

Behaviour change techniques and intervention characteristics in digital cardiac rehabilitation: A systematic review and meta-analysis

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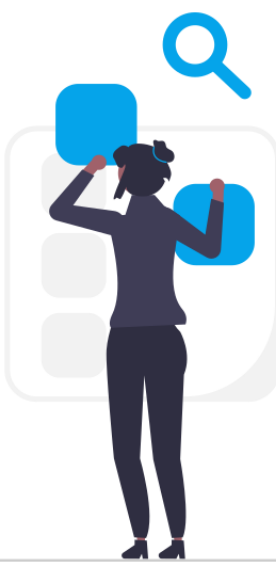
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Background

- Cardiac rehabilitation (CR) aims to **stabilise, slow, or reverse** the progression of cardiovascular disease
- Emerging evidence suggests that digitally delivered cardiac rehabilitation (CR) is likely to be **as effective as** centre-based CR
- However, there is **limited understanding** of the behaviour change techniques (BCTs) and intervention characteristics included in digital CR programmes

Review questions

- Identify the **behaviour change techniques** (BCTs) and **intervention characteristics** used in digital CR programmes
- Examine the BCTs and intervention characteristics **associated with effective** digital CR programmes



Methods

Database search

- PubMed, MEDLINE (Ovid), EMBASE (Elsevier), CINHAL (EBSCO), PsycINFO (Ovid) and Cochrane Central Register of Controlled Trials were searched for **RCTs of digital CR** in patients with heart disease

Data extraction

- Interventions were coded using the **BCT taxonomy v1** and the Template for Intervention Description and Replication (**TIDieR**) checklist
- Data on **behavioural, clinical** and **physiological** outcomes were extracted

Data synthesis

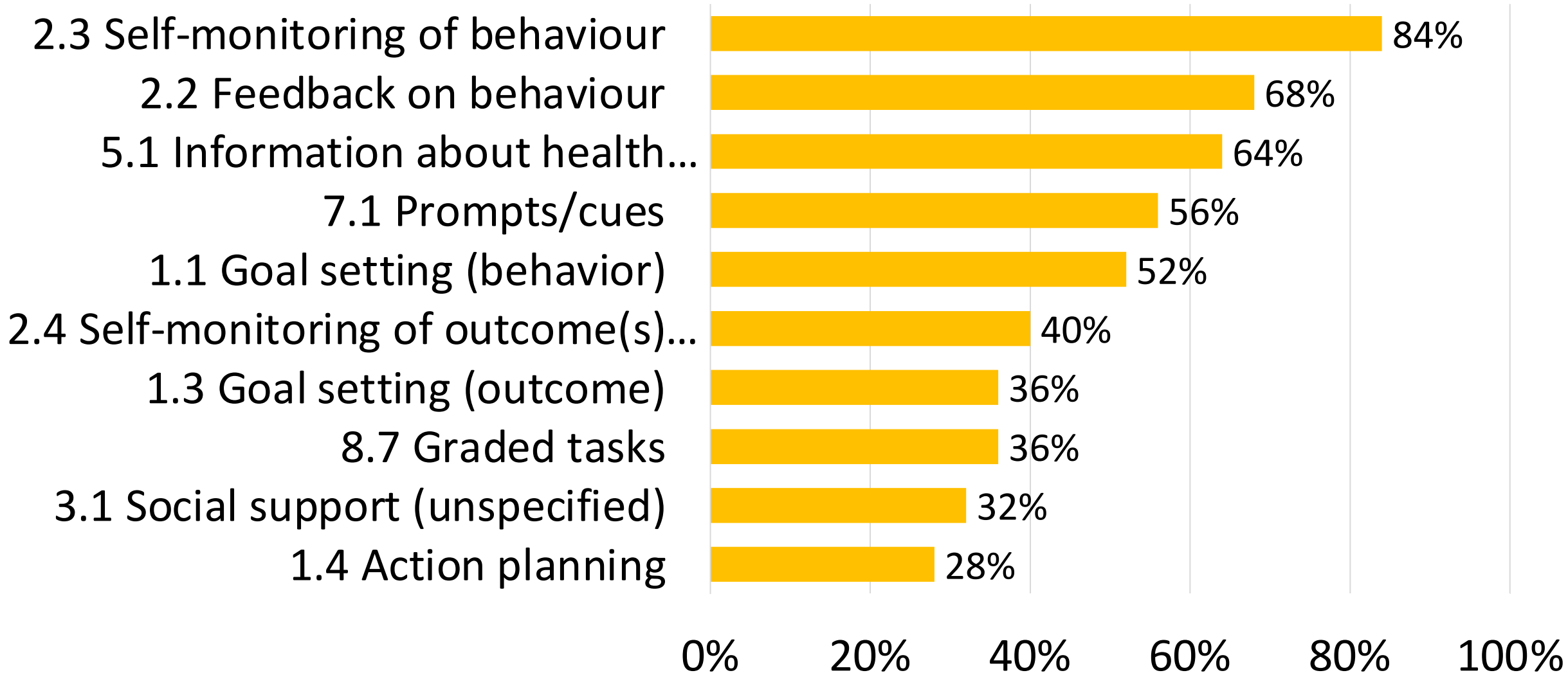
- Outcomes were synthesis in a series of **meta-analyses** and **narratively** where appropriate
- Interventions were classified as ‘effective’ if they produced **a statistically significant difference** between intervention and comparator in a behavioural outcome

Results (cont.)

Behaviour change techniques

- 37 unique BCTs were coded in the interventions
- Interventions used an **average 8.2 BCTs** (SD = 5.37; range 3 – 23)
- The most common BCT groups were ‘**feedback and monitoring**’ (30% of all coded BCTs), ‘**goals and planning**’ (23%), ‘**natural consequences**’ (9%), and ‘**social support**’ (8%)
- See Table 1 for the most frequently coded BCTs

Table 1. Frequency of BCTs in the interventions



- Below are the BCTs associated with **significant improvements** in four behavioural outcomes



Physical activity

- 1.1 Goal setting (behaviour)
- 1.2 Problem solving
- 2.2 Feedback on behaviour
- 2.3 Self-monitoring of behaviour
- 3.1 Social support (unspecified)
- 6.1 Demonstration of the behaviour



Healthy eating

- 1.3 Goal setting (outcome)
- 2.2 Feedback on behaviour
- 5.1 Information about health consequences



Smoking cessation

- 2.3 Self-monitoring of behaviour
- 5.1 Information about health consequences
- 7.1 Prompts/cues



Medication adherence

- 5.1 Information about health consequences
- 7.1 Prompts/cues

Results

Study and intervention characteristics

- 25 RCTs** were included in the review
- Total sample = 3,667 (Mean age = 60.06; Males = 75%)
- 13 interventions (52%) reported using a **theoretical framework**
- Mode of delivery** included:



Websites
72%



Smartphone
apps
40%



Telemonitoring
devices
64%



SMS
32%



Email
40%



Face-to-face
64%

Completeness of intervention reporting

- Completeness of reporting in the studies among the TIDieR items ranged from 42% (n = 5) to 92% (n = 11)
- Only 6 studies** (24%) adequately described the materials used in the interventions

Effectiveness

- Digital CR was **comparable** to centre-based CR on all outcomes
- Versus usual care, digital CR lead to **significant improvements** in:
 - Daily steps (SMD 0.31, 95% CI = 0.10 to 0.51; P = .003)
 - Light physical activity (SMD 0.29, 95% CI = 0.08 to 0.50; P = .006)
 - Functional capacity (SMD 0.23, 95% CI = 0.10 to 0.37; P < .001)
 - Low-density lipoprotein-cholesterol (LDL-C) (SMD -0.18, 95% CI = -0.30 to -0.05; P = .006)
 - Medication adherence

Conclusion

- Digital CR appears effective** at improving outcomes for patients with cardiovascular disease
- Interventions that were effective at improving behavioural outcomes frequently employed BCTs relating to feedback and monitoring, goals and planning, natural consequences, and social support
- Many characteristics of digital CR interventions are **not adequately described**, preventing accurate interpretation of results and intervention replication
- Future work should aim to improve the quality of reporting of interventions and their theoretical basis

