

# The feasibility and appeal of mobile ‘apps’ for supporting healthy food purchasing and consumption among socioeconomically disadvantaged women: a pilot study

Kylie Ball<sup>A,B</sup>, Jennifer Mouchacca<sup>A</sup> and Michelle Jackson<sup>A</sup>

<sup>A</sup>Centre for Physical Activity and Nutrition Research, School of Exercise and Nutrition Sciences, Deakin University, 221 Burwood Highway, Burwood, Vic. 3125, Australia.

<sup>B</sup>Corresponding author. Email: kylie.ball@deakin.edu.au

## Abstract

**Aim:** This pilot study aimed to assess the feasibility and appeal of using existing hand-held mobile technology (iPod or iPad) ‘apps’ as tools promoting healthy food planning, shopping and eating behaviours among socioeconomically disadvantaged women.

**Methods:** Surveys were administered before and immediately after a 4-week trial of seven currently available iPod or iPad apps, each of which addressed known barriers to healthy eating among socioeconomically disadvantaged women. A convenience sample was recruited from a local community in Melbourne, Australia, comprising 19 women with a low education (fewer than 12 years of formal education) or a low income (a household income of less than \$1000 per week, and/or having a pension or benefit as the main source of income).

**Results:** More than half of the sample ( $n = 11$ , 61%) used most apps at least weekly over the study period. Few found any of the apps complex or difficult to use, and most ( $n = 14$ ) reported that they would use their preferred apps again. Features liked included portability, simplicity, user-friendliness, and novelty/new knowledge provided by certain apps; less appealing features included requirements for time-consuming data entry and inability to access features offline.

**Conclusions:** Selected iPod and iPad apps are useable and appealing to socioeconomically disadvantaged women. Particular features of apps, including simplicity of use and providing seasonal information, appear helpful in assisting women to plan, shop and consume healthy foods.

**So what?** This study demonstrates a promising approach for reaching and engaging socioeconomically disadvantaged target populations in healthy eating, through the use of mobile apps. Further research establishing the effectiveness of these apps in promoting healthy food planning, shopping and eating behaviours is now warranted.

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## Introduction

Given the long-established risk of consuming a less healthful diet amongst people experiencing socioeconomic disadvantage,<sup>1,2</sup> low-cost, effective nutrition promotion approaches capable of reaching and engaging socioeconomically disadvantaged participants are required. Mobile technology is increasingly ubiquitous and offers novel capabilities for delivering health promotion support. High-speed data transmission, inexpensive provider plans, sophisticated mobile handsets, and increasing numbers of innovative mobile applications or ‘apps’ are revolutionising the manner in which information can be accessed and delivered. Mobile phone penetration levels have reached saturation point (over 100%, or more subscriptions than people) in Australia.<sup>3</sup> This communications

revolution provides new opportunities to connect with users and promote health using new and innovative technologies. Of particular promise, mobile technology is widely accessible across socioeconomic groups, given that almost every adult Australian (at least up to age 60 years), including those with low incomes or in low-status occupations, owns at least one mobile telephone,<sup>4</sup> and currently more than two-thirds (68%) own a smartphone.<sup>5</sup> With smartphone costs continually decreasing, it is estimated that in 2–3 years almost all Australian adults will own a smartphone.<sup>5</sup>

One innovation of mobile phone technology is the application or ‘app’. There are many thousands of health or fitness apps available in the iTunes store. These apps provide novel potential to support individuals in their endeavours to eat more healthily, to be physically

active, or to lose weight. A limited number of feasibility studies have assessed the appeal of selected diet-related apps, suggesting that these show promise.<sup>6–8</sup> However, these apps are limited in number and have tended to focus on weight loss. Evidence of the appeal and effectiveness of mobile apps in promoting healthy eating is lacking. This is particularly the case amongst socioeconomically disadvantaged individuals, who comprise an important target group for nutrition promotion.

The aim of this study was to assess the feasibility (e.g. ease of use, likelihood of using) and appeal of using existing hand-held mobile technology (iPod, iPad) apps as tools promoting healthy food planning, shopping and eating behaviours among socioeconomically disadvantaged women. Women were targeted, since they remain primarily responsible for food shopping and preparation in Australian households.<sup>9,10</sup>

## Methods

This study was approved by the Deakin University Faculty of Health Human Ethics Advisory Group (HEAG–H131\_11). A convenience sample of 19 women of low education (defined as fewer than 12 years of formal education) or low income (defined as having a household income of less than \$1000 per week, which is ~80% of the median income in Australian households,<sup>11</sup> or having a pension or benefit as the main source of income) was recruited in 2012 via local advertising placed around the researcher's campus in Burwood, Victoria, snowball techniques and word of mouth. Participants were screened to ensure they met at least one of these eligibility requirements upon registering interest in the study; further specific details were not sought given the sensitivity of these questions. The participants completed a pre-trial survey on current use and perceptions of the technology, and were then depending on preference loaned an iPad 2 ( $n=15$ ) or an iPod ( $n=4$ ) loaded with seven apps (see Table 1), currently available in the iTunes store, relevant to food planning, purchasing or consumption. The apps were chosen on the basis of their relevance to addressing known barriers to healthy eating among socioeconomically disadvantaged women. These included perceived affordability, which was addressed in two apps: Fresh Right Now,<sup>12</sup> which provided details of the fruits and vegetables in season and hence more available and affordable at different times of the year; and Pennies,<sup>13</sup> a budgeting app in which users set a

budget and enter and monitor expenses in different categories. Other apps addressed behavioural strategies such as meal planning (ShopShop,<sup>14</sup> a simple shopping list app), cooking skills (Epicurious,<sup>15</sup> a recipe app that includes more than 30 000 tested, fully photographed and member-rated recipes), or established behaviour change principles (Traxitall,<sup>16</sup> a goal-setting and self-monitoring app that enables users to set any types of goals, monitor and view progress towards these, and receive reminders). We also tested two apps that incorporated local environmental relevance – apps for Coles<sup>17</sup> and Woolworths,<sup>18</sup> the two largest supermarket chains in Australia. Both of these apps incorporated several features, including promotions of fresh produce currently on sale within local stores, as well as weekly catalogues, shopping lists sorted by aisle, product finders and nutritional information, and recipes. Women were asked to trial all of the apps for a 4-week period, after which they reported on their use and perceptions and perceived usefulness of the apps using scales devised by the researchers. Women responded to a 4-point scale assessing the frequency of use of the apps; daily, 2–3 times a week, once a week or never. They then rated their agreement, on Likert scales of 1–5 (strongly disagree to strongly agree), with a range of statements about the ease of use and appeal of each app (e.g. 'I found the app easy to use', 'I felt very confident using the app', 'I would use the app again'). They were also asked open-ended questions about what they liked and disliked about each app, and whether or not they felt the app would assist them to eat healthily. Descriptive (scale questions) and thematic (open-ended questions) analyses were used to examine the data.

## Results

The mean age of the 19 participants was 41.9 years (s.d. 10.9 years). Most women were employed part time ( $n=8$ ), with smaller numbers enrolled as a student ( $n=3$ ), doing home-duties full time ( $n=3$ ), being employed full time ( $n=2$ ), retired ( $n=1$ ), on maternity leave ( $n=1$ ) or self-employed ( $n=1$ ). Eight women had fewer than 12 years of formal education, nine had a household income of less than \$1000 a week and two had a pension or benefit as their main source of income. Over half of the women ( $n=13$ ) reported that they had used a mobile phone application before, and six women reported having used a grocery budgeting, shopping or cooking (including recipes) app before. The women generally reported liking the portability (for iPods) and user-friendliness of the technology; most of the sample ( $n=16$ ) agreed that they were confident with using the iPad 2/iPod at recruitment.

Results showed that five of the seven apps were reportedly used at least weekly over the study period by the majority of women ( $n=11$ , 61%) (Table 1). Some women avoided particular apps altogether, which indicates either lack of perceived relevance or perceived difficulty of use. The least commonly used were Traxitall (used at least weekly by only four women; one woman explained 'It wasn't for me: I don't have any 'trackable' goals and am self-motivated already'); and Pennies (used at least weekly by only seven women),

**Table 1. Reported app use during the 4-week trial ( $n=19$  women)**

| App             | Daily (n) | 2–3 times a week (n) | Once a week (n) | Never (n) |
|-----------------|-----------|----------------------|-----------------|-----------|
| Fresh Right Now | 0         | 3                    | 14              | 2         |
| Epicurious      | 0         | 7                    | 11              | 1         |
| ShopShop        | 1         | 6                    | 5               | 7         |
| TraxitAll       | 0         | 1                    | 3               | 15        |
| Pennies         | 1         | 3                    | 3               | 11        |
| Coles           | 0         | 4                    | 13              | 2         |
| Woolworths      | 2         | 4                    | 12              | 1         |

with a typical response being 'It's too time consuming. I think if you didn't have to work and had time to play around with it, it would be great'. The app most commonly reported as helpful was Fresh Right Now (used at least weekly by 17 women), which women described as 'It was novel. I learned some new things. It might help you save money by buying 'in season' fruits and vegetables' and 'Easy to use. Very helpful when planning dinner/school lunches.' Other commonly used apps were Epicurious ( $n = 18$ ) liked best for its 'large library of recipes' and ease of use, Woolworths ( $n = 18$ ) commonly liked best for 'the recipes and shopping lists' and for its ability to display specials, and Coles ( $n = 17$ ) also commonly liked best for 'recipes, shopping lists and weekly specials'.

Women reported that they generally felt confident using the apps and 74% ( $n = 14$ ) reported that they would use their preferred apps again. Table 2 shows that relatively few women reported feeling that the apps were difficult or complex to use; only three apps were reported as complex to use by any participants. Four women found Pennies complex to use, and two participants found the Woolworths and Coles apps complex to use. While most women found the apps easy to use, they generally did not think they covered all the things that they wanted them to. For example, several women noted that the Fresh Right Now app would be improved by including recipes linked to the featured seasonal produce; the fact that the Epicurious recipe app did not provide access to recipes when offline was also reported as problematic; and several women wished that the Coles and Woolworths apps provided healthy recipes with nutritional information.

Fresh Right Now and ShopShop were more commonly reported as apps that would help participants eat more healthily. Ten of the 17 women who used Fresh Right Now, and seven of the 12 women who used ShopShop reported that these apps would help them to eat healthily. For example, women reported that they used Fresh Right Now 'to increase awareness of eating more fruit and veg', 'before going shopping in order to eat more fruits and veg', 'for meal planning' and 'to eat fresh and healthy and knowing what is in season and spending less'. The ShopShop app appealed because

'by having a list it avoids me buying other unnecessary items', 'encourages you to buy what's on your list and not just fill up on other things' and 'helped me remember what I needed when I was at the shops - more healthy food in the house means I am more likely to cook a healthy meal instead of ordering takeaway - as a result I have this app on my iPhone'.

## Discussion and conclusions

The results of this pilot study suggest that selected iPod and iPad apps are useable and appealing to women experiencing socioeconomic disadvantage. However, results also identified wide variation in the frequency of use and appeal of several apps. For example, two apps, incorporating behavioural strategies that could support healthy food procurement (Traxitall and Pennies), were avoided by the majority of the sample, with lack of perceived relevance, and time-intensive nature of data input required, cited as barriers to use. The findings also identified particular features of apps, including simplicity of use and providing seasonal information, which may be most helpful in assisting women to plan, shop and consume healthy foods.

Limitations of this study include the small sample size and short trial duration, which were unavoidable given the small budget for this research. It is possible that women who had not previously owned an iPhone or iPad were biased towards more frequent use due to the novelty of the technology; however, the majority of women had previously used either an iPhone ( $n = 11$ ), iPod ( $n = 4$ ), iPad ( $n = 3$ ) or other smartphone ( $n = 2$ ), and 13 had used apps previously. Consideration also needs to be given to the cost of the apps for this population. While the participants in this pilot study did not bear the cost of downloading the apps, which ranged from A\$0 to A\$2.49 with no ongoing costs, it is acknowledged the cost of available apps outside of this trial may be prohibitive to socioeconomically disadvantaged individuals. Similarly, lack of WiFi access may comprise a barrier for women using particular apps. Due to budget restrictions, the iPods and iPads in this study did not have 3G access. The majority of apps (ShopShop, Fresh Right Now, Traxit All and Pennies) did not require the internet 3G/WiFi after initial

**Table 2. Number of women reporting that they agreed or strongly agreed with statements about each app used ( $n = 19$  women)**

|   | Fresh Right Now | Epicurious | ShopShop | Traxitall | Pennies | Coles    | Woolworths |
|---|-----------------|------------|----------|-----------|---------|----------|------------|
| Number who used the app                                 | $n = 17$        | $n = 18$   | $n = 12$ | $n = 4$   | $n = 8$ | $n = 18$ | $n = 17$   |
| I think that I would use the app a lot                  | 7               | 8          | 5        | 2         | 6       | 6        | 10         |
| I found the app really complex to use                   | 0               | 0          | 0        | 0         | 4       | 2        | 2          |
| It was easy to find the information I needed on the app | 15              | 13         | 8        | 3         | 8       | 11       | 14         |
| I liked using the screens of the app                    | 15              | 13         | 7        | 2         | 6       | 11       | 12         |
| I found the app easy to use                             | 17              | 17         | 10       | 3         | 8       | 13       | 16         |
| I liked the layout of the app                           | 16              | 14         | 5        | 1         | 7       | 9        | 14         |
| The app covered all the things I wanted it to           | 13              | 8          | 4        | 0         | 7       | 6        | 10         |
| The app occasionally failed to work or save information | 1               | 5          | 2        | 0         | 3       | 7        | 5          |
| It was easy to learn to use the app                     | 16              | 17         | 11       | 3         | 8       | 15       | 16         |
| I would use the app again                               | 14              | 12         | 7        | 2         | 6       | 10       | 14         |
| Overall, I liked the app                                | 15              | 12         | 8        | 1         | 6       | 8        | 14         |

set up completed before the distribution of devices. The limited components of the remaining apps that did require 3G/WiFi access were recipe searches in Epicurious, Coles and Woolworths apps. This meant that these features were limited to use where WiFi was available (e.g. at home, for meal/shopping planning rather than in stores). None of the women noted this as a barrier to use. However, access to WiFi/3G for maximising use of apps such as these should be an important consideration for future trials with target groups whose income may prohibit access to apps involving ongoing operational or networking costs.

Acknowledging these limitations, this study provides useful preliminary information that is currently lacking in the literature, on the appeal and feasibility of use of widely available mobile phone apps as a tool for promoting healthy eating among an important target group at risk of poor nutrition and associated ill health.<sup>1,2</sup> These findings suggest that larger randomised controlled trials, which can provide evidence of the effects of app use on nutrition-related behaviours, are warranted, and may represent a promising approach for reaching and engaging socioeconomically disadvantaged target populations. Given the variation in the use and appeal of different types of apps, as well as the appeal of different features across apps, the development and testing of a purpose-designed app for promoting healthy food shopping, preparation and consumption may be warranted.

### Conflicts of interest

None.

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