best QoL. All SF-36 scale average scores, PCS, and MCS average scores are presented in Table 3.

The Association Between Distressing Symptoms and QoL Among Patients With HF

Pearson correlation coefficient (r) was used to assess the association between distressing symptoms and the PCS, the MCS, and the total score of the SF-36. The results showed significant negative correlations between all symptoms burdens and the PCS. The strongest association was found between the PCS and pain ($r = .66$, $p < .001$). Higher symptom burdens were also associated with lower MCS, except drowsiness that found to have no significant association with the MCS. The strongest association was found between depression and the MCS ($r = .56$, $p < .001$). The overall SF-36 was negatively associated with all symptoms except drowsiness. Pearson correlation coefficient values for the correlations among ESAS symptoms and SF-36 domains are shown in Table 4.

Predictors of HF Patients' QoL

To examine whether symptoms burdens are significant predictors of the PCS and the MCS, multiple linear regression analysis was conducted. Before running the regression analysis, the assumptions of independence, normality, linearity, and homoscedasticity were evaluated. Two separate multiple linear regression analyses were used to determine the predictors of the PCS and the MCS. In each model, the PCS and the

MCS scores were entered as the dependent variables, and using the enter method the symptoms burdens were entered as the independent variables.

The results of the regression analyses (Table 5) showed that pain, tiredness, nausea, loss of appetite, anxiety, and well-being were significant predictors of the PCS. The model explained 63.7% of the variance in the PCS, $F(10, 156) = 27.41$, $p < .001$. In regard to the MCS, the total variance explained by the model was 50.4%, $F(10, 156) = 15.82$, $p < .001$. The predictors of the MCS were tiredness, nausea, loss of appetite, and anxiety.

Discussion

This study aimed to assess the severity of distressing symptoms and to assess the relationships between these symptoms and QoL among patients with HF in Jordan. The results showed that patients with HF have a significant symptom burden which negatively influences their QoL. The most distressing symptom among our sample was tiredness. Tiredness (fatigue) is a significant symptom that is widely reported by patients with HF (Pavlovic et al., 2022). In a qualitative study, participants reported that fatigue was the worst of HF symptoms (Walthall et al., 2019). Fatigue imposes a significant adverse impact on physical, social, and emotional aspects of patients' lives which affects their QoL (Ishida & Makaya, 2017; Walthall et al., 2019; Williams, 2017). Fatigue is a multidimensional experience that requires holistic understanding and comprehensive measurements to find innovative approaches to manage patients' suffering.

The second most prevalent symptom is worse well-being. Worse well-being could be attributed to the high prevalence of fatigue, anxiety, and depression among the patients. Those symptoms were found to play a significant role in patients with HF perceptions of their well-being (AbuRuz, 2018; Pavlovic et al., 2022). The high impact of HF on patients' well-being and poor QoL alerts health professionals about the need for holistic healthcare programs which unfortunately is lacking in Jordanian healthcare sectors.

The study results revealed that the third most prevalent symptom is drowsiness (feeling sleepy). Sleep disorders are prevalent in patients with HF (Javaheri & Germany, 2022). Pain, fatigue, dyspnea, and depression were found to be correlated with insomnia symptoms (Gharzeddine et al., 2022). Insomnia results in many negative consequences for patients with HF including depression, fatigue, daytime sleepiness, poor self-reported physical functioning, decreased exercise capacity, cardiac events, and poor health-related QoL (Gharzeddine et al., 2021).

Anxiety and depression are highly prevalent among patients in our study. These findings are consistent with previous studies showing that anxiety and depression were commonly reported by patients with HF, with a prevalence of five times higher than that reported in the general population

Table 3. Quality of Life in Patients With Heart Failure (N = 167).

| Subscales of Short Form-36 questionnaire | Mean (SD) |
|--|---------------|
| Physical functioning | 45.22 (31.39) |
| Role limitation due to physical functioning | 29.34 (39.38) |
| Bodily pain | 67.86 (32.73) |
| General health | 45.39 (17.53) |
| Vitality (energy) | 46.62 (22.98) |
| Social functioning | 65.66 (32.08) |
| Role limitation due to emotional functioning | 51.49 (47.80) |
| Mental health | 61.24 (22.30) |
| Physical component summary | 51.27 (18.48) |
| Mental component summary | 54.01 (24.75) |
| Total score of Short Form-36 | 50.47 (21.29) |

Table 4. Relationships Between the Distressing Symptoms and the PCS, the MCS, and the Total SF-36 (N = 167).

| Variables | Pain | Tiredness | Drowsiness | Nausea | Loss of appetite | Shortness of breath | Depression | Anxiety | Worse well-being |
|----------------------------|-----------------|-----------------|------------------|-----------------|------------------|---------------------|-----------------|-----------------|------------------|
| Physical component summary | $r = -.66^{**}$ | $r = -.58^{**}$ | $r = -.025^{**}$ | $r = -.20^{**}$ | $r = -.41^{**}$ | $r = -.50^{**}$ | $r = -.34^{**}$ | $r = -.44^{**}$ | $r = -.34^{**}$ |
| Mental component summary | $r = -.39^{**}$ | $r = -.49^{**}$ | $r = -.002$ | $r = -.23^{**}$ | $r = -.45^{**}$ | $r = -.40^{**}$ | $r = -.56^{**}$ | $r = -.45^{**}$ | $r = -.32^{**}$ |
| Total SF-36 scores | $r = -.48^{**}$ | $r = -.40^{**}$ | $r = -.07$ | $r = -.28^{**}$ | $r = -.44^{**}$ | $r = -.44^{**}$ | $r = -.43^{**}$ | $r = -.49^{**}$ | $r = -.34^{**}$ |

Abbreviations: SF-36 = Short Form-36; PCS = physical component summary; MCS = mental component summary. Correlation is significant at the *0.01 level and **0.001 level (two-tailed).

(Abu Ruz, 2018; Denfeld et al., 2020). Despite the high prevalence of anxiety and depression and their negative impacts on patients with HF, they are usually under-recognized and undertreated in clinical practice (Celano et al., 2018).

QoL Among Patients With HF

Consistent with the findings of other studies worldwide, this study showed that patients with HF have a substantial impairment in QoL in both physical and mental components (Hayeah et al., 2017; Johansson et al., 2021). These findings were congruent with previous studies conducted in Jordan and globally (AbuRuz, 2018; Hajj et al., 2020). For instance, an international study that included 40 countries reported that patients with HF had inadequate QoL (Johansson et al., 2021). Yet, optimal QoL for those patients is still unmet which resulted in an increase in hospital admissions, high motility rate, and poor prognosis (Johansson et al., 2021; Yeh & Shao, 2021). As QoL is an essential indicator of patients' health outcomes and the effectiveness of treatment, it is important to give more attention to improving management practices that promote QoL among patients with HF.

In regard to the eight domains of the SF-36, role limitation due to physical functioning had the lowest scores, which reflects the significant burden that HF imposes on patients' lives. Similar findings were found by Alharbi et al. (2022). These findings could be attributed to patients' experience of high symptoms burden of fatigue, drowsiness, and dyspnea which influenced patients' ability to carry out activities of daily living (Nesbitt et al., 2014).

Pain and social functioning had the highest scores in our study. These findings are consistent with a study conducted in Saudi Arabia (Alharbi et al., 2022), which has a comparable cultural context. Social support for well and ill persons is considered a keystone in Arabic and Islamic culture. Family members provide continuous psychological and social support for ill persons (Alanazeh et al., 2021).

Correlation Between Symptom Burden and QoL

Our study revealed that symptoms burdens are negatively associated with the PCS and the MCS. The strongest association was found between pain and the PCS. Pain has been increasingly acknowledged as an important symptom in patients with HF with prevalence ranging between 77% and 85% (Feng et al., 2021; Haedtke et al., 2019). Despite the obvious negative effects of pain on patients' health and QoL, pain is often unrecognized and undertreated (Alpert et al., 2017). Therefore, further efforts are needed to effectively assess and develop new strategies to manage pain in patients with HF (Kang et al., 2021).

The second strongest association was found between fatigue and PCS. This reflects the devastating effect of fatigue on physical functioning among patients with HF. This finding was in accordance with the existing literature.

Table 5. Multiple Linear Regressing Physical (PCS) and Mental (MCS) Summaries of QoL Among HF Patients.

| Physical component summary | Symptoms | B | SE | Beta (β) | T | p value |
|----------------------------|---------------------|--------|-------|------------------|--------|---------|
| Physical component summary | Pain | -2.53 | 0.32 | -4.5 | -7.9 | <.001 |
| | Tiredness | -1.38 | 0.38 | -0.24 | -3.67 | <.001 |
| | Nausea | -1.75 | 0.59 | 0.17 | 2.97 | .003 |
| | Loss of appetite | -0.93 | 0.391 | -0.135 | -2.38 | .018 |
| | Anxiety | -0.789 | 0.394 | -0.133 | -2.003 | .047 |
| | Well-being | -0.871 | 0.383 | -0.119 | -2.27 | .024 |
| | Drowsiness | -0.36 | 0.300 | -0.06 | -1.19 | .24 |
| | Depression | -0.003 | 0.364 | -0.001 | -0.008 | .993 |
| | Shortness of breath | -0.442 | 0.354 | -0.083 | -1.25 | .213 |
| | Other symptoms | -0.688 | 0.314 | -0.119 | -2.190 | .030 |
| Mental component summary | Tiredness | -1.526 | 0.591 | -0.200 | -2.58 | .011 |
| | Nausea | 2.106 | 0.921 | 0.153 | 2.287 | .024 |
| | Loss of appetite | -1.99 | 0.612 | -0.216 | -3.25 | .001 |
| | Anxiety | -2.201 | 0.617 | -0.276 | -3.566 | <.001 |
| | Pain | -0.678 | 0.502 | -0.089 | -1.349 | .179 |
| | Drowsiness | -0.068 | 0.470 | -0.008 | -0.145 | .885 |
| | Shortness of breath | -0.267 | 0.555 | -0.037 | -0.482 | .631 |
| | Depression | 1.075 | 0.571 | -0.414 | -1.881 | .062 |
| | Well-being | -0.775 | 0.601 | -0.079 | -1.289 | .199 |
| | Other symptoms | -1.157 | 0.493 | -0.149 | 2.349 | .020 |

Abbreviations: QoL = quality of life; PCS = physical component summary; MCS = mental component summary.

For instance, a study conducted in the United States of America showed that fatigue was a significant predictor of PCS among patients with HF (Haji et al., 2020). Fatigue hinders patients' abilities to perform self-care behaviors (Kessing et al., 2016), and impedes patients' abilities to start and complete physical activities which makes them feel frustrated (Whitehead, 2017). The substantial contribution of fatigue in worsening the physical domains of the QoL escalates healthcare providers' attention to the importance of routinely assessing fatigue and developing innovative interventions to help patients adjust their activities according to the intensity of fatigue.

In regard to the MCS, the symptom with the strongest association with the MCS is anxiety. In a similar vein, a Jordanian study demonstrated that anxiety was an independent predictor of poor MCS (Alemoush et al., 2021). Anxiety is very common among patients with HF, it was 60% higher in patients with HF compared to healthy elderly (Alhurani et al., 2015). The presence of other symptoms, such as breathlessness, contributes to the increased anxiety level (Alpert et al., 2017). Anxiety has been linked to adverse medical and functional outcomes in HF patients (Celano et al., 2018), and it was associated with higher suicidality (Polikandrioti et al., 2018). Although evidence showed the negative impacts of anxiety on health outcomes, the association between anxiety and health outcomes among patients with HF is still less clear (Celano et al., 2018). Furthermore, routine assessment of anxiety is highly recommended in patients with HF to identify their needs and to provide appropriate psychosocial interventions.

The second highest association was found between the MCS and fatigue. Evidence revealed a strong relationship between fatigue and the indicators of emotional well-being such as anxiety and depression. In a retrospective study, depression had the strongest association with fatigue in 4,827 patients newly diagnosed with HF (Williams, 2017). However, several studies reported a reciprocal effect among fatigue, anxiety, and depression where each symptom affects the other regardless of the primary cause (Pavlovic et al., 2022; Polikandrioti et al., 2018). For example, depression causes sleep disturbance and lack of motivation to perform physical activity which in turn escalates the level of fatigue (Alpert et al., 2017). Further research is needed to better understand the mutual relationship between anxiety, depression, and fatigue. This will enhance the development of effective management interventions that address fatigue and influence emotional and mental well-being as well.

Symptoms Predictors of QoL

The current study revealed that pain, fatigue, nausea, loss of appetite, anxiety, and well-being were significant predictors of PCS. These findings were consistent with Hwang and colleague's (2014) study showed that worse physical symptoms were significant predictors of poor QoL. Physical symptoms limit HF patients' abilities to perform daily activities and decrease their sense of control over their lives which impairs patients' QoL (Pelegriano et al., 2011). Unfortunately, physical symptoms are inevitable in patients

with HF due to decompensated heart function. However, optimizing QoL within the limitations imposed by HF is a primary goal of HF management guidelines. Considering the determinants of QoL in patients' care is important to translate guidelines into empirical steps using innovative interventions.

Fatigue, anxiety, loss of appetite, and nausea were significant predictors of the MCS in our study. Fatigue has previously been found to significantly influence emotional and psychological HF patients' health; it resulted in feelings of frustration, depression, helplessness, and lack of motivation (Walthall et al., 2019), which in turn negatively affected patients' QoL. Regarding anxiety, similar to our finding, Alemoush et al. (2021) found that anxiety was a significant predictor of MCS among patients with HF. Also, Andreae and colleagues (2021) found that in addition to its association with low QoL, loss of appetite was associated with fatigue and depression.

Strengths and Limitations

This study is one of the few studies in the Middle East region that sheds light on various simultaneous symptoms experienced by patients with HF and their impacts on patients' QoL. However, some limitations of this study should be acknowledged. Firstly, the use of a cross-sectional design limits the ability to infer causal relationships between symptom burden and QoL. Secondly, this study was conducted in limited settings in Jordan, however, the selected hospitals have more than 1,000 beds capacity and represent the three healthcare sectors in Jordan. Finally, a convenience sampling approach was used to recruit the participants. This approach is subject to selection bias which may restrict the generalizability of the findings (Polit & Beck, 2017).

Implications for Practice

Complete freedom from HF symptoms may not be a realistic expectation during HF trajectory. Therefore, healthcare providers have to focus their care on minimizing the burden of HF symptoms to the extent possible to ultimately ensure better QoL. Nursing care plans for patients who are diagnosed with HF should be based on careful assessment of symptoms that affect patients QoL. These plans are directed toward individualized care taking into consideration the most prevalent symptoms. Understanding these symptoms will facilitate the application of better comfort measures that decrease patients' suffering through their chronic illness trajectory.

Conclusion

The findings of this study showed that patients with HF facing significant symptom burden. Fatigue, worse well-

being, and drowsiness were the most burdensome symptoms to patients with HF. In the current study, patients with HF showed inadequate QoL in both PCS and MCS that were inversely associated with symptom burden. The symptoms burdens with the strongest association with PCS were pain, fatigue, and shortness of breath. While, anxiety, fatigue, and depression were the symptoms burden with the strongest association with the MCS. The symptoms burden that significantly predict PCS are fatigue, pain, nausea, loss of appetite, anxiety, and well-being. On the other hand, fatigue, anxiety, loss of appetite, and nausea were predictive of the MCS. Given the debilitating effect of symptom burden on HF patients' QoL, therefore, symptom assessment and management have to be a priority in patients with HF.

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Authors' Contribution

MA contributed to the study's conception and design. MA data analysis and editing of the manuscript. Both authors read and approved the final manuscript.

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References

- AbuRuz, M. E. (2018). Anxiety and depression predicted quality of life among patients with heart failure. *Journal of Multidisciplinary Healthcare*, 2018(11), 367–373. <https://doi.org/10.2147/JMDH.S170327>
- Alananzeh, I., Lord, H., & Fernandez, R. (2021). Social support for Arab people with chronic conditions: A scoping review. *Clinical Nursing Research*, 30(4), 380–391. <https://doi.org/10.1177/1054773820932262>
- Alemoush, R. A., Al-Dweik, G., & AbuRuz, M. E. (2021). The effect of persistent anxiety and depressive symptoms on quality of life among patients with heart failure. *Applied Nursing Research: ANR*, 62, 151503. <https://doi.org/10.1016/j.apnr.2021.151503>
- Alharbi, M., Alharbi, F., AlTuwayjiri, A., Alharbi, Y., Alhofair, Y., Alanazi, A., AlJlajle, F., Khalil, R., & Al-Wutayd, O. (2022). Assessment of health-related quality of life in patients with

- heart failure: A cross-sectional study in Saudi Arabia. *Health and Quality of Life Outcomes*, 20(1), 128. <https://doi.org/10.1186/s12955-022-02040-7>
- Alhurani, A. S., Dekker, R. L., Abed, M. A., Khalil, A., Al Zaghali, M. H., Lee, K. S., Mudd-Martin, G., Biddle, M. J., Lennie, T. A., & Moser, D. K. (2015). The association of co-morbid symptoms of depression and anxiety with all-cause mortality and cardiac rehospitalization in patients with heart failure. *Psychosomatics*, 56(4), 371–380. <https://doi.org/10.1016/j.psych.2014.05.022>
- Alpert, C. M., Smith, M. A., Hummel, S. L., & Hummel, E. K. (2017). Symptom burden in heart failure: Assessment, impact on outcomes, and management. *Heart Failure Reviews*, 22(1), 25–39. <https://doi.org/10.1007/s10741-016-9581-4>
- Andreae, C., van der Wal, M. H. L., van Veldhuisen, D. J., Yang, B., Strömberg, A., & Jaarsma, T. (2021). Changes in appetite during the heart failure trajectory and association with fatigue, depressive symptoms, and quality of life. *The Journal of Cardiovascular Nursing*, 36(6), 539–545. <https://doi.org/10.1097/JCN.0000000000000756>
- Austin, R., Schoonhoven, L., Kalra, P., & May, C. (2019). Burden of treatment in chronic heart failure: Does symptom burden play a role? *British Journal of Cardiac Nursing*, 14(2), 91–93.
- Austin, R. C., Schoonhoven, L., Clancy, M., Richardson, A., Kalra, P. R., & May, C. R. (2021). Do chronic heart failure symptoms interact with burden of treatment? Qualitative literature systematic review. *BMJ open*, 11(7), e047060. <https://doi.org/10.1136/bmjopen-2020-047060>
- Bruera, E., Kuehn, N., Miller, M. J., Selmser, P., & Macmillan, K. (1991). The Edmonton symptom assessment system (ESAS): A simple method for the assessment of palliative care patients. *Journal of Palliative Care*, 7(2), 6–9. <https://doi.org/10.1177/082585979100700202>
- Celano, C. M., Villegas, A. C., Albanese, A. M., Gaggin, H. K., & Huffman, J. C. (2018). Depression and anxiety in heart failure: A review. *Harvard Review of Psychiatry*, 26(4), 175–184. <https://doi.org/10.1097/HRP.0000000000000162>
- Claeys, A., Berdai-Chaouni, S., Tricas-Sauras, S., & De Donder, L. (2021). Culturally sensitive care: Definitions, perceptions, and practices of health care professionals. *Journal of Transcultural Nursing: Official Journal of the Transcultural Nursing Society*, 32(5), 484–492. <https://doi.org/10.1177/1043659620970625>
- Conley, S., Feder, S., & Redeker, N. S. (2015). The relationship between pain, fatigue, depression and functional performance in stable heart failure. *Heart & Lung: The Journal of Critical Care*, 44(2), 107–112. <https://doi.org/10.1016/j.hrtlng.2014.07.008>
- Coons, S. J., Alabdulmohsin, S. A., Draugalis, J. R., & Hays, R. D. (1998). Reliability of an Arabic version of the RAND-36 health survey and its equivalence to the US-English version. *Medical Care*, 36(3), 428–432. <https://doi.org/10.1097/00005650-199803000-00018>
- Denfeld, Q. E., Bidwell, J. T., Gelow, J. M., Mudd, J. O., Chien, C. V., Hiatt, S. O., & Lee, C. S. (2020). Cross-classification of physical and affective symptom clusters and 180-day event-free survival in moderate to advanced heart failure. *Heart & Lung: The Journal of Critical Care*, 49(2), 151–157. <https://doi.org/10.1016/j.hrtlng.2019.11.004>
- Elasfar, A. A., Alhabeed, W., & Elasfar, S. (2020). Heart failure in the middle east Arab countries: Current and future perspectives. *Journal of the Saudi Heart Association*, 32(2), 236–241. <https://doi.org/10.37616/2212-5043.1040>
- El-kalla, M., Khalaf, A., Saad, M., & Othman, E. (2016). Reliability of the Arabic Egyptian version of short form 36 health survey questionnaire to measure quality of life in burned patient. *Medical Journal of Cairo University*, 84(2), 311–316.
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. <https://doi.org/10.3758/BF03193146>
- Feng, K. Y., O'Connor, C. M., Clare, R., Alhanti, B., Piña, I. L., Kraus, W. E., Whellan, D. J., & Mentz, R. J. (2021). Greater pain severity is associated with worse outcomes in patients with heart failure. *Journal of Cardiovascular Translational Research*, 14(5), 984–991. <https://doi.org/10.1007/s12265-021-10104-0>
- Ferreira, J. P., Kraus, S., Mitchell, S., Perel, P., Piñeiro, D., Chioncel, O., Colque, R., de Boer, R. A., Gomez-Mesa, J. E., Grancelli, H., Lam, C. S. P., Martinez-Rubio, A., McMurray, J. J. V., Mebazaa, A., Panjath, G., Piña, I. L., Sani, M., Sim, D., Walsh, M., & Yancy, C., ... K. Sliwa (2019). World Heart Federation roadmap for heart failure. *Global Heart*, 14(3), 197–214. <https://doi.org/10.1016/j.ghheart.2019.07.004>
- Gharzeddine, R., McCarthy, M. M., Yu, G., & Dickson, V. V. (2021). Insomnia and insomnia symptoms in persons with heart failure: An integrative review. *The Journal of Cardiovascular Nursing*, 36(4), 374–384. <https://doi.org/10.1097/JCN.0000000000000719>
- Gharzeddine, R., McCarthy, M. M., Yu, G., & Dickson, V. V. (2022). Associations of insomnia symptoms with sociodemographic, clinical, and lifestyle factors in persons with HF: Health and retirement study. *Research in Nursing and Health*, 45(3), 364–379. <https://doi.org/10.1002/nur.22211>
- Global Burden of Disease Collaborative Network [GBD] (2017). Disease and Injury Incidence and Prevalence Collaborators (2018). Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: A systematic analysis for the global burden of disease study 2017. *Lancet (London, England)*, 392(10159), 1789–1858. [https://doi.org/10.1016/S0140-6736\(18\)32279-7](https://doi.org/10.1016/S0140-6736(18)32279-7)
- Haedtke, C. A., Moser, D. K., Pressler, S. J., Chung, M. L., Wingate, S., & Goodlin, S. J. (2019). Influence of depression and gender on symptom burden among patients with advanced heart failure: Insight from the pain assessment, incidence and nature in heart failure study. *Heart & Lung: The Journal of Critical Care*, 48(3), 201–207. <https://doi.org/10.1016/j.hrtlng.2019.02.002>
- Haji, J., Mathelier, H., Drachman, B., & Laudanski, K. (2020). Sleep quality, fatigue, and quality of life in individuals with heart failure. *The Journal for Nurse Practitioners*, 6(6), 461–465. <https://doi.org/10.1016/j.nurpra.2020.03.002>
- Hayeah, H. M., Saifan, A. R., AbuRuz, M. E., & Aljabery, M. A. (2017). Health-related quality of life in heart failure in Jordan from patients perspectives. *IOSR Journal of Nursing and Health Science*, 6(1), 14–21.
- Heidenreich, P. A., Bozkurt, B., Aguilar, D., Allen, L. A., Byun, J. J., Colvin, M. M., Deswal, A., Drazner, M. H., Dunlay, S. M., Evers, L. R., Fang, J. C., Fedson, S. E., Fonarow, G. C., Hayek, S. S., Hernandez, A. F., Khazanie, P., Kittleson, M. M., Lee, C. S., Link, M. S., & Milano, C. A., ...

- C. W. Yancy (2022). 2022 AHA/ACC/HFSA guideline for the management of heart failure: A report of the American college of cardiology/American heart association joint committee on clinical practice guidelines. *Circulation*, *145*(18), e895–e1032. <https://doi.org/10.1161/CIR.0000000000001063>
- Hui, D., & Bruera, E. (2017). The Edmonton symptom assessment system 25 years later: Past, present, and future developments. *Journal of Pain and Symptom Management*, *53*(3), 630–643. <https://doi.org/10.1016/j.jpainsymman.2016.10.370>
- Hwang, S. L., Liao, W. C., & Huang, T. Y. (2014). Predictors of quality of life in patients with heart failure. *Japan Journal of Nursing Science: JJNS*, *11*(4), 290–298. <https://doi.org/10.1111/jjns.12034>
- Ishida, H., & Makaya, M. (2017). Fatigue in patients with heart failure: Results from a systematic review. *Journal of Cardiac Failure*, *23*(10), 47–53. <https://doi.org/10.1016/j.cardfail.2017.08.222>
- Javaheri, S., & Germany, R. (2022). Sleep and breathing disorders in heart failure. *Handbook of Clinical Neurology*, *189*(2022), 295–307. <https://doi.org/10.1016/B978-0-323-91532-8.00009-4>
- Jering, K., Claggett, B., Redfield, M. M., Shah, S. J., Anand, I. S., Martinez, F., Sabarwal, S. V., Seferović, P. M., Kerr Saraiva, J. F., Katova, T., Lefkowitz, M. P., Pfeffer, M. A., McMurray, J. J. V., & Solomon, S. D. (2021). Burden of heart failure signs and symptoms, prognosis, and response to therapy: The PARAGON-HF trial. *JACC. Heart Failure*, *9*(5), 386–397. <https://doi.org/10.1016/j.jchf.2021.01.011>
- Johansson, I., Joseph, P., Balasubramanian, K., McMurray, J. J. V., Lund, L. H., Ezekowitz, J. A., Kamath, D., Alhabib, K., Bayes-Genis, A., Budaj, A., Dans, A. L. L., Dzudie, A., Probstfield, J. L., Fox, K. A. A., Karaye, K. M., Makubi, A., Fukakusa, B., Teo, K., Temizhan, A., & Wittlinger, T., ... G-CHF Investigators (2021). Health-related quality of life and mortality in heart failure: The global congestive heart failure study of 23 000 patients from 40 countries. *Circulation*, *143*(22), 2129–2142. <https://doi.org/10.1161/CIRCULATIONAHA.120.050850>
- Kang, Y., Choi, Y. K., Stehlik, J., Nielsen, J. D., & Reid, M. C. (2021). Pain in homebound older adults with heart failure after hospital discharge. *Home Healthcare Now*, *39*(5), 278–285. <https://doi.org/10.1097/NHH.0000000000000955>
- Kessing, D., Denollet, J., Widdershoven, J., & Kupper, N. (2016). Fatigue and self-care in patients with chronic heart failure. *European Journal of Cardiovascular Nursing*, *15*(5), 337–344. <https://doi.org/10.1177/1474515115575834>
- Lawson, C. A., Benson, L., Squire, I., Zaccardi, F., Ali, M., Hand, S., Kadam, U., Tay, W. T., Dahlstrom, U., Lund, L. H., Savarese, G., Lam, C. S. P., Khunti, K., & Strömberg, A. (2023). Changing health related quality of life and outcomes in heart failure by age, sex and subtype. *EClinicalMedicine*, *14*(64), 102217. <https://doi.org/10.1016/j.eclinm.2023.102217>
- Lippi, G., & Sanchis-Gomar, F. (2020). Global epidemiology and future trends of heart failure. *AME Medical Journal*, *5*(15), 1–6. <https://doi.org/10.21037/amj.2020.03.03>
- Ministry of Health (2019). Jordan National Stepwise Survey (STEPS) for Noncommunicable Diseases Risk Factors (2019). <https://www.who.int/ncds/surveillance/steps/en/>
- Nesbitt, T., Doctorvaladan, S., Southard, J. A., Singh, S., Fekete, A., Marie, K., Moser, D. K., Pelter, M. M., Robinson, S., Wilson, M. D., Cooper, L., & Dracup, K. (2014). Correlates of quality of life in rural patients with heart failure. *Circulation. Heart Failure*, *7*(6), 882–887. <https://doi.org/10.1161/CIRCHEARTFAILURE.113.000577>
- Pavlovic, N. V., Gilotra, N. A., Lee, C. S., Ndumele, C., Mammos, D., Dennisonhimmelfarb, C., & AbshireSaylor, M. (2022). Fatigue in persons with heart failure: A systematic literature review and meta-synthesis using the biopsychosocial model of health. *Journal of Cardiac Failure*, *28*(2), 283–315. <https://doi.org/10.1016/j.cardfail.2021.07.005>
- Pelegriño, V., Dantas, R., & Clark, A. (2011). Health-related quality of life determinants in outpatients with heart failure. *Rev. Latino-Am. Enfermagem*, *19*(3), 451–457. <https://doi.org/10.1590/S0104-11692011000300002>
- Polikandrioti, M., Tzirogiannis, K., Zyga, S., Koutelekos, I., Vasilopoulos, G., Theofilou, P., & Panoutsopoulos, G. (2018). Effect of anxiety and depression on the fatigue of patients with a permanent pacemaker. *Archives of Medical Sciences. Atherosclerotic Diseases*, *3*(2018), e8–e17. <https://doi.org/10.5114/amsad.2018.73231>
- Polit, D. F., & Beck, C. T. (2017). *Nursing research: Generating and assessing evidence for nursing practice* (7th ed.). Wolters Kluwer.
- RAND health care (n.d.). 36-Item Short Form Survey (SF-36) Scoring Instructions. Accessed February 15. https://www.rand.org/health-care/surveys_tools/mos/36-item-short-form/scoring.html
- Savarese, G., & Lund, L. H. (2017). Global public health burden of heart failure. *Cardiac Failure Review*, *3*(1), 7–11. <https://doi.org/10.15420/cfr.2016.25.2>
- Shamiah, O., Amin, Z., Al-Hawamdeh, A., Abu Farsakh, F., Abu Nasser, M., Al-Omari, M., et al. (2018). Validation of Edmonton Symptom Assessment System (ESAS) in Arabic Language, ESAS-A. Retrieved from <https://www.morressier.com/article/15-validation-edmonton-symptom-assessment-system-esas-arabic-language-esasa/5afadd8bf314ac000849af89>
- Stockdill, M. L., Patrician, P. A., & Bakitas, M. (2019). Understanding and measuring symptom burden in heart failure: A concept analysis. *Western Journal of Nursing Research*, *41*(10), 1423–1447. <https://doi.org/10.1177/0193945919833710>
- Walthall, H., Floegel, T., Boulton, M., & Jenkinson, C. (2019). Patients experience of fatigue in advanced heart failure. *Contemporary Nurse*, *55*(1), 71–82. <https://doi.org/10.1080/10376178.2019.1604147>
- Whitehead, L. (2017). The family experience of fatigue in heart failure. *Journal of Family Nursing*, *23*(1), 138–156. <https://doi.org/10.1177/1074840716684232>
- Williams, B. A. (2017). The clinical epidemiology of fatigue in newly diagnosed heart failure. *BMC Cardiovascular Disorders*, *17*(1), 122. <https://doi.org/10.1186/s12872-017-0555-9>
- World Health Organization (2012). Programme on mental health: WHOQOL user manual, 2012 revision. Accessed January 15. <https://www.who.int/tools/whoqol%20%2D%20Measuring%20Quality%20of%20Life%7C%20The%20World%20Health%20Organization&text=WHO%20defines%20Quality%20of%20Life,%2C%20expectations%2C%20standards%20and%20concerns>
- World Health Organization (2024). East Mediteranian Region. Accessed January 16, 2024. <https://www.emro.who.int/jor/jordan-infocus/jordan-implements-who-hearts-in-primary-health-care-to-strengthen-management-of-cardiovascular-diseases-and-related-risks.html>
- Yeh, H. F., & Shao, J. H. (2021). Quality of life and associated factors in older adults with heart failure. *The Journal of Nursing Research: JNR*, *29*(5), e166. <https://doi.org/10.1097/JNR.0000000000000445>

Appendix

Table A1. Recording Items of the Eight Domains of Short Form-36 (SF-36) (Step One).

| Item number | Change the original response category ^a | To recorded value: |
|---------------------------------|--|--------------------|
| 1, 2, 20, 22, 34, 36 | 1 → | 100 |
| | 2 → | 75 |
| | 3 → | 50 |
| | 4 → | 25 |
| | 5 → | 0 |
| 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 | 1 → | 0 |
| | 2 → | 50 |
| | 3 → | 100 |
| 13, 14, 15, 16, 17, 18, 19 | 1 → | 0 |
| | 2 → | 100 |
| 21, 23, 26, 27, 30 | 1 → | 100 |
| | 2 → | 80 |
| | 3 → | 60 |
| | 4 → | 40 |
| | 5 → | 20 |
| | 6 → | 0 |
| 24, 25, 28, 29, 31 | 1 → | 0 |
| | 2 → | 20 |
| | 3 → | 40 |
| | 4 → | 60 |
| | 5 → | 80 |
| | 6 → | 100 |
| 32, 33, 35 | 1 → | 0 |
| | 2 → | 25 |
| | 3 → | 50 |
| | 4 → | 75 |
| | 5 → | 100 |

Note: ^a Precoded response choices as printed in the questionnaire.

Table A2. Averaging Items to Form Scales (Step Two).

| Scale | Number of items | After recoding, average the following items |
|--|-----------------|---|
| Physical functioning | 10 | 3 4 5 6 7 8 9 10 11 12 |
| Role limitations due to physical health | 4 | 13 14 15 16 |
| Role limitations due to emotional problems | 3 | 17 18 19 |
| Energy/fatigue | 4 | 23 27 29 31 |
| Emotional well-being | 5 | 24 25 26 28 30 |
| Social functioning | 2 | 20 32 |
| Pain | 2 | 21 22 |
| General health | 5 | 1 33 34 35 36 |