

## ADAPTIVE TECHNOLOGIES TO SUPPORT REHABILITATION AND SELF-MANAGEMENT OF PATIENTS WITH CARDIAC CONDITIONS

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### INTRODUCTION

Dealing with cardiovascular care is challenging, and people often struggle to follow rehabilitation and self-management programs. Cardiac rehabilitation and self-care are critical to long-term cardiac health [2]. However, major challenge is ensuring good patient engagement and compliance with recommended exercise programs and lifestyle changes [3]. This project aims to address these challenges and to create design solutions to support cardiac rehabilitation and self-management. It mainly answers four research questions; What is the current state of the art in technology that provides support for cardiac rehabilitation and self-management? What are patient's experiences of cardiac rehabilitation and self-management? What are the key opportunities and challenges that new technologies can address? What design solutions can be applied to support cardiac rehabilitation and self-management? Does the implementation and use of such a solution support an effective and ongoing change in health-related behaviours?

### MATERIALS AND METHODS

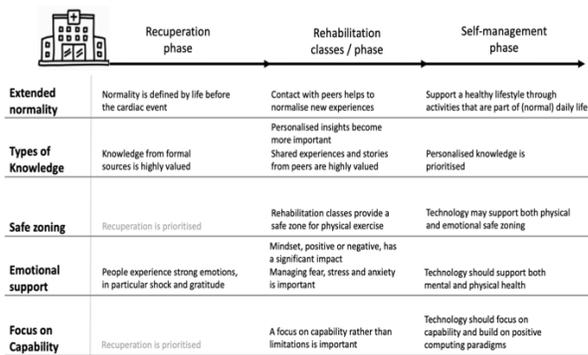
The User centred design process is used for this project, it is a popular iterative design process that focuses on the user [4]. It starts with understanding the context of use, specifying the user requirements, designing solutions and evaluating the solutions against the requirements. In this project, this process would involve 4 studies. To understand the context of use, study 1 is a systematic LR with an objective of understanding the current state of art, patient's perspectives of using current digital interventions, determining the factors that help or hinder towards cardiac self-care. To specify user requirements, study 2 is a semi-structured interview with cardiac patients It focused on their post-hospitalization experience, cardiac rehabilitation experience and experience with current health technology. Study 3 is an observation and co design study to investigate and evaluate alternative design solutions and gain additional information about patient needs and expectations. Lastly, study 4 would involve user testing the solutions derived from study 3 to determine if the new design solution acceptable by the users and to reveal limitations or difficulties for future iterations.

### RESULTS AND DISCUSSION

In the first study which was a systematic review, we focused on qualitative data related to people's experiences of technology for cardiac rehabilitation and self-management. A grounded theory literature review of articles from major electronic databases was conducted [1]. Key factors that acted as barriers and facilitators were

the need for different types of knowledge: background and in-the-moment, importance of personal responsibility and social connectedness, and the need to support engagement while avoiding overburdening people. We found that although background knowledge is an important facilitator, technology should also support greater ongoing and in-the-moment understanding. Connectedness is valuable, but to avoid becoming a barrier, technology must also respect and enable individual responsibility. Personalization and gamification can also act as facilitators of engagement, but care must be taken to avoid overburdening people. Although some studies applied user-centered methods, only 6 involved users throughout the design process.

In the second study, we conducted semi-structured interviews with people who had attended rehabilitation programs following hospitalisation for an acute cardiac event with an aim to understand their experience of cardiac rehabilitation and self-management. Interviews were developed and data was analysed via the Theoretical Domains Framework, a pragmatic framework that synthesizes prior behaviour change theories. This study allowed us to explore how factors that influence behaviour evolve over time. For example, participants experienced a strong initial need for formal knowledge and access to health experts. This subsequently shifted to desire for detailed personal insight and shared peer knowledge. We found that there is a need for technology to support a normal life; social influences could be leveraged to extend participants sense of normality; technology can be used to provide a safe zone; there is a need to support both emotional and physical wellbeing; and technology should focus on recognizing their capability and provide positive recommendations (Fig 1.).



**Figure 1** Key experiences and recommendations during recuperation, rehabilitation, and self-management.

## REFERENCES

Use this compact format for references:

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[3] John Daly, Andrew P. Sindone, David R. Thompson, Karen Hancock, Esther Chang, and Patricia Davidson. 2002. Barriers to participation in and adherence to cardiac rehabilitation programs: a critical literature review. Progress in cardiovascular nursing

[4] User Centered Design Process <https://www.usability.gov/what-and-why/user-centered-design.html>