HeartHab: a study to evaluate the effectiveness of an app-based telerehabilitation program in increasing physical activity levels of patients with coronary artery disease

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BACKGROUND: In rehabilitation of Coronary Artery Disease (CAD) patients, exercise training is an important component. Telerehabilitation techniques have been proven successful to enable patients to continue rehabilitation at home after their hospital-based rehabilitation. However, achieving a sustained elevation in physical activity levels over a long term in the absence of supervised exercise intervention is difficult. We designed HeartHab, an app-based telerehabilitation program, by incorporating novel persuasive techniques to motivate CAD patients to reach personalized physical activity targets. In our study, we evaluated the effects of HeartHab on physical activity levels, modifiable risk factors and general health behaviour of patients who completed a hospital based rehabilitation program.

METHODS: 32 CAD patients were recruited. Four patients had to be excluded and three others did not use the app at all. We compared the values of the remaining 25 patients before and after using HeartHab for a period of 8-10 weeks. We measured baseline values of weight, blood pressure, $VO2_{max}$ using ergo spirometry and physical activity levels using the International Physical Activity Questionnaire (IPAQ). We prescribed personalized exercise targets using recommendations from ESC's EXPERT tool. We translated the prescribed targets and physical activities logged by patients in the app into MET (Metabolic Equivalent of Task) values using ACSM's guidelines for exercise testing and prescription. We compared the mean MET values achieved after using the app against the prescribed targets and baseline values.

RESULTS: On average, 52% of patient exceeded the prescribed weekly targets and 44% reached the prescribed goals. One patient did not register any physical activity in the app. For 68% of patients, the mean METs per week increased as compared to the baseline. For the remaining 32%, the lack of increase could be attributed to low app usage and low usage of the physical activity module of the app. Further evaluation showed no significant differences in body weight, systolic blood pressure, diastolic blood pressure or VO2 max.

CONCLUSION: The use of HeartHab had a positive effect on increasing the mean physical activity levels of patients and motivated them to reach or exceed prescribed exercise targets in a non-supervised setting. No significant effects were seen on other outcomes, probably because of the short duration and relatively low intensity of the intervention.