Closure of outpatient cardiac rehabilitation during the first COVID-19 lockdown in Austria in spring 2020 resulted in deteriorating physical exercise capacity: a mixed-methods study

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Background: Group-based cardiac rehabilitation (CR) has inevitably been disrupted by COVID-19-related public health measures, increasing the risk of deterioration in modifiable risk factors for patients with cardiovascular disease (CVD).

Purpose: To examine the impact of CR closure during the first COVID-19-related national lockdown in Austria in spring 2020 on patients' maintenance of physical activity, physical fitness levels, and cardiovascular risk profile; and to describe the patient experience of lack of group-based CR training due to COVID-19.

Methods: This mixed-methods study recruited patients from an outpatient CR centre in Austria during summer 2020. Eligibility criteria were regular attendance at weekly group-based exercise training at the centre until the COVID-19-related lockdown in March 2020; pre-lockdown completion of a maximal cycle ergometer test; no contraindications for maximal exercise testing; and no new complaints limiting exercise performance. Participants underwent post-lockdown quantitative assessment of physical fitness (maximal cycle ergometer testing, submaximal cycle ergometer training session at individual pre-lockdown settings) and cardiovascular risk status. These were compared with pre-lockdown data from medical records. Participants gave qualitative interviews about their experience of maintaining exercise during lockdown. Interviews were audio-recorded, transcribed, coded, and interpreted using framework analysis.

Results: Twenty-eight (57%) of 49 eligible patients were recruited, 1 withdrew, and 27 completed all study procedures. Two participants were excluded from analysis of physical fitness data, due to subsequent diagnosis of new complaints limiting exercise performance. Mean (SD) age was 69 (7.4) years. Six (22%) were female. Median (IQR) time since first CVD event was 8 (5.5, 9) years. In maximal ergometer testing, 14 (56%) had deteriorated, 10 (40%) were unchanged, and 1 (4%) had improved post-lockdown. At group level, power was significantly reduced (maximal ergometer testing, submaximal ergometer training), whereas CVD risk factors remained unchanged from pre- to post-lockdown (table 1). Qualitative analysis corroborated the negative impact of the closure of CR classes (table 2).

Conclusions: This patient cohort was heterogeneous with respect to physical activity levels and exercise capacity, yet overall motivated and experienced in exercise training, having regularly attended training sessions at the centre before the lockdown. Despite individually seeking out alternative exercise options during lockdown, group average exercise capacity deteriorated even in this motivated and exercise-conscious group. This highlights the importance of providing group-based opportunities for supervised high intensity training for patients who engage well in such a setting, and the detrimental impact of disruption to this type of CR service.

Table 1. Physical fitness and cardiovascular disease (CVD) risk status in 27 cardiac rehabilitation patients pre *versus* post COVID-19-related lockdown in spring of 2020.

Outcome	Parameter	Pre	Post	Difference	p-value
Maximal cycle ergometer test [a]	Power (W)	165 (70)	151 (70)	-14 (12)	<0.001**
	Power (% of reference value)	112 (37)	102 (38)	-10 (10)	<0.001**
	Maximal heart rate (bpm)	142 (24)	135 (24)	-7 (9)	0.003**
Submaximal cycle ergometer training session [b]	Power (W)	99 (40)	97 (40)	-2.3 (5.2)	0.038*
	Peak heart rate (bpm)	131 (28)	134 (28)	3.0 (22)	0.73
	Average heart rate (bpm)	112 (19)	115 (21)	2.4 (11)	0.30
CVD risk status	Resting systolic blood pressure (mmHg)	121 (20)	124 (18)	3 (20)	0.46
	Weight (kg)	82.5 (25.2)	82.4 (15.6)	-0.1 (3.4)	0.87
	Body mass index (BMI)	27.13 (4.8)	27.12 (4.8)	-0.01 (1.0)	0.94
	Cholesterol (mg/dl)	169 (53)	171 (55)	2 (28)	0.74
	Triglycerides (mg/dl)	137 (70)	145 (90)	8 (56)	0.45
	HDL cholesterol (mg/dl)	59 (14)	65 (16)	6 (7)	<0.001**
	LDL cholesterol (mg/dl)	88 (49)	81 (50)	-7 (23)	0.11
	Glucose (mg/dl) [c]	102 (18)	96 (10)	-6 (17)	0.11
	HbA1c (%) [d]	6.0 (0.3)	6.0 (0.2)	<0.1	0.12
	CVD risk (%) [e]	7.0 (2.8)	6.9 (2.4)	-0.1 (0.9)	0.61

Figures are arithmetic mean (SD); p-values were calculated by paired t-test or Wilcoxon signed rank test (2-tailed, alpha=0.05); * statistically significant at 0.05 significance level; ** statistically significant at 0.01 significance level; [a] n=25; median (IQR) time period between pre and post lockdown test = 11 (10, 20) months; [b] Median (IQR) time period between pre and post lockdown training session = 5 (5, 7) months; [c] n=25; [d] n=23; [e] Framingham Risk Score for recurrent cardiovascular event within 2 years

Table 2. Qualitative interview findings from 27 cardiac rehabilitation patients. Patients recounted their experience during the COVID-19-related lockdown in spring of 2020.

Themes	Summary of findings
Maintaining physical activity and physical fitness	Almost all participants had found alternatives to keep physically active during lockdown. Activities included self-directed training at home or outdoors (home trainer, jogging, cycling), going for walks and hikes, and household activities such as gardening and chopping firewood. Despite this, 17 (63%) said they had not been able to maintain their exercise levels, and 15 (56%) felt their fitness had deteriorated.
Medication adherence, smoking, and diet	Circumstances during lockdown did not affect medication adherence. Participants reported that processes for prescription and supply of medication had generally worked well. Doctors had provisionally prescribed larger quantities of medication to cover the lockdown period, and pharmacies had coped well with filling 'contactless' electronic prescriptions. Smoking behaviour had not changed during lockdown in this group of 18 (67%) lifelong non-smokers and 9 (33%) ex-smokers. Regarding their diet, most participants reported that they generally observed heart-healthy dietary recommendations and that they had continued to do so during lockdown. A few participants said they had eaten more unhealthy food during lockdown and had gained weight. Some participants found that lockdown created more time for home-cooking, causing them to reflect on and improve their diet.
Closure of group-based cardiac rehabilitation classes	Participants regretted the lack of a weekly 'fixture' for exercise. Many missed the sense of community at the outpatient rehabilitation centre and the motivation from training together with others. Several participants stated that without professional supervision they felt less confident or unsafe to train at the same (high) intensity as at the rehabilitation centre.