

Sex-specific differences in exercise-based rehabilitation of patients with Post-COVID-19 Syndrome

B. Schmitz¹, R. Garbsch¹, H. Schaefer¹, M. Kotewitsch¹, J. Mooren², M. Waranski¹, M. Teschler¹, K.A. Verecke², G. Boell², F.C. Mooren¹

¹University of Witten/Herdecke, Department of Rehabilitation Sciences, Witten, Germany

²Clinic Koenigsfeld, Ennepetal, Germany

Funding Acknowledgements: None.

Background: Post-COVID-19 Syndrome (PCS) involves multiple lead symptoms, including reduced physical performance, fatigue, dyspnea, cognitive impairment, and psychological distress. While it has been shown that exercise-based rehabilitation in PCS is effective, sex-specific differences are underreported.

Purpose: To compare the effects of exercise-based rehabilitation on pulmonary function, cardiopulmonary exercise capacity, and health-related outcomes in long-term female and male PCS patients.

Methods: A prospective cohort study was performed with PCS patients attending center-based rehabilitation. Cardiopulmonary exercise testing (CPET) and spirometry were conducted at admission and before discharge. Questionnaires were used to assess health-related quality of life, fatigue, wellbeing, and workability for up to 6 months.

Results: 145 patients (women, n=52 [36%]) with a mean age of 50.2 ± 10.7 years (women, 47.1 ± 12.7 years; men, 52.0 ± 9.1 years; $p=0.018$) were referred to rehabilitation 262.0 ± 128.8 days (women, 285.5 ± 140.6 days; men, 248.8 ± 112.0 days; $p=0.110$) after acute infection. Diagnosed lead symptoms were fatigue/exercise intolerance (81.4%), shortness of breath (74.5%), and cognitive dysfunction (52.4%). Men presented with lower relative baseline exercise capacity ($68.8 \pm 13.3\%$) compared to women ($82.0 \pm 14.3\%$, $p<0.001$), but female PCS patients showed greater improvement in submaximal workload ($p=0.026$). By contrast, men exhibited higher values for FEV1/VC, MEF, and PEF and lower VC at baseline ($p\leq 0.038$), while FEV1/VC showed greater improvements in women ($p=0.027$). Higher fatigue and lower wellbeing were detected in women at baseline which correlated with impaired pulmonary function ($p<0.05$). Disease perception including fatigue, health-related quality of life, wellbeing and workability improved for up to six-month after rehabilitation.

Conclusions: Exercise-based rehabilitation improves pulmonary function, cardiopulmonary fitness, and disease burden in women and men with long-term PCS. While women with PCS may benefit from intensified respiratory muscle training, rehabilitation in men with PCS should set a strong focus on physical exercise training. Clinical assessment for all PCS patients should include CPET and pulmonary function tests and assessments of fatigue to document limitations and tailor therapeutical strategies.

