


## Letter to the Editor

# Is Digital Technology the Solution for Pulmonary Rehabilitation in Developing Countries During the COVID-19 Pandemic?

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Dear Editor,

The rising number of COVID-19 cases and deaths has caused substantial changes in the global healthcare system and put further demands on the current capacity of health systems. Several steps have been taken to combat the disease; for example, several hospitals and hospital wards have been reconverted into COVID units.

The services for respiratory patients, including rehabilitation, have been affected by this pandemic. The total number of hospital admissions related to non-COVID pulmonary pathology has decreased; those with worse symptoms go to hospitals and those with less severe symptoms choose to stay at home. Uncertainty about COVID-19 may be a cause of the increasing stress that worsens underlying conditions among respiratory patients.

Many of respiratory patients have lost the attention of hospitals, leading to insufficient prevention, poor adherence to drug use, and reduced levels of physical activity that worsen their condition. Physical inactivity is an important constituent of deteriorations in patients' quality of life (QOL) and contributes markedly to poor prognosis in patients with chronic lung diseases [1].

Pulmonary rehabilitation by virtue of its exercise training protocols (respiratory muscle training, aerobic training, strength training, flexibility and balance training), emphasizing self-management and changes in behavior, and psychosocial support may—when combined with pharmacological therapies—achieve and improve tolerance to exercise, muscle strength, and QOL and reduce dyspnea and fatigue [2].

Digital technology such as smartphones, tablets, and related applications (e.g., Microsoft Teams, Skype, and Google teams) is easily available to a large segment of patients and healthcare professionals. Telemedicine has gained importance during the pandemic [3]. Using technology to deliver rehabilitation in addition to telemedicine could be a remarkable step in managing the respiratory disease in developing and low-resource countries.

Virtual pulmonary rehabilitation approaches should focus on individualized management, as most respiratory pathology patients are elderly or frail. Video calls can be used for psychological counseling, explaining physical activity, breathing and nutritional strategies, and patient monitoring, and even supporting patients with chronic respiratory conditions to adhere to plans set for them. Interactive applications with audio and video capabilities can be utilized to maintain communication between patients and healthcare providers.

Technology-centered applications using smartphones and other wearable accessories have the potential to gather health information, thereby assisting in monitoring patients and reducing their dependence on caregivers and burden the latter feel regarding some tasks [4]. Various applications and online resources (from respiratory/lung societies) are available for rehabilitating and educating patients with pulmonary diseases and could be vastly beneficial during the pandemic (Table 1). These resources can make patient aware of the disease, build a positive attitude, help in self-management, and allow them to be active partners in therapy. If patients are able to obtain reliable information, they can make better use of healthcare system.

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**Table 1.** Online resources and applications

Resource/App	Sources	Benefits
British Thoracic Society Resource pack for pulmonary rehabilitation	<a href="https://www.brit-thoracic.org.uk/document-library/quality-improvement/covid-19/resource-pack-for-pulmonary-rehabilitation/">https://www.brit-thoracic.org.uk/document-library/quality-improvement/covid-19/resource-pack-for-pulmonary-rehabilitation/</a>	Resources for pulmonary rehabilitation including self-management, a home exercise program, and others.
Lung foundation Australia- Pulmonary rehabilitation toolkit	<a href="https://pulmonaryrehab.com.au/importance-of-education/education-topics/">https://pulmonaryrehab.com.au/importance-of-education/education-topics/</a>	Education
Pulmonary Rehab Patient Resources	<a href="https://www.aacvcp.org/Resources/Resources-for-Patients/Pulmonary-Rehab-Patient-Resources">https://www.aacvcp.org/Resources/Resources-for-Patients/Pulmonary-Rehab-Patient-Resources</a>	Education
Live better with Pulmonary rehab	<a href="http://www.livebetter.org/">http://www.livebetter.org/</a>	Education
MyBreath app	<a href="https://apps.apple.com/us/app/mybreath-app/id1199130108?l=es">https://apps.apple.com/us/app/mybreath-app/id1199130108?l=es</a>	Breathing exercises to reduce stress, enhance relaxation and mindfulness, and improve performance.
myCOPD	<a href="https://play.google.com/store/apps/details?id=com.mymhealth.hybrid">play.google.com/store/apps/details?id=com.mymhealth.hybrid</a>	Pulmonary rehabilitation program
Kaia COPD app	<a href="https://www.kaiahealth.com/solutions/copd/for-providers/">https://www.kaiahealth.com/solutions/copd/for-providers/</a>	Video-based artificial intelligence therapy, psychosocial support, patient education and medication tracking.
Pranayama free	<a href="https://play.google.com/store/apps/details?id=my.apps.yoga.breathing.exercise.pranayama.free&amp;hl=en_IN">play.google.com/store/apps/details?id=my.apps.yoga.breathing.exercise.pranayama.free&amp;hl=en_IN</a>	Education (breathing techniques)
Breathe2Relax	<a href="https://apps.apple.com/us/app/breathe2relax/id425720246">https://apps.apple.com/us/app/breathe2relax/id425720246</a>	Diaphragmatic breathing app
The COPD Pocket Guide	<a href="https://play.google.com/store/apps/details?id=org.copdfoundation.pocketconsultant&amp;hl=en_IN">https://play.google.com/store/apps/details?id=org.copdfoundation.pocketconsultant&amp;hl=en_IN</a>	Assessments and lists of medications for COPD, treatments, videos, and screening tests for depression and anxiety.
Lift Pulmonary Rehab App	<a href="https://apps.apple.com/us/app/lift-pulmonary-rehab/id1329590036">https://apps.apple.com/us/app/lift-pulmonary-rehab/id1329590036</a>	Home fitness and wellness program for COPD and other conditions.
ConnectMYcare	<a href="https://download.cnet.com/ConnectMyCare/3000-2129_4-76947944.html">https://download.cnet.com/ConnectMyCare/3000-2129_4-76947944.html</a>	Appointments, providers, resources, reminders, and medications
Rehab My Patient - for Therapists	<a href="https://play.google.com/store/apps/details?id=com.rehabmypatient.app&amp;hl=en_IN">https://play.google.com/store/apps/details?id=com.rehabmypatient.app&amp;hl=en_IN</a>	Allows therapists to select exercises they can share with patients.

Digital technology rehabilitation services are cost-effective, help maintain continuousness of care, educate patients through remote consultation, and can be used to conduct assessments, plan a therapeutic exercise program, and monitor patients' progress; this can provide them with continuous supervision and feedback [5]. However, levels of education, linguistic barriers for online resources, basic knowledge of the Internet, and facilities in rural areas could be important challenges to overcome.

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