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Research paper

The Digital Heart Manual: A pilot study of an innovative cardiac rehabilitation programme developed for and with users

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ABSTRACT

Objective: Patients are seeking greater choice and flexibility in how they engage with self-management programmes. While digital innovations offer opportunities to deliver supportive interventions to patients undergoing cardiac rehabilitation little is known about how accessible, useful and acceptable they are for this group. This project developed a digital version of a leading evidenced cardiac rehabilitation programme, the Heart Manual (HM). The prototype was developed and evaluated iteratively in collaboration with end users.
Methods: Using a mixed methods design 28 participants provided feedback using semi-structured questionnaires and telephone interviews.
Results: Rich data revealed the perceived user-friendliness of the HM digital format and its effectiveness at communicating the programme's key messages. It flagged areas requiring development, such as more flexible and intuitive navigation pathways. These suggestions informed the refinement of the resource.
Conclusion: This evaluation offers support for the new Digital Heart Manual and confirms the value of employing a user-centred approach when developing and improving online interventions. The system is now in use and recommendations from the evaluation are being translated into quality improvements.
Practice implications: The Digital Heart Manual is user friendly and accessible to patients and health professionals, regardless of age, presenting a suitable alternative to the paper version.

1. Introduction

Users of health services are seeking more flexible ways of interacting with health professionals and accessing health information. Increasingly health care providers are using digital technology to deliver such support [1]. Nevertheless there remain uncertainties around how patients will interact with digital health interventions, what is acceptable to them, and what works best for them [1–6].

The uptake of cardiac rehabilitation has been a consistent challenge with barriers to adherence including poor accessibility or dislike of attending classes [7,8]. Such barriers may be greater with a shortened recovery period. Patients are treated faster, discharged earlier and are returning to work sooner. Soares et al. [9] suggest that future cardiac rehabilitation requires flexibility of delivery and personalisation of care. Patient preference and choice is an important factor for participation in cardiac rehabilitation [7,10].

The Heart Manual (NHS Lothian) [11] is an individually tailored six-week cardiac rehabilitation intervention for patients recovering from acute Myocardial Infarction (MI) and/or revascularisation. Developed in order to overcome accessibility barriers it provides a guided programme of information and self-help tools in the form of a patient-held paper manual to be used alone and in collaboration with the patient's cardiac rehabilitation team. The Heart Manual (HM) was founded on cognitive behavioural principles to address patients' cardiac misconceptions and equip them with effective coping strategies for risk factor modification. In a series of randomised trials the HM was shown to improve accessibility to cardiac rehabilitation, reduce unplanned health care usage (hospital and GP visits), lower the key coronary heart disease risk factors of anxiety and depression and improve patients' quality of life [8,12–14]. It has been in sustained implementation in the UK National Health Service (NHS) for 25 years, and is also used internationally [15]. While aspects of the HM approach have been integrated into previous eHealth platforms for cardiac conditions, such as in the HeartCycle study [16]

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the resource overall has not previously been available in digital format.

Several studies have sought to develop alternative models of cardiac rehabilitation including telehealth and internet based programmes with varying degrees of success [1]. However, none have been derived from a comparative non digital programme that is well established and for which appropriate benchmarks are available based on the outcomes of previous randomised control trials [7,17,18].

Our project aimed to develop a digital version of the HM – the 'Digital Heart Manual' (D-HM) which is acceptable and usable by patients and health professionals, whilst offering an equivalent level of support to patients as the paper-based version. It recognises that engaging service users and providers in the developmental stage of technological systems is a key step towards their implementation and future use [19]. It also provides an opportunity to explore the additional benefits and opportunities that digital programmes may present.

The primary aims of the project were to assess the acceptability, accessibility and usability of the D-HM prototype to patients and cardiac nurses to optimise the intervention and user engagement.

2. Methods

2.1. Study design

The study utilised a mixed method design involving expert review, observation, survey and interviews across two phases to assess participant's perceived acceptability, usability and accessibility of the D-HM. Data triangulation was used to develop a rich picture of participants' responses to the concept and prototype.

2.2. Participants

Twenty eight people participated; patient representatives (PR) (graduates of the HM or other cardiac rehabilitation programme), their partners (PR) and health professionals (HP) (both familiar and unfamiliar with the original HM programme). Inclusion criteria for PRs were: history of MI or revascularisation, completion of a cardiac rehabilitation programme over six months ago, stable condition and access to any technological device (e.g. computer, tablet) with an internet access. Individuals varied in age, confidence and experience using digital technology.

PRs were recruited through community cardiac support groups and HM coordinators at NHS health boards. HPs were identified and recruited using the HM database of trained facilitators and via HM coordinators. The recruitment process is detailed in Fig. 1.

2.3. The system

The Digital Heart Manual website is powered by ExpressionEngine [20] and the systems resides on the NHS web server. ExpressionEngine [20] is a powerful and secure content management system, designed to allow a website to be managed using a built in control panel.

To retain the integrity of the original HM, the innovative digital version was identical in structure and content. Key design considerations for the digital version were that it was to be offered as an alternative format to the paper version. The content of the paper version has been fully validated and evidenced to be effective form of cardiac rehabilitation, therefore all content and guidance should be retained. However, further instruction would be needed to aid the use of the website. Given that the Heart Manual programme is NHS owned, the web content accessibility guidelines (WCAG 2.0) [21] used by the NHS and Scotland's Health on the web (SHOW) should guide the design of the prototype. WCAG principles are shown in Table 1.

2.4. Procedure

Project approval was granted by the Quality Improvement team (NHS Lothian) and was considered a service evaluation.

2.4.1. Expert review

The digital prototype was subjected to expert review by members of the specialist development team, which included a health psychologist, senior nurse manager, specialist cardiac rehabilitation nurse, assistant psychologist, usability assessor, academic expert in eHealth and external IT experts, and used both group discussion of the product and individual feedback. The review identified early changes necessary to remotely track usage patterns, improve user interface and increase user login security. These changes were applied before commencing the full field trial.

2.4.2. Phase 1: field trial & user evaluation: initial prototype

Individuals were emailed unique login details, a secure link to access the D-HM resource and Usability and Accessibility Questionnaire to complete and return on completion of their trial. Users tested the tracked digital prototype in their own time and environment to explore how the resource fits into their everyday routine. Throughout the evaluation respondents were given the opportunity to contact the research team to ask any questions or to request technical support (accessibility/usability comments were noted and included in the qualitative analysis).

2.4.3. Phase 2: user evaluation of revised prototype

Participants reviewed the modified version of the resource (focusing on a list of implemented changes) and provided feedback via semi-structured telephone interviews. On completion of the study all participants were emailed a summary of evaluation findings and thanked for participation.

2.5. Measures

2.5.1. Phase 1

2.5.1.1. Usability and accessibility questionnaire (UAQ). The semi-structured UAQ (derived from standardised Web Content Accessibility Guidelines [21,22]) assessed the acceptability (attitudes to the introduction of a digital format) accessibility (in terms of accessible content and web browsers, and usability (direct user experience) of the D-HM (Appendix A). It comprised two parts: (1) The *quantitative* section assessed website usability aspects (16 items) e.g. layout, text size plus one item assessing confidence using technology, using a five point Likert rating scale (1 = very poor/low; 5 = very good/high) and (2) The *qualitative* part (11 open-ended questions) explored participants' experience using the HM resource.

2.5.1.2. User tracking. Expression Engine v2.8.1. [20] was used to remotely record participants' website interaction. The tracking generated a list of users that had visited the website, pages visited, date, time and duration each page was visited.

2.5.2. Phase 2

2.5.2.1. Semi-structured telephone interviews. Interviews (mean = 15 min, range 5–28 min) were carried out by two members of the research team (J.E. and L.M.). The interview schedule included three open ended questions asking participants about their views on the modified resource, specific changes

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