A systematic and integrated review of mobile-based technology to promote active lifestyles in people with Type 2 Diabetes

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Introduction

- Substantial benefits of leading an active lifestyle following a diagnosis of Type 2 Diabetes have been reported, including improved glycaemic control. Reduced sedentary time has been shown to be effective in the management of blood glucose levels in non-diabetic adults irrespective of physical activity levels.
- Technology offers a method of delivering interventions on a much larger scale and could have a significant impact on management of the current diabetes epidemic.
- Studies examining the use of mobile-based technologies to promote an active lifestyle have not previously been reviewed.

Aims

To review studies examining the effectiveness, acceptability and feasibility of mobile-based technology for promoting active lifestyles in people with Type 2 Diabetes.

Methods

- An integrated review was conducted using a modified methodological framework developed by Whittemore and Knafl (2005).
- Electronic databases (PubMed, Medline, ScienceDirect and ACM Digital Library) were searched for papers up to October 2015
- The inclusion criteria included:
  - **Participant**: Participants with Type 2 Diabetes.
  - **Intervention**: Promotion of an active lifestyle using smartphone apps and wearable technology for Type 2 Diabetes management.
  - **Comparison**: Any comparison.
  - **Outcome**: Feasibility, acceptability or effectiveness of technology
  - **Study Design**: Both empirical and theoretical research published in English from peer reviewed journals and conference papers.
- Data were extracted and quality was assessed using an adapted quality assessment tool.
- Studies were categorised as:
  - 1)informing, 2)monitoring, 3)provoking or 4)sustaining behaviour.

Figure 1: Literature Search Exclusion Chart

Initial Literature Search
(*n* = 7662)

Papers removed following application of exclusion criteria
(*n* = 72)

Papers removed following evaluation of abstracts
(*n* = 13)

Papers removed following evaluation of full texts

Final collection of papers for review
(*n* = 9)

Results

- Figure 1 illustrates the search and exclusion process.
- Nine papers were identified as suitable for review.
  - Five studies used Smartphone or tablet apps, one used a Diabetes PDA, one used a combination of continuous glucose monitor and accelerometer, one used a pedometer and one used a website delivered by a Smartphone.
- Six studies examined effectiveness, three examined feasibility, the acceptability of technology was examined in four studies and three studies examined a combination.
- Five papers focused on the effectiveness of using mobile-based technology to inform, provoke and sustain lifestyle change.
- Three papers examined the feasibility of technology used to inform, monitor and provoke lifestyle change.
- Four focused on the acceptability of mobile-based technology on informing, monitoring and provoking lifestyle change.
- No papers examined the effectiveness of mobile-based technology in monitoring health behaviours and behaviour change.
- The feasibility and acceptability of using mobile-based technology to provide sustained lifestyle change has not been investigated.
- Four of the studies found mobile-based technology to be motivational and supportive for behaviour change.

Discussion and Conclusions

- The visual reinforcement of the importance of being physically active for good glucose management was identified as motivational.
- None of the studies examined all three of the outcomes.
- None of the studies focused solely on decreasing the participants' sedentary behaviour.
- Limited research has examined the feasibility, acceptability and effectiveness of mobile-based technology to promote active lifestyles and subsequently good diabetes management in people with Type 2 Diabetes.

Recommendations

- Consider using mobile-based technology that can be tailored to the individual.
- Future interventions should be informed by research that has examined all three variables to identify the most effective, feasible and acceptable mobile-technology methods in promoting sustained active lifestyles in those with Type 2 Diabetes.

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