Center of Rehabilitation Research

Patient-reported outcomes as determinants of return to work and health-related quality of life 6 months after cardiac rehabilitation

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Objectives

Multi-component cardiac rehabilitation (CR) is to be conducted to achieve improved prognosis, superior health-related quality of life (HRQL) and social integration. We aimed to identify predictors of return to work (RTW) and HRQL among cardiovascular risk factors and physical performance as well as patient-reported outcome measures (PROMs) modifiable during CR.

Design

In the prospective observational multi-center study, we enrolled 1586 patients between 05/2017 and 05/2018 in 12 German rehabilitation centers (Fig. 1). Besides general data (e. g. age, gender, diagnoses), parameters of risk factor management (e. g. smoking, lipid profile, hypertension, lifestyle change motivation), physical performance (e. g. maximum exercise capacity, endurance training load, 6-min walking distance), and anxiety, HRQL, subjective well-being, somatic and mental health, pain, general self-efficacy, pension desire as well as self-assessment of occupational prognosis using several questionnaires) were documented at CR admission and discharge. 6 months after discharge, status of RTW and HRQL (SF-12) were captured by a follow-up (FU) survey and analyzed in multivariable regression models with multiple imputation of missing values.

Figure 1 Flowchart of patient recruitment and study process

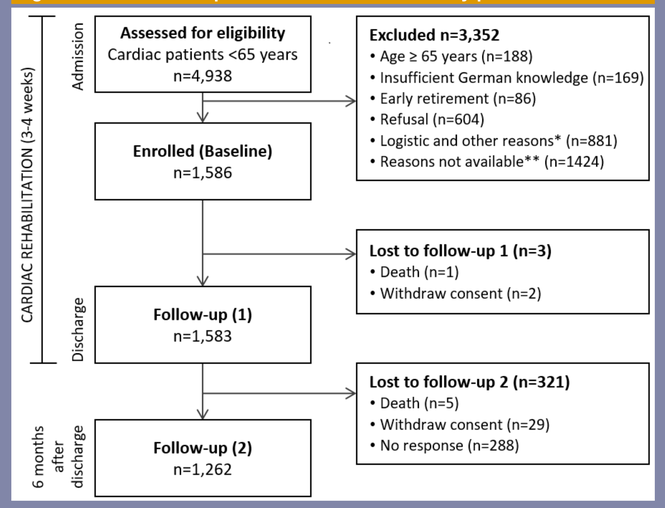


Table 1 Functional parameters, risk factors and patient-reported outcome measures at baseline and discharge from cardiac rehabilitation (*N* = 1,262; mean ± standard deviation; *n* and percentage)

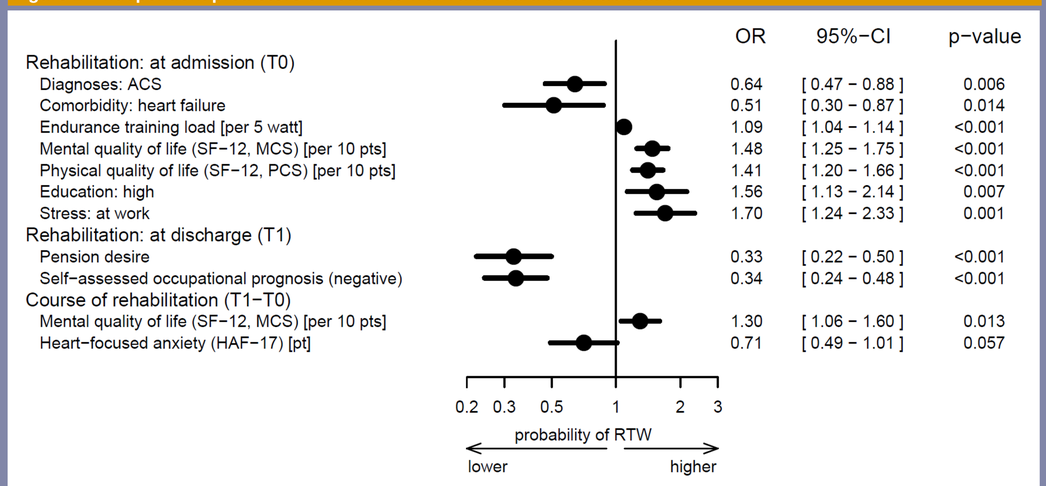
Parameters	Available data n (%)	Admission m ± SD; n (%)	Discharge m ± SD; n (%)	*P*-value	Standardized effect size*
Cardiovascular risk factors					
Smoking behavior (smoker)	1,234 (97.8)	427 (34.6)	187 (15.2)	<0.001	--
Systolic blood pressure (mmHg)	1,258 (99.7)	128.8 ± 18.5	121.6 ± 13.8	<0.001	0.36
Diastolic blood pressure /mmHg)	1,258 (99.7)	80.3 ± 11.4	75.2 ± 9.1	<0.001	0.42
LDL-Cholesterol (mmol/l)	981 (77.7)	4.6 ± 2.5	3.8 ±2.2	<0.001	0.32
Physical Performance					
Maximum exercise capacity (Watt)	790 (62.6)	111.4 ± 37.6	130.9 ± 41.5	<0.001	0.52
Endurance training load (Watt)	1,204 (95.4)	48.6 ±20.6	69.7 ± 26.3	<0.001	1.03
6-min walking distance (m)	812 (64.3)	451.8 ± 90.6	526.6 ± 90.8	<0.001	0.82
Patient-reported outcome measures					
Depression (PHQ-9)	1,149 (91.0)	6.4 ± 4.8	4.4 ± 4.0	<0.001	0.43
Heart-focussed anxiety (HAF-17)	1,102 (87.3)	1.5 ± 0.6	1.3 ± 0.6	<0.001	0.32
HAF-17 heart-focussed fear	1,146 (90.8)	1.6 ± 0.7	1.4 ± 0.7	<0.001	0.27
HAF-17 heart-focussed avoidance	1,163 (92.2)	1.5 ± 1.0	1.0 ± 0.8	<0.001	0.44
HAF-17 heart-focussed attention	1,158 (91.8)	1.3 ± 0.7	1.3 ± 0.6	0.308	0.02
Quality of life/Subjective well-being					
WHO-5	1,180 (93.5)	51.2 ± 25.6	69.5 ± 21.1	<0.001	0.71
SF-12: Physical component summary	1,072 (84.9)	38.9 ± 10.6	44.6 ± 9.5	<0.001	0.53
SF-12: Mental component summary	1,072 (84.9)	48.2 ± 11.9	54.3 ± 8.9	<0.001	0.51
IRES-24: Physical Health	1,173 (92.9)	5.8 ± 2.7	7.0 ± 2.4	<0.001	0.43
IRES-24: Mental Health	1,190 (94.3)	6.4 ± 2.5	7.8 ± 2.1	<0.001	0.58
IRES-24: Pain	1,190 (94.3)	6.3 ± 2.6	7.3 ± 2.4	<0.001	0.40
General self-efficacy expectations (ASKU)	1,185 (93.9)	4.1 ± 0.7	4.1 ± 0.7	<0.001	0.10
Lifestyle change motivation (certain/fairly certain)	1,187 (94.1)	939 (79.1)	1037 (87.4)	<0.001	--
Self-assessed health prognosis (excellent/very good)	1,187 (94.1)	509 (42.9)	605 (51.0)	<0.001	--
Pension desire (yes)	1,170 (92.7)	205 (17.5)	182 (15.6)	0.028	--
Self-assessed occupational prognosis (negative)	1,137 (90.1)	463 (40.7)	507 (44.6)	<0.001	--

* according Cohen's d; ASKU, Allgemeine Selbstwirksamkeit Kurzskala (short scale for measuring general self-efficacy beliefs); HAF-17, Herzangstfragebogen (German version of the Cardiac Anxiety Questionnaire); IRES-24, indicators of rehabilitation status; LDL, low density lipoprotein; PHQ-9, Patient Health Questionnaire; SD, standard deviation; SF-12, Short-Form health survey; WHO-5, World Health Organization well-being index

Results

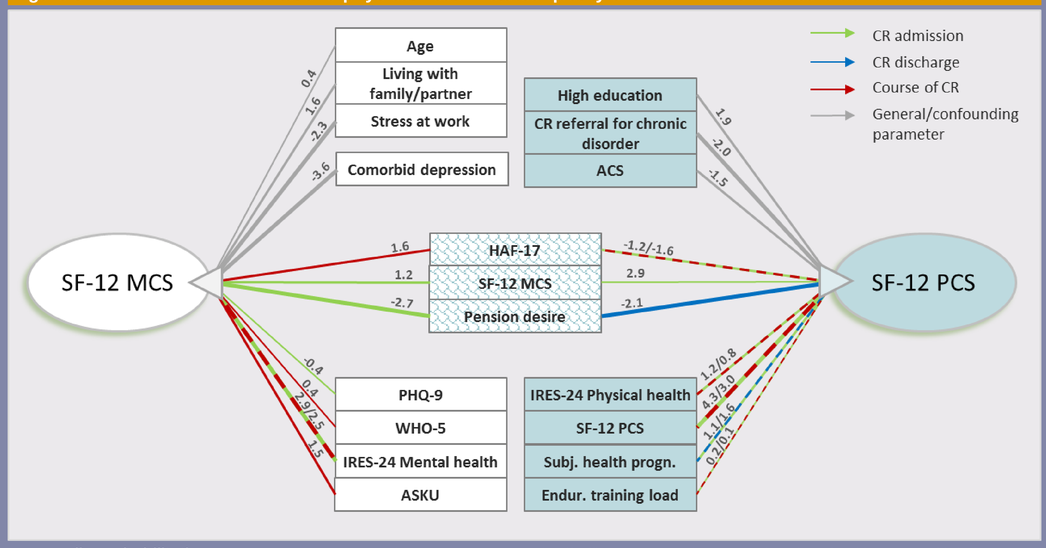
1262 patients (54 ± 7 years, 77% men) responded to the FU survey. Most of them were assigned to CR primarily due to myocardial infarction (40%) or coronary artery disease without myocardial infarction (18%), heart valve diseases (12%) and bypass surgery (8%). During CR, a multitude of functional and clinical parameters and PROMs were improved (Tab. 1). After CR, 864 patients (69%) returned to work, predicted predominantly by patients' pension desire, negative self-assessed occupational prognosis and HRQL (Fig. 2). HRQL after 6 months was also determined more by PROMs (e. g. pension desire, anxiety, physical/mental HRQL in SF-12, physical/mental health in IRES-24, stress, well-being and self-efficacy), while clinical parameters or physical performance were of subordinate importance (Fig. 3).

Figure 2 Independent predictors of return to work after cardiac rehabilitation



Final model after backwards selection; T0, baseline measurement at CR atmission; T1, CR discharge; T2, follow-up 6 months after CR discharge; CI, confidence interval; HAF-17, Herzangstfragebogen (German version of the Cardiac Anxiety Questionnaire); OR, odds ratio; pt(s), point(s); RTW, return to work; SF-12, Short-Form health survey with physical/mental component summary (PCS/MCS)

Figure 3 Determinants of mental and physical health-related quality of life 6 months after cardiac rehabilitation



CR, cardiac rehabilitation; ACS, Acute coronary syndrome; ASKU, General self-efficacy expectations; SF, Short form health survey with its mental/physical component summary (MCS/PCS); HAF-17, Cardiac Anxiety Questionnaire; PHQ-9, Patient Health Questionnaire; WHO-5, World Health Organization well-being questionnaire; IRES, indicators of rehabilitation status;

Conclusion

Patient-reported outcome measures predominantly influenced RTW and HRQL in heart-disease patients, whereas patients' pension desire and heart-focussed anxiety had a dominant impact on all investigated endpoints. Therefore, the multi-component CR approach focussing on psychosocial support is crucial for subjective health prognosis and occupational resumption.

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