Does pain predict physical function, cognitive function, activities of daily living, or health-related quality of life among adults with heart failure?

Asa B. Smith, Miyeon Jung, Susan J. Pressler

Asa B. Smith, PhD, RN
Assistant Professor, IU School of Nursing
asasmit@iu.edu

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Introduction and Aims

- An estimated 54% of patients with heart failure (HF) and chronic pain report high symptom-associated distress.
- It is unclear whether pain predicts reduced physical function, cognitive function, independent activities of daily living (IADL), or health-related quality of life (HRQL) in HF over time.
- Identifying these consequences of pain in HF over time could improve understanding of impact.

Aim: Evaluate baseline pain presence as a predictor of changes in physical function, cognitive function, IADL, and HRQL from baseline to 8 months.

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Methods

Design and Sample

- Longitudinal descriptive design.
- Data from the MEMOIR-HF study (N=237).
- Data at baseline, 10 weeks, 4 months, and 8 months.

Measures

- Independent variable: pain (yes/no) - HUI-3.
- Dependent variables:
  - Physical function - TUG
  - Cognitive function - MoCA
  - IADL - EPT
  - HRQL - LHFQ

Analyses

- Pairwise t-tests of variables by pain presence over time.
- Linear mixed models while controlling for gender.

EPT: Everyday Problems Test; HRQL: health-related quality of life; HUI-3: Health Utilities Index; IADL: Independent Activities of Daily Living; LHFQ: Minnesota Living with Heart Failure Questionnaire; MoCA: Montreal Cognitive Assessment; TUG: Timed Up and Go. MEMOIR-HF: Cognitive Intervention to Improve Memory in Heart Failure Patients (NR016116)

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Demographics

In independent t-tests at baseline, patients with pain…

- Were more frequently NYHA Class III
- Had a higher body mass index
- Experienced significantly longer (i.e., worse) physical function scores
- Experienced significantly higher (i.e., worse) HRQL scores

Bolded: $p < .05$

BNP: B-type natriuretic peptide; BMI: body mass index; EPT: Everyday Problems Test; ESS: Epworth Sleepiness Scale; IADL: Independent Activities of Daily Living; PHQ-8: Patient Health Questionnaire; LHFQ: Minnesota Living with Heart Failure Questionnaire; LVEF: Left ventricular ejection fraction; MoCA: Montreal Cognitive Assessment; NYHA: New York Heart Association; HRQL: quality of life

Table 1 – Demographics at baseline (N=237)

Variable	Total (N=237)	No pain (n=77)	Pain (n=160)	p
Age, in years	66.40 ± 12.02	67.94 ± 12.66	65.66 ± 11.67	.186
Gender				.120
Women	128 (54.0)	36 (46.8)	92 (57.5)	
Men	109 (46.0)	41 (53.2)	68 (42.5)	
Race				.180
White	203 (85.7)	64 (83.1)	139 (86.9)	
Black	32 (13.5)	11 (14.3)	21 (13.1)	
Other	2 (0.8)	2 (2.6)	0	
LVEF	48.90 ± 14.57	47.64 ± 14.71	49.51 ± 14.51	.360
NYHA Class				**.002**
I	23 (9.7)	15 (19.5)	8 (5.0)	
II	89 (37.6)	28 (36.4)	61 (38.1)	
III	125 (52.7)	34 (44.2)	91 (56.9)	
Elevated BNP (>400 ng/mL)	116 (48.9)	39 (50.6)	77 (48.1)	.716
Body mass index	**34.23 ± 8.81**	**32.39 ± 7.84**	**35.12 ± 9.13**	**.019**
Comorbid conditions				
Atrial fibrillation	101 (42.6)	31 (40.3)	70 (43.7)	.611
Coronary artery disease	103 (43.5)	67 (87.0)	36 (22.5)	.478
Coronary artery bypass graft	48 (20.3)	18 (23.4)	30 (18.8)	.407
Diabetes	105 (44.3)	32 (41.6)	73 (43.6)	.555
Hypertension	193 (81.4)	60 (77.9)	133 (83.1)	.335
Myocardial infarction	47 (19.8)	15 (19.5)	32 (20.0)	.925
Stroke	22 (9.3)	7 (9.1)	15 (9.4)	.944
Sudden cardiac arrest	6 (2.5)	1 (1.3)	5 (3.1)	.667
Transient ischemic attack	8 (3.4)	3 (3.9)	5 (3.1)	.717
Ventricular arrythmia	39 (16.5)	13 (16.9)	26 (16.3)	.902
Depression, PHQ-8	**5.92 ± 5.12**	**4.26 ± 4.71**	**6.71 ± 5.14**	**<.001**
Sleep disturbances, ESS	8.65 ± 4.58	8.71 ± 4.66	8.61 ± 4.55	.874
Serum BDNF, in ng/ml	18.40 ± 7.63	19.32 ± 7.50	17.95 ± 7.68	.196
Cognitive function, MoCA	25.22 ± 2.56	25.01 ± 2.70	24.32 ± 2.49	.406
Physical function, TUG (n=226)	**12.89 ± 7.01**	**11.35 ± 5.08**	**13.63 ± 7.67**	**.008**
IADL, EPT	26.47 ± 4.81	26.38 ± 5.51	26.51 ± 4.45	.860
HRQL, LHFQ	**31.84 ± 22.86**	**22.81 ± 19.87**	**36.19 ± 22.99**	**<.001**

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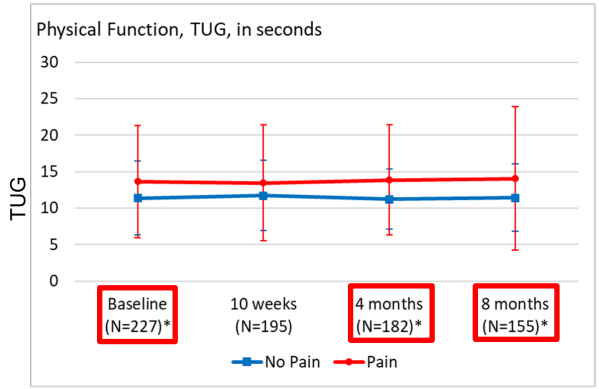
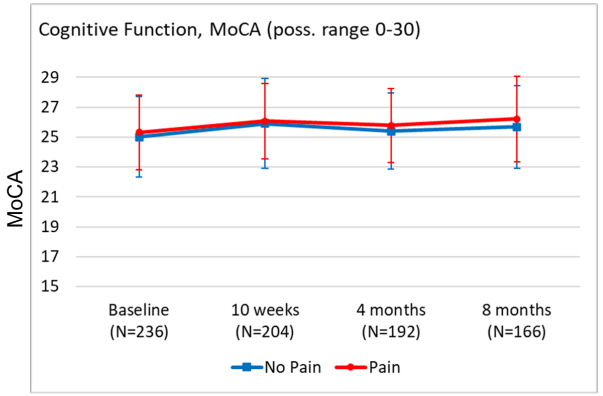
Results

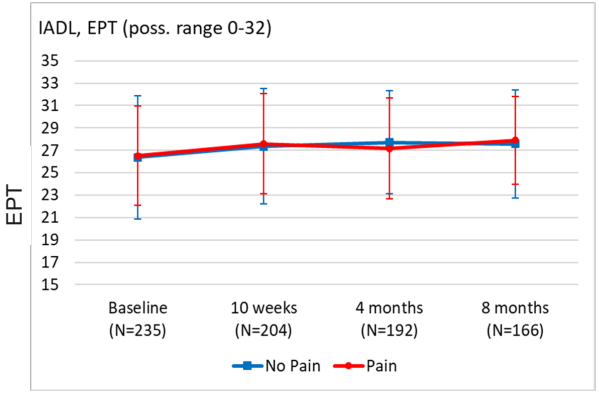
Average scores in total sample over time

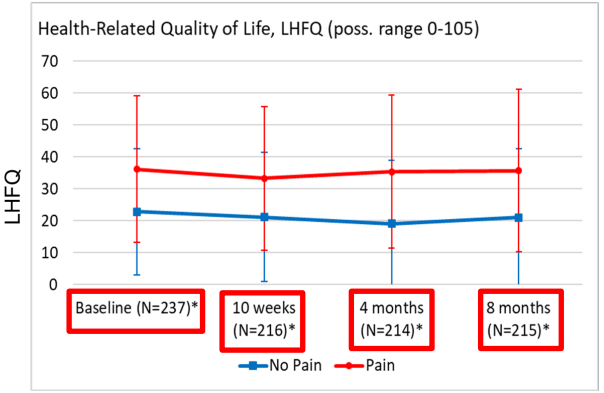
- Physical function: 12.9 - 13.2 (seconds, ↑ = worse)
- Cognitive function: 25.2 - 26.03 (poss. range 0 - 30, ↑ = better)
- IADL: 26.5 - 27.8 (poss. range 0 - 32, ↑ = better)
- HRQL: 29.18 - 31.84 (poss. Range 0 - 105, ↑ = worse)

FIGURE 1: LINE GRAPHS OF OUTCOMES BY PAIN PRESENCE (N=237)









* = p <0.05 from pairwise t-test

EPT: Everyday Problems Test; IADL: independent activities of daily living; LHFQ: Minnesota Living with Heart Failure Questionnaire; MoCA: Montreal Cognitive Assessment; TUG: Timed Up and Go

Results

In pairwise independent t-tests, patients with pain experienced…

- Significantly longer (i.e., worse) physical function scores at all timepoints except 10 weeks.
- Significantly higher (i.e., worse) HRQL scores at all timepoints.

In linear mixed models, pain at baseline did not predict…

- Physical function (F = 1.239, p = .298).
- Cognitive function (F = 0.148, p = .931).
- IADL (F = 0.522, p = .668).
- HRQL (F = 0.364, p = .779).

Conclusions

- Patients with HF and pain experienced significantly worse physical function and HRQL scores at multiple timepoints.
- Pain did not significantly predict cognitive function, physical function, IADL, or HRQL over time.
- Limitations were lack of data regarding pain severity or interference.
- Future prospective studies are needed to determine other outcomes associated with pain using robust pain measurements.