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EDITORIAL

Home-based mobile health exercise intervention: a solution to increase physical activity in recipients of transcatheter aortic valve replacement?

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This editorial refers to 'Effect of a pragmatic home-based mobile health exercise intervention after transcatheter aortic valve replacement: a randomized pilot trial', by B.R. Lindman *et al.*, on page 90.

Transcatheter aortic valve replacement (TAVR) has become a well-established treatment choice to patients with symptomatic severe aortic stenosis and remains a rapidly evolving technique.[1] Although TAVR brings survival benefits, nearly half of patients communicated the desire to regain the ability to do a specific activity as the goal for receiving TAVR.[2] TAVR population is known to be frail with restricted physical function, meaning what the procedure alone achieves does not always translate to improved quality of life. In fact, it is striking that the habitual physical activity 1 year after TAVR was lower than baseline.[3] Cardiac rehabilitation is a customized outpatient programme of exercise and education offered to patients with heart disease, which has shown to reduce mortality, morbidity, unplanned hospital admissions, improvements in exercise capacity, quality of life, and psychological well-being.[4] Despite its effectiveness, the participation rate to centre-based programme is relatively low (<50%) due to socioeconomic and geographical issues.[4] Home-based cardiac rehabilitation delivered either by healthcare facilitators or mobile applications is emerging as alternatives to improve uptake of rehabilitation programmes. With the ageing population and the expansion of TAVR programme worldwide, the need of an effective and easily-accessible way to cardiac rehabilitation is huge but research in this aspect is lacking.

In this issue of *European Heart Journal - Digital Health*, Lindman *et al.*[5] reported the effect of a home-based mobile health exercise intervention on daily activity, physical function, and quality of life in elderly patients undergoing TAVR. The study was a two-phase randomized study, where Phase 1 served as a roll-in period to select 50 patients who were compliant with study instructions during 30 days post-TAVR, then to be randomized stratifying by sex and 5-m walk time into Phase 2. In Phase 2, patients were allocated 1:1 to an intervention (i.e. reminders and feedbacks of exercise instructions from a wrist-worn device) or control (i.e. with only time displayed on the device) group for a 6-week period after which they returned to the study site for final assessments of physical performance and completion of quality of life questionnaires. During the study, the enrollees were not restricted to participate traditional centre-based cardiac rehabilitation. This cohort was in average 76 years old, of low surgical risk and less frail than the general TAVR population. The intervention did not improve their co-primary endpoints, including daily steps, Short Physical Performance Battery and Kansas City Cardiomyopathy Questionnaire, but improved secondary physical activity parameters, including moderate-to-intense daily active minutes. However, the intervention improved measures of physical activity, including daily steps, daily active minutes, and moderate-to-intense daily active minutes in enrollees not participating in centre-based cardiac rehabilitation ($n = 30$).

Patients' awareness of the benefit of rehabilitation after TAVR is low, given that 36% of patients declined to undergo rehabilitation in a previous study.[6] Novel measures to encourage these patients to mobilize themselves at home are necessary, because sedentary patients have been found to have a higher risk of mortality and functional decline post-TAVR.[3] The intervention via the wrist-worn device in the current study incorporated notifications to meet a personalized daily step goal and instructions to perform daily resistance exercise (i.e. chair sit-to-stand exercises, chair push-ups and stress ball squeezes), as well as daily question regarding whether they completed the exercises. Although the components offered to patients and activities

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required were much simpler than a traditional centre-based rehabilitation programme, the intervention did improve several measures of daily activities, particularly among patients not participating in centre-based cardiac rehabilitation. Such patients likely did little to none activities on their own at home, thus the benefit is obvious. During the current COVID-19 pandemic, the surge of telemedicine innovations brings a shift in healthcare delivery platforms but also poses challenges to the management of elderly patients. Older age was independently associated with lower rates of telemedicine visits and less video use for telemedicine visits.[7] In this study, around 40% of patients who were non-compliant to wear the device in its Phase 1 period or unwilling to continue participation in Phase 2 were excluded, leading to selection bias and also pointing out the importance of involving in more patients. Further improvements of mobile health rely not only on technical advancements but also on better patient education offered by the Heart Team.

Conflict of interest: none declared.

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