

Center of Rehabilitation Research

• Porsdam Holistic effects in multi-modal comprehensive short-term cardiac rehabilitation – preliminary results from the OutCaRe-registry

A. Salzwedel¹, B. Zoch-Lesniak¹, A. Schlitt², J. Glatz³, C. Bongarth⁴, S. Spörl-Dönch⁵, K. Schröder⁶, J. Nothroff⁷, R. Westphal⁸, R. Schubmann⁹, M. Wrenger¹⁰, E. Langheim³, R. Marx¹¹, M. Schikora¹², H. Völler¹³

Purpose

Comprehensive cardiac rehabilitation (CR) affects simultaneously physical capacity, cardiovascular risk factors as well as psychosocial aspects of cardiovascular disease. However, the immediate success of this approach is not sufficiently investigated due to the lack of suitable clinical measures.

Flowchart of patient recruitment and study process Figure 1



self-assessment of occupational prognosis, work ability) and subjective health (depression: PHQ9, anxiety, health-related quality of life: SF12, WHO5 well-being index, indicators of rehabilitation state: IRES24) were documented at admission to and discharge from CR (Fig 2). Six months after CR, the return to work (RTW) rate as primary outcome measure was determined by a postal survey. The assessment of feasibility and modifiability of parameters was based on the proportion of available data as well as statistical significance and standardized effect sizes (SES) for the prepost comparison between admission to and discharge from CR. For the revelation of the underlying structure of tested parameters, an exploratory factor analysis (EFA) was performed. The assoziation of outcome parameters and RTW was analyzed using a logistic regression model.

We aimed to evaluate the feasibility and modifiability of a multitude of outcome parameters during CR.

Methods

In the prospective multicentric registry, 1,586 patients < 65 years (54 \pm 7 years, 77% men) were enrolled between 05/2017 and 05/2018 (Fig 1). General data (e.g. age, gender, diagnoses) and parameters of risk factor

management (e.g. smoking, lifestyle change motivation, hypertension, LDL cholesterol), physical performance (e.g. maximum exercise capacity, endurance training load, 6-min walking distance), occupational medicine (pension desire,



Results

Most patients (n = 1,319, 83%) were enrolled in CR after an acute cardiac event (e.g. acute coronary syndrome (22%) or CABG (7%)) within 17 days after discharge from hospital, while 267 patients (17%) were referred to CR due to chronic disorders (e. g. heart failure, rhythm disturbances or Diabetes mellitus). With a mean duration of 23 \pm 5 days, CR was mostly performed in an inpatient setting (91%).

BMI, body mass index; IRES, indicators of rehabilitation status; SF, Short form quality of life quetionnaire; WHO, World Health Organization well-being questionnaire

Table 1 Changes in outcome parameters of cardiac rehabilitation								
Parameters	Available data n (%)	Admission m ± SD n (%)	Discharge m ± SD n (%)	SES				
Cardiovascular risk factors								
Smoking behavior (smoker)	1,501 (94,6)	568 (37.9)	273 (18.2)					
Lifestyle change motivation	1,446 (91.2)	1,139 (78.7)	1,251 (86.5)					
Systolic blood pressure	1,574 (99.2)	128.8 ± 19.0	121.9 ± 14.0	0.36				
Diastolic blood pressure	1,574 (99.2)	80.3 ± 11.6	75.4 ± 9.2	0.42				
Physical Performance								
Endurance training load	1,479 (93.3)	48.1 ± 20.5	69.1 ± 26.2	1.03				
Social medicine								
Self-assessment of occupational prognosis	1,387 (87.5)	560 (40.4)	606 (43.7)					
Subjective Health								
Depression (PHQ-9)	1,403 (88.4)	6.5 ± 4.9	4.5 ± 4.1	0.42				
WHO 5	1,438 (90.5)	50.7 ± 25.3	68.6 ± 21.3	0.71				
IRES-24: Physical Health	1,434 (90.4)	5.8 ± 2.7	7.0 ± 2.4	0.43				
IRES-24: Subjective Health	1,452 (91.5)	6.4 ± 2.5	7.8 ± 2.1	0.57				
IRES-24: Pain	1,454 (91.6)	6.2 ± 2.6	7.3 ± 2.4	0.39				
Subjective health expectation (excellent/very good)	1,446 (91.1)	618 (42.8)	730 (50.5)					

Smoking behavior, blood pressure, exercise load, motivation for lifestyle modification, self-assessment of occupational as well as health prognosis, PHQ9, IRES24 and WHO5 showed *P*-values <0.01 and SES >0.35 for the change during CR (Tab 1.). Approved by EFA, the tested psychological questionnaires PHQ9, IRES24 and WHO5 revealed overlapping information.

Social medicine

Neg. subj. occupational prognosis

Six months after CR, 1,262 patients (80%) responded to the follow up survey. Out of these, 864 (69%) returned to work, 67 (5%) were retired and 190 patients (15%) stayed at sick leave. Regarding CR outcome parameters, endurance training load and subjective occupational prognosis predicted RTW (Tab 2).

Table 2	Predictors of return to work six months after cardiac rehabilitation				
Parameter	°S	Odds Ratio	95%-CI	<i>P</i> -value	
Physical Po	erformance				
Enduranc	e training load (Watt)	1.01	1.00 - 1.02	0.006	

Comorbidities			
Chronic obstructive pulmonary disease	2.24	1.07 - 4.70	0.034
Heart valve disease	2.15	1.28 - 3.61	0.004
Coronary artery bypass graft	2.25	1.23 - 4.11	0.008

0.33

0.26 - 0.42 < 0.001

The logistic regression for the probability of return to work included the following covariates: sex, age, endurance training load, smoking behavior, diagnoses, comorbidities, subjective health prognosis, subjective occupational prognosis, ability to work at discharge, lifestyle change motivation, PHQ-9, WHO-5, IRES-24, diastolic blood pressure and CR after an acute coronary event.

The changes between admission to and discharge from cardiac rehabilitation in all outcome parameters are statistically significant with p < 0.01.

IRES, indicators of rehabilitation status; PHQ, patient health questionnaire; SD, standard deviation; SES, standardized effect size; WHO, World Health Organization well-being questionnaire

Conclusion

The preliminary results indicate the suitability of several parameters in the tested domains, in particular the change of smoking behavior, exercise load and WHO5 well-being index, to represent the immediate CR success. However, the predictive value of these parameters for the mid-term occupational prognosis seems to be low.

(1) University of Potsdam, Center of Rehabilitation Research, Germany (2) Paracelsus-Harz-Clinic Bad Suderode, Quedlinburg, Germany (3) Reha-Zentrum Seehof, Teltow, Germany (4) Clinic Hohenried, Bernried, Germany (5) Frankenklinik, Bad Neustadt a. d. Saale, Germany (6) ZAR Stuttgart, Germany (7) MediClin Reha-Zentrum Spreewald, Burg, Germany

(8) Segeberger Clinics Bad Segeberg, Germany (9) Clinic Möhnesee, Germany (10) Caspar Heinrich Klinik, Bad Driburg, Germany (11) Mediclin Fachklinik Rhein/Ruhr, Essen, Germany (12) Brandenburg Klinik, Bernau, Germany (13) Klinik am See, Rüdersdorf, Germany

Disclosures (all authors): none Contact: Doctor Annett Salzwedel (EUD ID : 550231) University of Potsdam, Center of Rehabilitation Research; 14469 - Potsdam Germany; Email: annett.salzwedel@uni-potsdam.de