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ORIGINAL ARTICLE

Patient-reported outcomes, clinical, and demographic variables as predictors of withdrawal from the workforce after hospitalization with heart failure: findings from the national DenHeart survey

Nina Cecilie Tjustrup[1]*†, Signe Engel Schmidt[1]*†, Anne Vingaard Christensen [2], Trine Bernholdt Rasmussen [1,3], Britt Borregaard [4,5], Lars Thrysoee [5], Rikke Elmose Mols [6], Charlotte Brun Thorup [7,8], Knud Juel [9], Anne Ankerstjerne[6], and Selina Kikkenborg Berg [1,2,9]

[1]Faculty of Health and Medical Sciences, University of Copenhagen, Blegdamsvej 3B, Copenhagen N 2200, Denmark; [2]Department of Cardiology, Rigshospitalet, Copenhagen University Hospital, Blegdamsvej 9, Copenhagen 2100, Denmark; [3]Department of Cardiology, Herlev and Gentofte University Hospital, Hellerup, Denmark; [4]Department of Cardiothoracic and Vascular Surgery, Odense University Hospital, Odense, Denmark; [5]Department of Cardiology, Odense University Hospital, Odense, Denmark; [6]Department of Cardiology, Aarhus University Hospital, Aarhus, Denmark; [7]Department of Cardiology, Aalborg University Hospital, Aalborg, Denmark; [8]Clinical Nursing Research Unit, Department of Cardiothoracic Surgery, Aalborg University Hospital, Aalborg, Denmark; and [9]National Institute of Public Health, University of Southern Denmark, Studiestræde 6, Copenhagen 1455, Denmark

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Aims Increased prevalence and survival among patients with heart failure draws attention to their everyday life, including their ability to work. Many patients with heart failure withdraw from the workforce, which can affect their quality of life. The aim was to investigate patient-reported outcomes (PROs) and clinical and demographic variables as predictors of withdrawal from the workforce after admission with a diagnose of heart failure.

Methods and results Patients with heart failure, who were part of the workforce at admission were included from the national cross-sectional survey, DenHeart. Data were collected from five national heart centres in Denmark, from April 2013 to April 2014. Patient-reported outcomes measured at discharge included SF-12, HeartQoL, HADS, and ESAS. Clinical and demographic variables were obtained from registers, medical records, and index hospitalization. Patient-reported outcomes, clinical, and demographic variables were combined with labour market affiliation 3, 6, 9, and 12 months after admission. The response rate was 49.1% ($n = 1517$) and of those 364 patients were part of the workforce at index admission. Patients with lower QoL odds ratio (OR) 2.58 [95% confidence interval (CI) 1.24–5.37], symptoms of depression OR 2.57 (95% CI 1.47–4.50) and ejection fraction (EF) ≤35% OR 2.48 (95% CI 1.35–4.56) were more likely to withdraw from the workforce in the first year after admission. Patients with lower symptom burden OR 0.36 (95% CI 0.19–0.68) and a hospital stay of 0–2 days OR 0.18(95% CI 0.08–0.37) were less likely to withdraw.

Conclusion Low QoL, high symptom burden, symptoms of depression, a longer length of hospital stay, and low EF can predict withdrawal from the workforce in the first year after admission with heart failure.

Keywords Heart failure • Patient-reported outcomes • Workforce • Quality of life • Symptom burden • Anxiety/depression

† First authorship is shared between Nina Cecilie Tjustrup and Signe Engel Schmidt.
* Corresponding authors. Tel: +45 51270586. Email: nina.tjustrup@gmail.com (N.C.T.); Tel: +45 29904485. Email: sien@live.dk (S.E.S.)

Implications for practice

- Lower QoL, higher symptom burden, symptoms of depression, hospital stay >7 days, and ejection fraction ≤35% should be considered in clinical care as they provide essential information regarding withdrawal from the workforce among patients with heart failure.
- Findings from this study should be used in clinical care to identify patients at risk of withdrawal from the workforce in order to support the transition. The transition should be directed by the individual's decisions and needs to prevent the adverse effects of withdrawal from the workforce.
- Findings from this study suggest that patients with heart failure at risk of leaving the workforce can be identified early. Early identification might help patients prepare for the transition and initiate initiatives, for example, bridge jobs, to preserve life satisfaction.

Introduction

Heart failure is associated with reduced quality of life (QoL), considerable morbidity, and 5-year mortality of >50%.[1,2] Prognosis has improved due to advances in pharmacological treatment and cardiac devices, which have led to improved life expectancy and increased prevalence of patients living with heart failure.[2–4] As a result, attention to the everyday life of patients with heart failure including the ability to work has become highly relevant. The ability to work has important socioeconomic consequences for patients as well as society.[5] Being part of the workforce is essential for physical and mental health, self-confidence, self-esteem, and social identity.[5–7] Involuntary detachment from the workforce is associated with decreased life satisfaction, self-efficacy, QoL, and increased risk of depression.[5,8,9] A study found that one-third of patients with heart failure did not return to the workforce 1 year after the first admission for heart failure.[10] Thus, it is central to identify patients at risk of withdrawal from the workforce in order to prevent withdrawal or support a transition to, for example, pension. It is already known that return to work among patients with cardiac diagnoses can be predicted by clinical and demographic variables such as age, sex, income, educational level, living with a partner, length of hospital stay, comorbidity, and left ventricular ejection fraction (EF).[6,10–12] However, in populations with heart failure, only a few of these variables have been examined as predictors of return to work, and only among patients aged 18–60 years.[10] Furthermore, no studies have investigated associations between patient-reported outcomes (PROs) and workforce detachment following admission with heart failure. Patient-reported outcomes are relevant measures of health and add valuable information to clinicians.[13] Patient-reported symptoms of anxiety and depression, low QoL, low self-perceived physical, and mental health and a high symptom burden have previously been reported among patients with heart failure,[14] and studies among patients with other cardiac diagnoses suggest that such PROs can predict future outcomes including a return to work and mortality independently of traditional clinical data.[12,14] The aim of this study was to investigate the difference in PROs—including self-perceived physical and mental health, QoL, symptom burden, symptoms of anxiety and depression, as well as clinical and demographic variables including age, sex, marital status, educational level, income, length of hospital stay, comorbidity, and EF—between patients with heart failure in the workforce and out of it. The aim was furthermore to investigate PROs and clinical and demographic variables as predictors of withdrawal from the workforce after admission with a diagnose of heart failure 3, 6, 9, and 12 months after hospital discharge. The objectives of this study were, therefore, to explore: (i) differences in PROs between patients in the workforce/out of the workforce, (ii) PROs as predictors of withdrawal from the workforce, and (iii) clinical and demographic variables as predictors of withdrawal from the workforce.

Methods

Study design

The DenHeart study is a national, cross-sectional study, combining PROs across cardiac diagnoses and national registry data. The study has been described in the published study protocol.[15] The current study reports on patients hospitalized with heart failure A or B diagnosis (The A diagnosis is the primary diagnosis given at the hospital. The B diagnoses refer to secondary diagnoses), from the DenHeart study.

Setting and participants

Data were collected from five Danish heart centres from 15 April 2013 to 15 April 2014. All patients who were discharged or transferred from the heart centres were asked to fill out the paper-based questionnaire, and thus the DenHeart population comprises both previously and newly diagnosed patients with heart failure. The questionnaire consisted of 80 items. All patients were consecutively included to reduce selection bias. Patients under the age of 18 years and patients without a Danish civil registration number, or who did not understand Danish were excluded.[15] To reduce recall bias, patients were asked to complete and return the questionnaire before they left the hospital or return it by mail in a prepaid envelope within 3 days after discharge. Patients with a diagnosis of heart failure were identified from ICD-10 diagnosis (I11.0, I42–I43.8, I50, I51.7, R57.0), obtained from the Danish National Patient Register[16] (DNPR).

Data collection

Clinical variables refer to EF, length of hospital stay, and comorbidity. Demographic variables refer to age, sex, marital status, educational level, and income.

Demographic and clinical data

In Denmark, all residents are assigned a unique personal civil registration number. This number allows individual-level linkage in the national registers.[17] Clinical and demographic information was obtained from The Danish Civil Registration System[18] and DNPR,[16] which is known internationally to be the most complete of its kind.[16] Ejection fraction was

obtained from medical records. Information on comorbidity for the previous 10 years and length of hospital stay was obtained from DNPR. The TU-index score was used to calculate the number of comorbidities based on primary and secondary diagnoses.[19]

Patient-reported outcomes

Self-perceived physical and mental health, QoL, symptom burden, anxiety, and depression were collected as PROs.

SF-12 is a short 12-item version of the Short-Form 36 and measures self-perceived physical and mental health. The recall is 4 weeks. A physical and a mental component summary score are generated, each with a range from 0 to 100, with higher scores indicating a better health status.[20]

Hospital Anxiety and Depression Scale (HADS) is a 14-item instrument that covers the last week and assesses levels of anxiety and depression in medically ill patients. Two subscales are generated, HADS-Anxiety (HADS-A) and HADS-Depression (HADS-D), and scores in each scale range from 0 to 21. Scores of 8–10 suggest the presence of a mood disorder, and scores of 11 and above indicate the probable presence of a mood disorder.[21]

HeartQoL is a disease-specific instrument that measures QoL in cardiac patients. A global score, a physical score, and an emotional score are generated. Each score has a range from 0 to 3, with higher scores indicating better QoL.[22]

Edmonton Symptom Assessment Scale (ESAS) is a 10-item instrument, where patients are asked to assess their current symptoms on a visual numeric scale from 0 to 10. Higher scores indicate the presence and intensity of symptoms.[23] ESAS has not yet been validated in cardiac patients but has proven to be valid in measuring self-reported symptoms in cancer patients.[23]

Withdrawal from the workforce

Information on labour marked affiliation was obtained from the Danish Register on Personal Income and Transfer Payments (DREAM). DREAM has been validated with a positive predictive value of 98.2%.[24] All residents in Denmark are entitled to social benefits financed by the government if they are not working (e.g. on sick leave, unemployed, eligible for early retirement, or disability pension). In this study, being part of the workforce prior to hospitalization was based on the 26 weeks leading up to the admission. To be categorized as being part of the workforce, the patient should have worked for 2 consecutive weeks during the period of 26 weeks before the index admission. Being part of the workforce was also defined as receiving state educational grants, maternity leave or other leave of absence benefits, as these social benefits are intended for persons who are capable of working. Patients who were part of the workforce at baseline were included. Only patients ≤63 years were included to ensure that the participants did not reach the age of state pension, which was 65 years at the time of the data collection, during the follow-up period.

Patients who withdrew from work, or who were on sick leave 3, 6, 9, and 12 months after the admission were categorized as being out of the workforce. The DREAM database records social benefits on a weekly basis. DREAM was used to identify labour market affiliation based on the status of the week representing 3, 6, 9, and 12 months after discharge.

Statistical methods

Baseline differences were tested using χ^2 and Wilcoxon two-sample test. Continuous PRO scores (SF-12, HeartQoL, ESAS) were divided into quartiles, and for HADS a cut-off at eight points was used in the analyses. Patients without complete PRO responses were excluded from the analyses. All associations were analysed using multiple logistic regression for binary outcomes. Patients who were part of the workforce at baseline were included in the final analyses. All estimates were calculated at 3, 6, 9, and 12 months after discharge. Analyses were adjusted for age, sex, marital status, educational level, income, and length of hospital stay. Results were reported as odds ratios (ORs) with 95% confidence intervals (CIs). Estimates are presented as adjusted at 3 and 12 months after discharge in this paper. For all analyses a P-value <0.05 is considered statistically significant. Statistical analyses were conducted using SAS version 9.4.

Ethics

The investigation conforms with the principles outlined in the Declaration of Helsinki.[25] The DenHeart study was approved by the Danish Data Protection Agency no: 2007-58-0015/30-0937 and registered at ClinicalTrials.gov (NCT01926145). The use of EF in this study was approved separately (1-16-02-170-16). Each participant signed informed consent.

Results

Baseline characteristic

A total of 34 564 patients were discharged from the heart centres during the study period. Out of 33 060 eligible patients, 3091 had a diagnosis of heart failure (A or B diagnosis), out of which 1517 (49.1%) completed the questionnaire (*Figure 1*). Among respondents, 364 (24%) patients were part of the workforce upon hospital admission and all of them were alive 12 months after discharge.

Demographic and clinical profiles for respondents and non-respondents are presented in *Table 1*. Characteristics are similar concerning age and clinical profile. Among respondents who were part of the workforce at baseline, 77.2% were men, 60.2% were in the age group 51–63 years, 55% were married, and 24.5% had a higher educational level. Furthermore, 35.4% had no comorbidities and 31.6% had EF ≤20%.

Baseline differences in patient-reported outcomes between patients in the workforce/out of the workforce

Patients in the workforce reported a significantly higher mean physical component summary score (PCS) in SF-12, compared with patients who were out of the workforce, $P < 0.0001$, *Table 1*. Similarly, the mean HeartQoL Global and HeartQoL Physical scores were significantly higher for patients in the workforce, compared with patients who were out of it, $P < 0.0001$. Mean HADS-D were significantly lower for patients in the workforce, compared with patients who were out of it, $P = 0.0001$.

Patient-reported outcomes as predictors of withdrawal from the workforce

After adjustment, patients with a lower HeartQoL Global score were more likely to withdraw from the workforce 3 months after discharge; worst quartile OR 2.58 (95% CI 1.24–5.37), *Figure 2*. A lower HeartQoL Physical score was associated with withdrawal from the workforce 3 months after discharge; worst quartile OR 2.693 (95% CI 1.25–5.81). A lower score on ESAS was associated with a lower probability of withdrawal from the workforce 3 months after discharge; worst quartile OR 0.36 (95% CI 0.19–0.68), and 12 months after discharge; worst quartile OR 0.37 (95% CI 0.18–0.75). Patients with HADS-D ≥ 8 were more likely to withdraw from the workforce

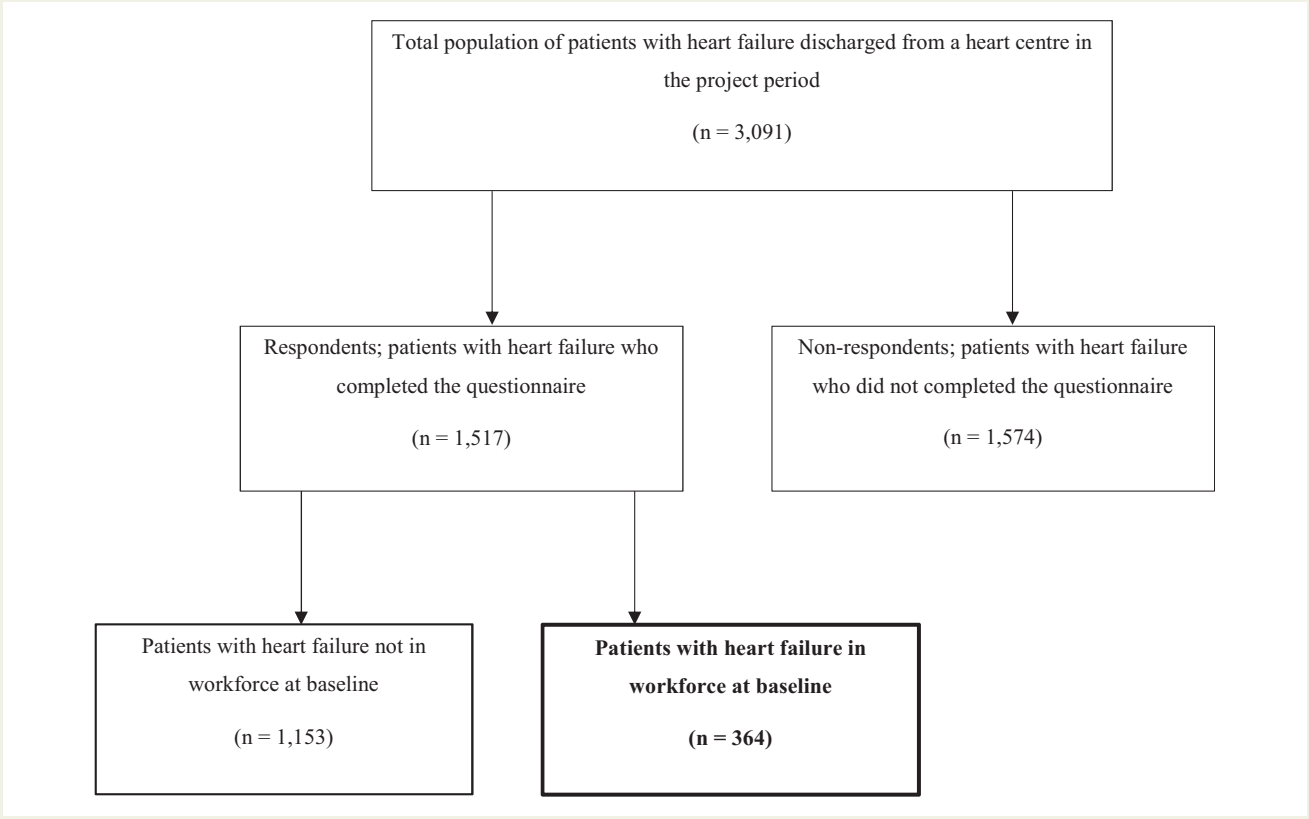

Figure 1 Flowchart.

3 months after discharge OR 2.57 (95% CI 1.47–4.50), as well as 12 months after discharge OR 2.05 (95% CI 1.15–3.66). Estimates for 6 and 9 months are presented in Supplementary material online, *Figure S1*.

Clinical and demographic profiles as predictors of withdrawal from the workforce

Patients with a hospital stay of 0–2 days were significantly less likely to withdraw from the workforce compared with patients with a hospital stay of >7 days 3 months after discharge OR 0.18 (95% CI 0.08–0.37), with the same significant findings at 6, 9, and 12 months after discharge (*Figure 3*). EF ≤ 35% was associated with an increased likelihood of withdrawal from the workforce 6 months after discharge OR 2.48 (95% CI 1.35–4.56), with the same significant finding 9 months after discharge. Estimates for age, income, and educational level were mostly non-significant. Estimates for 6 and 9 months are presented in Supplementary material online, *Figure S2*.

Discussion

This study found that lower QoL, symptoms of depression, higher symptom burden, longer hospital, and low EF were predictors of being out of the workforce during the first year after admission with heart failure.

Interpretation

Lower QoL, higher symptom burden, and symptoms of depression were the strongest predictors of withdrawal from the workforce. In this study, only a weak association was found between lower self-perceived physical health and withdrawal from the workforce, contrary to other studies where stronger associations were found.[12,26] One study also found that self-perceived mental health had a predictive value for return to work, which was not found in the current study.[12] Self-perceived physical health might reflect performance status, and thereby explain physical ability to work, and the link to employment status. The ability to work is more than just a physical capacity as it influences the patients' QoL.[7] Lower QoL has previously been found to predict withdrawal from the workforce.[14,27] Associations between lower QoL and withdrawal from the workforce were confirmed in the current study, which also found an association between symptoms of depression and withdrawal from the workforce, which is in line with existing evidence.[28] Poorer mental health and unemployment have previously been found to be associated.[7] An association between anxiety and withdrawal from the workforce was not found in the current study, however, anxiety has previously been found to be associated with less likelihood of returning to work after admission for coronary heart disease.[27] Patients with symptoms of depression and anxiety are suggested to have unhealthier habits, for example, regarding food, alcohol, smoking, and physical activity, and adherence to treatment.[14] These risk factors are associated with the progression of cardiac diseases[14] and might explain depression as a predictor of withdrawal from the workforce. In the

Table 1 Demographic and clinical profile at baseline for respondents and non-respondents with heart failure, and baseline patient-reported outcomes, respondents

	Respondents ($n = 1517$)			Non-respondents ($n = 1574$)		
Heart failure, A or B diagnosis, *n* (%)	**In workforce 364 (24.0)**	**Out of workforce 1153 (76.0)**		**In workforce 334 (21.2)**	**Out of workforce 1240 (78.8)**	
Age, *n* (%)						
18–50	145 (39.8)	35 (3.0)	$P < 0.001$[a]	141 (42.2)	61 (4.9)	$P < 0.001$[a]
51–63	219 (60.2)	196 (17.0)	$P < 0.001$[a]	193 (57.8)	148 (11.9)	$P < 0.001$[a]
≥64	0 (0.0)	922 (80.0)	$P < 0.001$[a]	0 (0.0)	1031 (83.0)	$P < 0.001$[a]
Sex, *n* (%)						
Men	281 (77.2)	847 (73.5)	$P = 0.155$[a]	260 (77.8)	856 (69.0)	$P = 0.002$[a]
Women	83 (22.8)	306 (26.5)	$P = 0.155$[a]	74 (22.2)	384 (31.0)	$P = 0.002$[a]
Marital status, *n* (%)						
Married	200 (55.0)	696 (60.4)	$P < 0.001$[a]	96 (30.5)	528 (44.7)	$P < 0.001$[a]
Divorced	62 (17.0)	142 (12.3)	$P < 0.001$[a]	43 (12.9)	195 (15.7)	$P < 0.001$[a]
Widowed	5 (1.3)	206 (17.9)	$P < 0.001$[a]	9 (2.7)	269 (21.7)	$P < 0.001$[a]
Single	97 (26.7)	109 (9.5)	$P < 0.001$[a]	94 (28.1)	135 (10.9)	$P < 0.001$[a]
Educational level, *n* (%); missing data for 36 respondents						
Basic school	83 (23.4)	349 (30.3)	$P < 0.001$[a]	96 (30.5)	338 (27.3)	$P < 0.001$[a]
Upper secondary or vocational school	185 (52.1)	488 (43.3)	$P < 0.001$[a]	151 (47.9)	473 (40.0)	$P < 0.001$[a]
Higher education	87 (24.5)	202 (17.9)	$P < 0.001$[a]	68 (21.6)	181 (15.3)	$P < 0.001$[a]
Income, *n* (%)						
Quartile 1	31 (8.5)	349 (30.3)	$P < 0.001$[a]	67 (20.1)	338 (27.3)	$P < 0.001$[a]
Quartile 2	37 (10.2)	342 (29.7)	$P < 0.001$[a]	22 (6.6)	367 (29.6)	$P < 0.001$[a]
Quartile 3	107 (29.4)	272 (23.6)	$P < 0.001$[a]	53 (15.8)	337 (27.2)	$P < 0.001$[a]
Quartile 4	189 (51.3)	190 (16.5)	$P < 0.001$[a]	192 (57.5)	198 (16.0)	$P < 0.001$[a]
Hospital stay, days, *n* (%)						
0–2	237 (65.1)	759 (65.8)	$P = 0.964$[a]	222 (66.5)	764 (61.6)	$P = 0.243$[a]
3–7	89 (24.5)	278 (24.1)	$P = 0.964$[a]	69 (20.7)	304 (24.3)	$P = 0.243$[a]
>7	38 (10.4)	116 (10.1)	$P = 0.964$[a]	43 (12.9)	172 (13.9)	$P = 0.243$[a]
A	244 (67.0)	728 (63.1)	$P = 0.177$[a]	212 (63.5)	730 (58.9)	$P = 0.128$[a]
B	120 (32.8)	425 (36.9)	$P = 0.177$[a]	122 (36.5)	510 (41.1)	$P = 0.128$[a]
Co-morbidity, *n* (%)						
Ischaemic heart disease	103 (28.3)	610 (52.9)	$P < 0.001$[a]	84 (25.2)	624 (50.3)	$P < 0.001$[a]
Hypertension	69 (19.0)	463 (40.2)	$P < 0.001$[a]	69 (20.7)	543 (43.8)	$P < 0.001$[a]
Chronic obstructive pulmonary disease	32 (8.8)	187 (16.2)	$P < 0.001$[a]	27 (8.1)	227 (18.3)	$P = 0.001$[a]
Diabetes with complications	10 (2.8)	64 (5.6)	$P = 0.030$[a]	13 (3.9)	99 (8.0)	$P = 0.001$[a]
Diabetes without complications	32 (8.8)	235 (20.4)	$P < 0.001$[a]	40 (12.0)	242 (19.5)	$P = 0.001$[a]
Cancer	15 (4.1)	150 (13.0)	$P < 0.001$[a]	15 (4.5)	175 (14.1)	$P < 0.001$[a]
Renal disease	10 (2.8)	101 (8.8)	$P < 0.001$[a]	11 (3.3)	110 (8.9)	$P = 0.001$[a]
Arrhythmia	140 (38.5)	618 (53.6)	$P < 0.001$[a]	107 (32.0)	583 (47.0)	$P < 0.001$[a]
Tu comorbidity score, *n* (%)						
0	129 (35.4)	166 (14.4)	$P < 0.001$[a]	120 (35.9)	215 (17.3)	$P < 0.001$[a]
1	99 (27.2)	287 (24.9)	$P < 0.001$[a]	104 (31.1)	294 (23.7)	$P < 0.001$[a]
2	95 (26.1)	377 (32.7)	$P < 0.001$[a]	75 (22.5)	374 (30.2)	$P < 0.001$[a]
≥3	41 (11.3)	323 (28.0)	$P < 0.001$[a]	35 (10.5)	357 (28.8)	$P < 0.001$[a]
Procedure, *n* (%)						
		26 (2.3)	$P > 0.1$[a]	16 (4.8)	41 (3.3)	$P > 0.1$[a]
Open heart surgery	5 (1.4)	1127	$P > 0.1$[a]	318 (95.2)	1199	$P > 0.1$[a]
No open-heart surgery	35 (98.6)	(97.8)			(96.7)	
Ejection fraction, *n* (%); missing data for all non-respondents						
≤20%	115 (31.59)	331 (28.7)	$P = 0.007$[a]			
21–35	142 (39.01)	534 (46.31)	$P = 0.007$[a]			
36–49	45 (12.36)	159 (13.79)	$P = 0.007$[a]			
≥50	62 (17.03)	129 (11.19)	$P = 0.007$[a]			

Continued

Table I *Continued*

Heart failure, A or B diagnosis, *n* (%)	Respondents (*n* = 1517) In workforce 364 (24.0)	Respondents (*n* = 1517) Out of workforce 1153 (76.0)		Non-respondents (*n* = 1574) In workforce 334 (21.2)	Non-respondents (*n* = 1574) Out of workforce 1240 (78.8)
Smoking, *n* (%); missing data for all non-respondents					
Ever smoker	238 (66.1)	802 (71.8)	*P* = 0.040[a]		
Current smoker	62 (17.2)	113 (10.1)	*P* = 0.040[a]		
>15	39 (10.9)	35 (3.2)	*P* = 0.040[a]		
Alcohol, *n* (%); missing data for all non-respondents					
Alcohol intake above high risk limit[c]	30 (8.8)	78 (7.6)	*P* = 0.508[a]		
Body Mass Index, *n* (%); missing data for all non-respondents					
<18.5	12 (3.3)	136 (11.8)	*P* < 0.001[a]		
18.5–25	108 (29.7)	347 (30.1)	*P* < 0.001[a]		
25–30	121 (33.2)	408 (35.4)	*P* < 0.001[a]		
>30	123 (33.8)	262 (22.7)	*P* < 00001[a]		
SF-12 (mean ± SD)					
Mental component	46.87 ± 11.10	46.73 ±11.79	*P* > 0.10[b]		
Physical component	42.12 ± 10.94	35.92 ± 9.97	*P* < 0.001[b]		
HeartQoL (mean ± SD)					
Global	1.66 ± 0.82	1.42 ± 0.75	*P* < 0.001[b]		
Physical	1.54 ± 0.91	1.20 ± 0.81	*P* < 0.001[b]		
Emotional	1.95 ± 0.90	2.00 ± 0.88	*P* = 0.352[b]		
ESAS (mean ± SD)					
ESAS	22.85 ± 16.41	24.71 ± 17.99	*P* = 0.173[b]		
HADS-A					
HADS-A (mean ± SD)	6.21 ± 4.24	5.79 ± 4.43	*P* = 0.056[b]		
HADS-A ≥ 8 (*n*, %)	129 (36.3)	366 (33.8)	*P* = 0.289[a]		
HADS-D					
HADS-D (mean ± SD)	4.50 ± 3.80	5.32 ± 3.90	*P* < 0.001[b]		
HADS-D ≥ 8, *n* (%)	72 (20.5)	293 (26.4)	*P* = 0.028[a]		

Missing data from 3% to 6% on all PRO instruments, except SF-12 with 21% missing data.
[a]χ^2 tests.
[b]Wilcoxon two sample test.
[c]The Danish National Board of Health defines the high-risk limit for alcohol consumption as a weekly intake of more than 21 standard drinks for men and more than 14 standard drinks for women.

current study, a higher symptom burden was associated with withdrawal from the workforce. To our knowledge, no studies have investigated associations between self-reported symptom burden and labour market affiliation in cardiac patients. However, studies have found a higher self-reported symptom burden to be associated with readmissions and mortality among patients with heart failure.[14,29] Among patients with cardiac diseases, current evidence suggests that lower EF, hospital stay >7 days, lower educational level, lower income, higher age, and female sex are associated with detachment from the workforce.[6,10,12] In the current study, associations between income, age, and sex were not convincingly confirmed, however, hospital stay >7 days and lower EF were associated with withdrawal from the workforce. Longer hospital stays and lower EF indicate a more complicated disease trajectory.

Strengths and limitations

The study does not allow conclusions to be drawn about the causal mechanism due to the design. The response rate in this study was 49.1%, and there is a risk that only a selected group of patients answered the survey. Therefore, the respondents may not be completely representative of the target population. On the other hand, respondents and non-respondents were quite similar in demographic and clinical characteristics. A strength of this study is the use of national registers which allowed for baseline data and complete follow-up on workforce data for respondents and non-respondents.

The sample in this study consisted of 364 respondents with heart failure who were part of the workforce at data collection. Some were excluded due to the age limitation of ≤63 years, which might be a limitation, as labour market affiliation is increasing among persons in the 65–69 years age group.[30] Also, some patients close to the age of retirement might, as a result of the disease and if feasible, have left the workforce and retired early. The small sample size resulted in limited statistical power in this study, and this might have affected or weakened the estimates. Associations between clinical and demographic profiles and withdrawal from the workforce were not significant for most of the variables, which might be due to a small sample, and the results must be interpreted with caution.

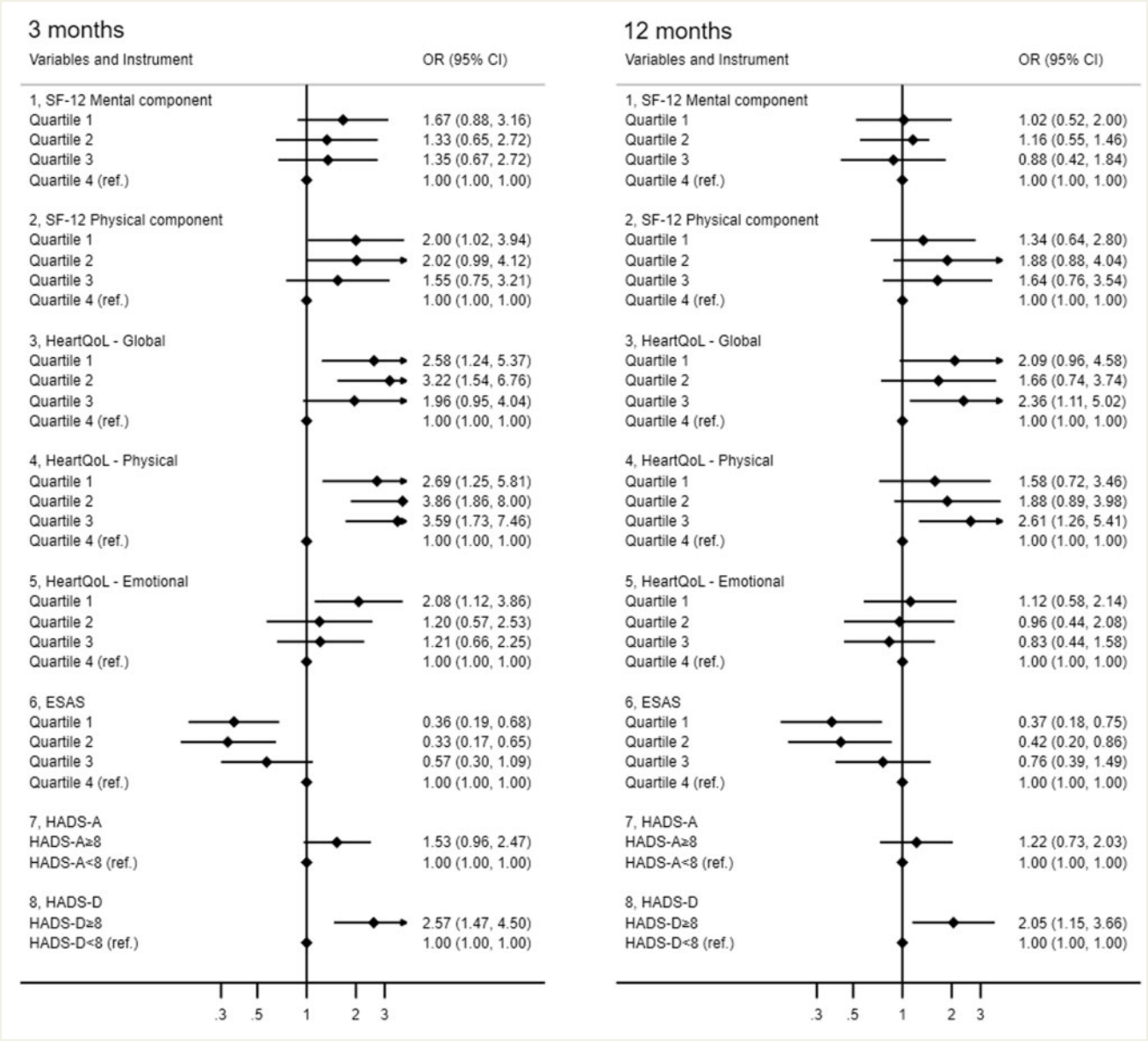

Figure 2 Patient-reported outcomes as predictors of withdrawal from the workforce. Missing data from 2% to 4% on all instruments, except SF-12 with 12% missing data.

In this study, work status was established by the status of public transfer payments for the specific week representing 3, 6, 9, and 12 months. There is a risk of misclassification, as the work status might have been different in the previous or the subsequent weeks. However, work status was established at four time points during follow-up, thus decreasing the risk of misclassification. Minor risk of misclassification could as well occur in patients who are not working but live as rentiers or are provided with income by their spouses.

The instruments included in this survey were validated, enhancing the validity of the results. However, one instrument (ESAS) was not validated for cardiac patients, and as a result, it is not established whether it measures what it is intended to measure in this study. Some instruments included in the survey have to recall up to 4 weeks. Patients with heart failure might differ in health status during the period of 4 weeks prior to discharge, due to hospital treatment. Therefore, some patients might have had difficulties answering these items.

Adjustment variables were selected based on previous research.[6,10] For the majority of the results, controlling for confounding variables did not change the associations. This indicates that the association is not only explained by known risk factors of detachment from the workforce. It was not possible to control for New York Heart Association Classification and adherence to intake of anti-congestive treatment, which might also have been potential confounders.

Generalizability

The survey was conducted at the five heart centres that treat the most critically ill patients in Denmark, and therefore chronic and terminally ill patients might be somewhat underrepresented in this

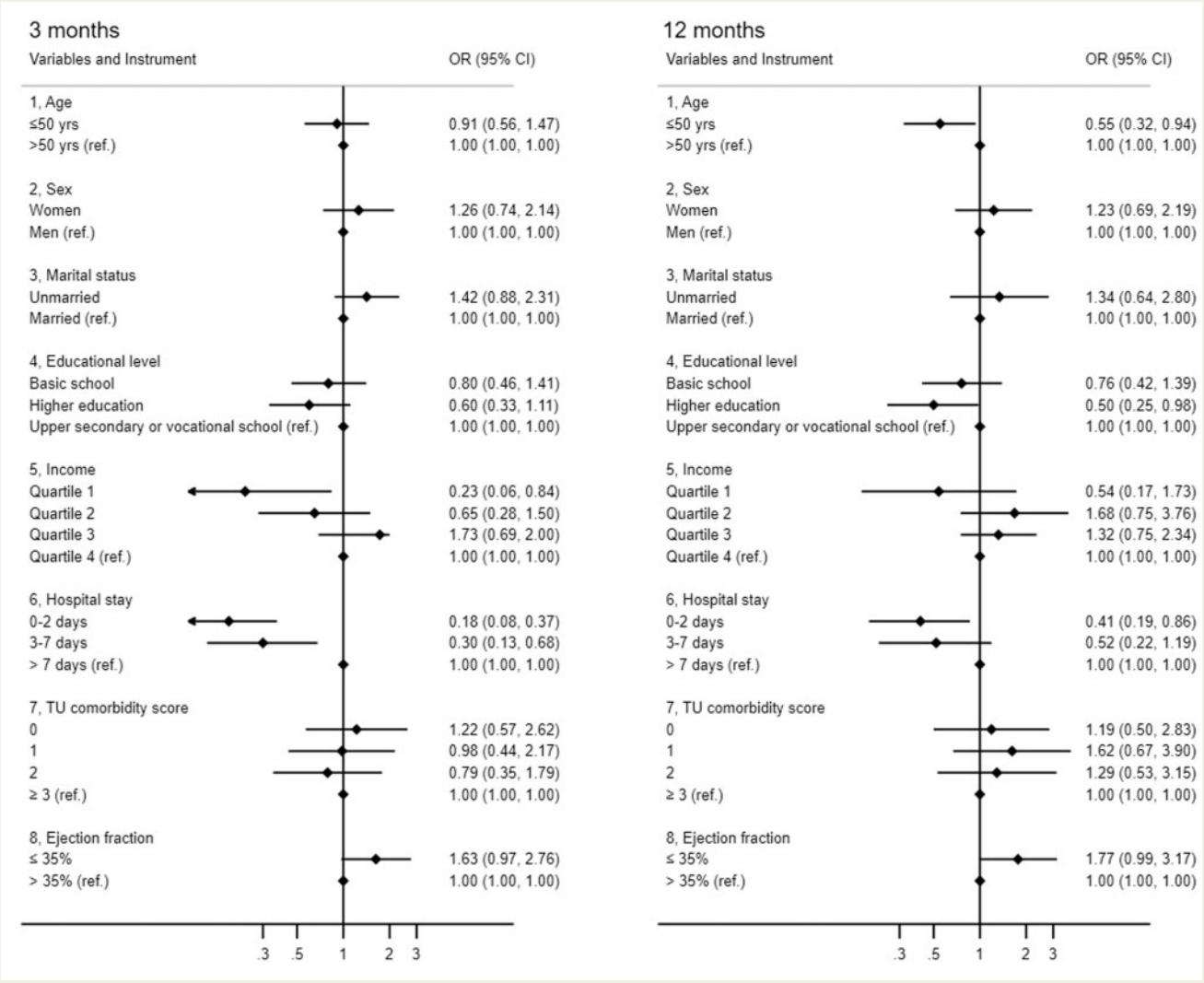

Figure 3 Clinical and demographic profiles as predictors of withdrawal from the workforce.

study, reducing its generalizability. Both previously and newly diagnosed patients with heart failure were included in the current study. As a result, it is unknown whether previously or newly diagnosed patients most frequently withdraw from the workforce after admission with heart failure.

Implications

PROs including QoL, symptom burden, and symptoms of depression add information that can be used to identify patients at risk of withdrawal from the workforce, and the same applies to the length of hospital stay and EF. These findings should be integrated into the treatment of patients with heart failure, for example, in rehabilitation and heart failure clinics, as withdrawal from the workforce is associated with decreased QoL and life satisfaction as well as increased risk of depression.[5,7–9] Unemployment is generally harmful, leading to higher mortality and poorer physical and mental health.[7] It is widely accepted that, when possible, job retention is desirable for chronically ill people, as work can improve QoL and well-being, lead to better health outcomes, and promote independence and participation in society.[7] Early retirement may have adverse financial and social effects,[7] not only for the patient but also for the entire family.[8] However, for a minority, unemployment can also lead to improved health and well-being,[7] which might be the case for some patients with heart failure. A study found that retirees who participated in bridge jobs had stable or increased life satisfaction after withdrawal from the workforce.[8] Interventions might prevent, delay or support the transition from the workforce. Health care professionals should guide and prepare patients at risk of leaving the workforce to support the individuals' decisions and needs, in order to retain personal control regarding a possible retirement, thereby support self-efficacy.[8]

Findings from the current study suggest that future studies should combine PROs and clinical and demographic variables to explore the predictive value of combining these variables in order to identify patients at risk of withdrawal from the workforce.

Conclusion

Among patients admitted with heart failure, lower QoL, a higher symptom burden, symptoms of depression, hospital stay >7 days and EF ≤35% predicted withdrawal from the workforce during the first year after hospital discharge.

Supplementary material

Supplementary material is available at *European Journal of Cardiovascular Nursing* online.

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Conflict of interest: none declared.

Data availability

The data underlying this article cannot be shared publicly due to privacy of individuals that participated.

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