

Suitability of exercise guidelines for the calculation of personalized exercise targets and progress monitoring in a telerehabilitation setting

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BACKGROUND: Determination of the appropriate intensity of exercise training is critical to achieve the benefits of cardiac rehabilitation. Clinical guidelines and decision support systems (e.g. EXPERT tool) assist clinicians in selecting appropriate exercise intensities for patients. However, a recent study indicated that guideline-based intensity domains for CVD patients seem inconsistent.

PURPOSE: We aim to investigate the applicability and suitability of the exercise guidelines for the calculation of personalized exercise targets and progress monitoring in a telerehabilitation setting.

METHODS: In an app-based telerehabilitation program, we prescribed guideline-based personalized exercise targets with the EXPERT tool. The targets were converted into Metabolic Equivalent of Task (MET) values using the guideline-based exercise intensity domains and ACSM's guidelines for exercise testing and prescription. Patients could log cardio (e.g. walking) and non-cardio (e.g. gardening) physical activities in the app. Progress towards the targets was determined using ACSM's guidelines and activity specific MET values from the Compendium of Physical Activities. We evaluated our approach in a crossover trial with 32 coronary artery disease patients who used the app for 7-10 weeks. Application logs and CPET data (collected before and after using the app) were analysed.

RESULTS: During the crossover trial, 4 patients dropped out and 4 patients did not log any activities. Of the remaining 24 patients, 83% achieved their minimum exercise targets every week and 8% reached their maximum targets at all times. In general, 63% of patients achieved their maximum exercise targets for at least half of the weeks. However, amongst patients who reached their maximal targets 70% of the time there was no significant difference in VO₂ max (P=0.268). For example, one patient exceeded his maximum exercise target at all time, but still did not improve VO₂ max. Furthermore, 46% of the patients reported mostly non-cardio physical activities, including household chores, gardening, and mowing the lawn. We found a significant difference in achieving the minimum (P=0.018) / maximum (P=0.001) exercise target when considering only cardio activities or all physical activities logged in the app.

CONCLUSION: The guideline-based intensity domains and activity specific MET values from the Compendium of Physical Activity seem non-optimal for determining personalized exercise targets to improve maximal exercise capacity. Patients often overachieved their prescribed exercise targets and yet failed to gain a significant increase in maximal exercise capacity. Therefore, the approach of this relatively short study was not sufficient to increase maximal exercise capacity but may be sufficient to have a positive effect on health and submaximal exercise capacity.