# Effect of the COVID-19 Pandemic on Cardiopulmonary Rehabilitation Patients

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**PURPOSE:** The COVID-19 pandemic has created numerous obstacles to providing optimal care to all patients, especially in the outpatient setting. Cardiopulmonary rehabilitation, a multidisciplinary-led rehabilitation program aimed at improving modifiable risk factors for cardiovascular and pulmonary diseases, has been proven to decrease hospital readmission rates and improve mortality rates for patients enrolled. Data are limited regarding the impact of the COVID-19 pandemic on patients enrolled in a traditional cardiopulmonary rehabilitation program, specifically patients that had their participation in one of these programs interrupted due to precautions and restrictions surrounding the pandemic.

**METHODS:** This single-center, retrospective cohort study utilized chart reviews of patients enrolled in a traditional, outpatient cardiopulmonary rehabilitation program. Basic demographic information was collected for each patient, including age, sex, and indication for rehabilitation. Cohort A included patients enrolled in the program in 2019 that were able to complete a full course of rehabilitation without interruption. Cohort B included patients enrolled in the program in 2020 that had their participation in the program interrupted when various outpatient services were halted due to precautions surrounding the COVID-19 pandemic. The primary outcome assessed between groups was all-cause hospital readmission rates, defined as a hospital admission occurring any time concurrent with enrollment in the cardiopulmonary rehabilitation program and up to 30 days after completion of the program. This study was designated exempt from IRB approval.

**RESULTS:** Sixty-seven patients were considered eligible and were enrolled in this study, 34 in Cohort A and 33 in Cohort B. Baseline characteristics were similar between groups, with 58% of patients in the 65-89 year old age-range and 64% males, overall. The most common indication for cardiopulmonary rehabilitation was a history of coronary artery disease, although many patients had multiple indications for enrollment. The primary outcome occurred in 6 patients in Cohort A (18%) and 8 patients in Cohort B (24%) leading to a relative risk of 1.37 (95% CI, 0.53 to 3.53, $p = 0.51$)

**CONCLUSION:** A small between-group difference was seen in all-cause hospital readmission rates, but this difference was not found to be statistically significant. This is likely related to the small sample size assessed, although possible other explanations exist. Readmission rates may have been directly affected by the COVID-19 pandemic, as patients may have been hesitant to seek medical care for fear of exposure to the virus. Not all patients included in Cohort B had completed a full course of rehabilitation when this data was collected, so actual hospital readmission rates may be higher than originally recorded within this group. Additionally, many of the patients enrolled in Cohort B still received some guidance and coaching from rehabilitation staff while the outpatient service was suspended. Overall, further research into this topic is still needed, specifically research that can reach a larger sample size of patients enrolled in cardiopulmonary rehabilitation programs.