

## SHORT COMMUNICATION

## MOBILE-BASED HEALTH APPS TO PROMOTE PHYSICAL ACTIVITY DURING COVID-19 LOCKDOWNS

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**Objective:** Periods of lockdown due to coronavirus disease 2019 (COVID-19) have a negative effect on individuals' physical health and quality of life, and may result in a weakened immune response, leading to enhanced risk of infection. Due to lack of access to public resources during periods of lockdown many individuals cannot perform their usual daily physical activities. The aim of this short report is to discuss the use of mobile-based health applications and virtual reality systems for promoting physical activity at home through an interactive and motivating digital environment.

**Methods and results:** Information on tele-health, available from the US Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO), and data on physical activity during lockdowns were reviewed. A list of mobile-based health applications suitable for use in promoting physical activity at home was compiled.

**Conclusion:** This report makes recommendations for mobile-based health applications to promote physical health, which can be used at home during periods of lockdown.

**Key words:** coronavirus; mobile application; physical health; quality of life.

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Various measures have been adopted to control the spread of coronavirus disease 2019 (COVID-19), such as social distancing, closure of non-essential services, limitation of gatherings, and restriction of travel. These measures have a negative impact on the physical

## LAY ABSTRACT

Being physically inactive or sedentary during COVID-19 lockdown may increase the chance of getting infection due to the reduced fighting ability of body against germs and decreases health. Day-to-day physical activities gets reduced due to the restrictions imposed by the competent authority and forced to be at home. Regular exercise strengthen the defence mechanism of the body. In this short communication, we have listed the available various mobile based application which might assist in maintaining the regular physical activity during these days of lockdown.

health of all individuals and affect the quality of life of individuals, due to the closure of gyms, parks and restriction of recreational activities (1). Lifestyle modifications to increase physical activity and exercise in one's daily routine may help to reduce the consequences of COVID-19, such as muscle atrophy due to disuse, inadequate respiratory capacity, risk of frailty, and poor psychological health. Moreover, COVID-19 may overstimulate the immune system, resulting in overproduction of immune cells and cytokines, which may attacks the person's own cells, causing damage to healthy tissue (2). Considering the clinical conditions related to COVID-19, rehabilitation must focus on specific impairments (3). The aims of this short communication is to discuss the various mobile-based health applications available to promote performance of physical activity in the home, which could be used during periods of lockdown, and to recommend exercises to promote physical health.

## PHYSICAL ACTIVITY AND HEALTH

Regular physical activity and exercise are beneficial for improving physical and mental health. It is therefore important to promote being physically active during periods of lock-

down. The American College of Sports Medicine (ACSM) guidelines recommend 150–300 min per week of moderate-intensity aerobic physical activity, such as jumping rope, video-based aerobic exercises, brisk walking around the house, and 2 sessions per week of muscle strength training, (e.g. strength workouts using mobile apps, squats, lunges, push-ups, etc.) (4). Physical activity and rehabilitation have been shown to have specific benefits, such as improved physical, psychological, and mental health (5). Healthcare interventions to promote physical activity, delivered by wearable monitors, are effective in promoting physical activity (6). Therefore, the implementation of structured mobile-app-based programmes during periods of lockdown might decrease the negative impact of inactivity on the health of individuals, including older people, who have a high risk of infection. We report here a range of health-related mobile applications and recommendations for specific home-based physical activity for use as complementary therapy in periods of lockdown.

During periods of lockdown, individuals have to follow social distancing or self-isolation protocols to prevent the spread of COVID-19. Various mobile-based, or tablet-based, health applications, or games, can be used to promote physical activity during these periods. Physical activity (PA) and energy expenditure (EE) have been shown to decrease significantly during periods of lockdown [PA 4,135.7 metabolic equivalent (MET)-min/week, EE 4,221.7 kcal/week] compared with before lockdown [PA 7,809.7 MET-min/week, EE 8,189.8 kcal/week] (7). The aim of increasing physical activity and exercise is to maintain or improve physical fitness, directly and indirectly improving immune, digestive and renal functions. For example, exercise increases antibody and white blood cell levels, to fight infections. During and after the exercises, an increase in body temperature may help the body fight infection. Infections are more likely to be linked with poor diet, disturbed sleep patterns, stress, and travel and exposure. Physical activity and exercise is therefore essential for individuals in all age groups during periods of lockdown, to maintain health and protect the body against COVID-19.

## VIRTUAL REALITY-BASED PHYSICAL ACTIVITY

The use of virtual reality (VR) in active video games and exergaming can be used as a complementary tool in rehabilitation. VR games promote individuals' motor learning, neural plasticity, and can be used as a complement to conventional exercises. VR-based games could optimize motor functioning by combining physical and cognitive training in an enjoyable and motivating way (8, 9). Our physiotherapy departments recommend the use of various exergaming applications: Wii Balance board with WiiFit, Nintendo Wii training, Balance rehabilitation unit, Computer unit and Step pad, a Dance video game with pad, Omni treadmill, and I cares Pro flight simulator. These games motivate individuals in performing home-based warm-up, resistance training, balance training, and running. One study recommends performing 25–60 min of exercise, 2–3 times a day, 1–5 times a week, to promote physical activity (9).

## MOBILE-BASED APPS TO PROMOTE PHYSICAL ACTIVITY AT HOME

Mobile-based apps are a promising tool to increase adherence to physical activity at home, enabling individuals to engage with health information and guidance at any time. Information and communication technologies are commonly used in the field of educational strategies and physical health. Technology-based interventions to promote physical activity offer an alternative to conventional care (10). Technologies enable individuals to monitor, evaluate, and instruct the performance of their physical activity (11). Various mobile-based apps are available to download from the internet. Mobile-based health applications for rehabilitation of neurological conditions, such as Parkinson's disease, have been shown to be useful during the COVID-19 pandemic (12).

**Table I** lists some of the mobile-based apps that we recommend to promote physical activity at home during lockdown. Mobile-based physical activity provides the opportunity for people to practice exercises and improve their

**Table I.** Mobile-based health applications used to promote physical activity

App name and URL	Description of app
Workout trainer <a href="https://play.google.com/store/apps/details?id=com.skimble.workouts&amp;hl=en_IN">https://play.google.com/store/apps/details?id=com.skimble.workouts&amp;hl=en_IN</a>	Works as a personal trainer and provides guidance to do specific exercises, training sessions and recording
JEFIT workout tracker <a href="https://play.google.com/store/apps/details?id=je.fit&amp;hl=en_IN">https://play.google.com/store/apps/details?id=je.fit&amp;hl=en_IN</a>	Provides workout training programmes to keep you fit at home
Fitocracy <a href="https://apkpure.com/fitocracy-workout-fitness-log/com.fitocracy.app">https://apkpure.com/fitocracy-workout-fitness-log/com.fitocracy.app</a>	Fitocracy motivates and empowers you to succeed at fitness and level up in real life
Runtastic Pro <a href="https://play.google.com/store/apps/details?id=com.runtastic.android&amp;hl=en_IN">https://play.google.com/store/apps/details?id=com.runtastic.android&amp;hl=en_IN</a>	Aerobic apps, used to monitor fitness activity and provide guidance
At Ease <a href="https://play.google.com/store/apps/details?id=com.meditationoasis.atease&amp;hl=en">https://play.google.com/store/apps/details?id=com.meditationoasis.atease&amp;hl=en</a>	Used for relief from anxiety and worry through breathing exercises and meditation
Strava <a href="https://play.google.com/store/apps/details?id=com.strava&amp;hl=en">https://play.google.com/store/apps/details?id=com.strava&amp;hl=en</a>	Strava's activity tracking provides key statistics, such as speed, pace, distance, elevation gained, and calories burned during and after exercise
J&J Official 7 minute work out <a href="https://play.google.com/store/apps/details?id=com.jnj.sevenminuteworkout&amp;hl=en">https://play.google.com/store/apps/details?id=com.jnj.sevenminuteworkout&amp;hl=en</a>	Centred around research on high-intensity interval training (HIIT) and circuit training, which shows that short bursts of hard exercise with short recoveries can improve aerobic fitness quickly
JEFIT <a href="https://play.google.com/store/apps/details?id=je.fit&amp;hl=en">https://play.google.com/store/apps/details?id=je.fit&amp;hl=en</a>	JEFIT enables you to track your workout routines and your rest time, and log and graph all body measurements as you progress
My Fitness <a href="https://play.google.com/store/apps/details?id=com.homeworkout.woman.muscle.sger&amp;hl=en">https://play.google.com/store/apps/details?id=com.homeworkout.woman.muscle.sger&amp;hl=en</a>	Used for fitness training and exercise prescription
RunKeeper <a href="https://play.google.com/store/apps/details?id=com.charitymilescom.android&amp;hl=en">https://play.google.com/store/apps/details?id=com.charitymilescom.android&amp;hl=en</a>	Track exercise, set goals, sweat, and see progress along the way

fitness, while staying at home to control spread of the virus. The use of mobile-based apps may help to promote mental and physical health during periods of lockdown, when people are unable to perform regular outdoor physical activity.

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