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A smartphone-based intervention to support cardiovascular patients adhere to a healthy diet: a usability and feasibility study

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Background: Dietary management is a vital component of lifestyle optimization in cardiac rehabilitation and secondary prevention, and face-to-face dietary consultation is the standard care in many clinical settings. The Mediterranean diet pattern is highly recommended to patients with cardiovascular disease. However, patients often have poor adherence to a healthy diet because of lack of motivation or knowledge about healthy diet, inaccurate dietary records, delayed response from a dietician and lack of follow up. Therefore, it is important for a patient to have access to clear information about the diet, and innovative interventions are needed to improve their motivation. Digital health solutions may have great potential for application in the field of nutrition and improve the adherence.

Purpose: The purpose of the study is to explore the usability and feasibility of a gamified smartphone application for diet management, as well as collect preliminary data of the effect on adherence to the mediterranean diet, knowledge about healthy nutrition and self-efficacy in patients with cardiovascular disease.

Methods: A six-week pilot intervention study was conducted with patients following a rehabilitation programme after a cardiac event, in which the patients were requested to use the smartphone application. Before and after the intervention, patients were given the MedDietScore questionnaire, "Nutrition Self-Efficacy Scale" and a nutrition knowledge questionnaire. At the end of the intervention, patients were asked to also finish the "Intrinsic Motivation Inventory (IMI)", "Self-reported Habit Index", an usability questionnaire and a semi-structured interview, which, alongside application logs, were used to determine usability and acceptance.

Results: 15 out of 21 patients (n=15, 80.0% (n=12) were male, mean age of 63.3 + 8.7) completed the full six-week trajectory. No significant improvements were found in the patients' MedDietScore, knowledge and self-efficacy. Patients did respond positively on the Interest-Enjoyment (20.4/35, 58.3%), Perceived competence (15.7/28, 56.2%) and Effort-Importance (17.0/28, 60.7%) dimensions of the IMI, while reporting relatively low on Tension-Pressure (11.8/28, 42.1%). An average total score of 44.1/84 (52.5%) was reported for the Self-Reported Habit Index. Furthermore, patients appreciated the application, specifically the logbook component and the dieticians feedback provided through this component, and reacted neutral to positive on the ability to search for products and track goals.

Conclusion: The results of the short intervention study reveal initial usability and feasibility evaluations of the app, and highlight preferred application features. A longer intervention is needed to evaluate possible medical and behavioural benefits. Considering patients' positive response to the interaction with the dieticians through the application, we suggest that future systems should facilitate similar interaction.