Invited editorial

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FIT@Home editorial: Supporting a new era of cardiac rehabilitation at home?

Ines Frederix[1,2,3], Paul Dendale[1,2] and Aziz Sheikh[4]

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Ischaemic heart disease remains prevalent in Europe: among patients surviving an acute coronary event, up to 20% suffer a repeat event in the first year.[1] Secondary prevention, by means of multidisciplinary cardiac rehabilitation, is recommended by the European Society of Cardiology (ESC) to reduce morbidity and mortality.[2,3] Centre-based or outpatient cardiac rehabilitation has a Class I, Level B indication for ST-segment elevation myocardial infarction patients,[2] a Class IIa, Level A indication for non ST-segment elevation myocardial infarction patients.[3] Despite the proven effectiveness of conventional centre-based programmes and the ESC recommendations, long-term benefits remain disappointing due to inadequate uptake and adherence.[4] Innovations in information technologies enabled the advent of cardiac tele-rehabilitation, an innovative care delivery strategy allowing ischaemic heart disease patients to rehabilitate in their own environment.[5] It was recently identified by the European Association of Preventive Cardiology as a promising new way to deliver secondary prevention.[6] The need for additional clinical research assessing (cost)effectiveness was underscored.

The FIT@Home study is a randomized, controlled clinical trial, comparing home-based with centre-based cardiac rehabilitation[7] in ischaemic heart disease patients ($N = 90$). Home-based patients entered a three-month exercise training programme at home, supervised remotely by heart rate and physical activity telemonitoring. They received weekly feedback on training frequency, duration and intensity via telephone. The centre-based group patients received a three-month cardiac rehabilitation programme in the outpatient rehabilitation centre. The primary endpoint was peak aerobic capacity. Secondary endpoints included Health-related Quality of Life (HRQoL), patient satisfaction and exercise training adherence. A cost–utility analysis was performed, using a societal perspective. All outcome measures were assessed at baseline, after the three-month cardiac rehabilitation programme and at one-year follow-up. The results of FIT@Home indicate that patients in both groups improved VO_2 peak and HRQoL (physical subscale) from baseline to discharge from cardiac rehabilitation and to one year, without between-group differences. The average costs per patient were €3160 lower for patients in the home-based group. The authors conclude that home-based training with telemonitoring guidance is a useful alternative to conventional centre-based training for low-to-moderate risk ischaemic heart disease patients.

In the recently published Telerehab III trial we observed a difference in favour of the patients receiving telerehabilitation.[8,9] Telerehab III was a randomized controlled clinical trial ($N = 140$) comparing the efficacy and cost-efficiency of a 24-week telerehabilitation programme *in addition to* conventional cardiac rehabilitation versus conventional cardiac rehabilitation alone. The patients receiving telerehabilitation improved more in physical fitness and HRQoL and the total cost per patient was lower.

These two studies nicely complement each other showing that this novel care delivery strategy has the potential to improve or replace classical centre based cardiac rehabilitation: improved uptake and adherence can be expected for an intervention that does not interfere with daily life, as transport, availability, cost and return to work are often quoted as reasons not to participate.

Although these results indicate telerehabilitation to be successful for ischaemic heart disease patients in research settings, we cannot predict how this will translate into clinical practice and/or affect patient outcomes and costs. As acknowledged in the ESC e-Health position statement, ensuring adequate integration of new technologies into the healthcare system is difficult.[10]

[1]Department of Cardiology, Jessa Hospital, Belgium
[2]Faculty of Medicine & Life Sciences, Hasselt University, Belgium
[3]Faculty of Medicine & Health Sciences, Antwerp University, Belgium
[4]Usher Institute of Population Health Sciences and Informatics, The University of Edinburgh, UK

Corresponding author:
Ines Frederix, Department of Cardiology, Jessa Hospital, Stadsomvaart 11, 3500 Hasselt, Belgium.
Email: ines.frederix@gmail.com

In the past, the implementation of several technology-based solutions has failed due to their inherent tendency to disrupt existing workflow patterns. Integration of telemedical care models in routine practice implies changing roles and responsibilities for healthcare staff and requires profound service redesign.[11] This underscores the importance of training programmes for all caregivers to define these new responsibilities, to clarify how the new way of care delivery will change current workflow and to aid them in adopting and applying the technologies. Adequate patient education in order for them to get acquainted with the new technologies and/or to understand their position in this more patient-centric care model is paramount.

Upfront clear and detailed descriptions of the telemedical programme content and its primary goal are needed in order to ascertain successful implementation. Specific, measurable, attainable and relevant outcome and/or process metrics should be defined and (re-) assessed on a regular basis to monitor improvement but also to adapt/abandon and/or remediate ineffective interventions.

Consideration of contextual factors related to the implementation of telemedical care is important. Both the FIT@Home and Telerehab III study are reflective of the situation in one country, for patients with a specific type of illness and sufficient ability to interface with the technology used. The variation in structure, content and duration of standard cardiac rehabilitation between different (non-)European countries may limit the external validity of the study findings to other healthcare settings that are geographically, demographically and socio-economically different. One should be cautious, to avoid simplistic extrapolation of reported benefits of cardiac telerehabilitation to related but differing patient populations.

There remain significant barriers to providing telemedical care: lack of reimbursement, compliance of available e-Health solutions with EU regulations for telemonitored data[12,13] and liability concerns, as well as healthcare provider resistance.[14]

Future research should include large-scale and long-term Europe-wide clinical trials, evaluating the efficacy of cardiac telerehabilitation with hard clinical endpoints in different demographical and socio-economical settings.[15] EUnetHTA (European network for Health Technology Assessment) compliant and comprehensive economic evaluations are needed in order to prove the value of telehealth to healthcare consumers and demonstrate return on investment. An improved description of telehealth intervention components, a clear and shared taxonomy on outcome and/or process metrics and profound study of the necessary resulting workflow redesign is mandatory. As e-Health technologies comprise complex interventions, standard evaluative methodologies (such as randomized controlled trials) alone may not be sufficient to assess their impact in a complex socio-technical environment and the effect they have on the delivery of care.[16] Therefore, more comprehensive evaluation approaches, encompassing continuous evaluations throughout the lifecycle of an e-Health intervention, should be encouraged.[17] Recurrent interim evaluations at the key stages provides a way to understand the implementation process better.

Author contribution

All authors contributed to the writing of this paper.

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