



Research Paper

Pilot study of a smartphone-based intervention to promote cancer prevention behaviours



Nuno Ribeiro^{a,b,c,*}, Luís Moreira^d, Ana Margarida Pisco Almeida^c, Filipe Santos-Silva^{a,b}

^a i3S – Instituto de Investigação e Inovação em Saúde, Universidade do Porto, Portugal

^b Ipatimup – Instituto de Patologia e Imunologia Molecular da Universidade do Porto, Portugal

^c Departamento de Comunicação e Arte, DigiMedia, Universidade de Aveiro, Portugal

^d RECI – Research in Education and Community Intervention, Escola Superior de Saúde Jean Piaget de Vila Nova de Gaia – Instituto Piaget, Portugal

ARTICLE INFO

Keywords:

Cancer prevention
Behaviour change
Smartphones
Mobile applications
mHealth

ABSTRACT

Background: Estimates predict that more than half of all cancers are due to inadequate lifestyle choices. Smartphones can be successfully used to support the behaviour change needed to prevent cancer.

Objective: The purpose of this study was to field-test Happy, a smartphone app designed to promote cancer prevention behaviours, based on tailored-messages.

Methods: Thirty-two participants downloaded and used the app for 28 consecutive days (4 weeks). At the end of this period, they all answered an online questionnaire and ten of them were interviewed. Usability, feasibility, message receptivity, and perceived impact of the app were assessed.

Results: Compliance with cancer prevention guidelines was lower than expected. Happy was considered simple, intuitive and easy to use. Messages sent by the app were considered easy to understand, providing good advice and meaningful information that catch reader's attention. Participants also considered that Happy might be an effective way to promote cancer prevention. Collected data showed an increased frequency in several cancer prevention related behaviours and an increase in the overall putative cancer prevention level.

Conclusions: This study showed the viability of designing and implementing smartphone-based interventions to promote cancer prevention behaviours. The results suggest that Happy is usable and might help users change their behaviour towards healthier choices and thus reduce their personal cancer risk.

1. Introduction

It is predicted that by the year 2030 cancer will affect more than 22 million people worldwide with over 17 million dying from the disease [1,2]. Factors like tobacco, sedentarism, alcohol, UV rays and a poor diet can seriously raise the risk of cancer. In fact, it is estimated that more than half of all cancers are due to inadequate lifestyle choices [3–10]. The European Code Against Cancer [11] states that many aspects of general health can be improved and many cancer deaths can be prevented if healthier lifestyles are adopted. These prevention behaviours can be achieved by following these guidelines: (1) Do not smoke; (2) Maintain a healthy body mass index (BMI); (3) Implement some brisk physical activity every day; (4) Increase daily intake of vegetables and fruits (at least five servings per day); (5) Limit alcohol consumption to one or two drinks per day (women and men, respectively); (6) Avoid excessive sun exposure; (7) Enrol in cancer screening tests (cervical, breast and colorectal); (8) Participate in vaccination programs against hepatitis B virus (HBV), and human papillomavirus (HPV); (9) Avoid

exposure to known cancer-causing substances. Although people have favourable attitudes towards healthy behaviours, they often lack the skills needed to maintain them as part of their daily routine [12].

Several studies have suggested that smartphone apps can support successful behaviour changes ranging from smoking cessation, to weight loss and disease management [13–19]. However, most of these studies describe limited interventions designed to target a specific behaviour. Targeting multiple behaviours at once, we can promote a health awareness that, in turn, might trigger other healthier behaviours with great benefits for the global health status [20]. This is particularly important in the area of cancer prevention, as the overall risk of cancer is a result of concurrent risk factors.

This paper reports the results from a pilot study of a smartphone-based intervention designed to promote cancer prevention behaviours called Happy (Health Awareness and Prevention Personalized for You).

* Corresponding author at: i3S – Instituto de Investigação e Inovação em Saúde, Universidade do Porto, Rua Alfredo Allen, 208, 4200-135 Porto, Portugal.
E-mail address: nribeiro@ipatimup.pt (N. Ribeiro).

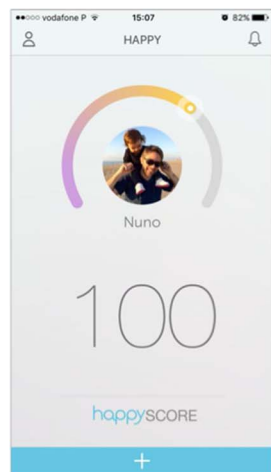
Table 1
Contribution of behavioural factors and indexes to Happy Score.

Behavioural factors and indexes	Description and range	Points
Smoking	Number of smoked cigarettes per day. From > 25 to 0 cigarettes.	0–35
Alcohol consumption	Number of alcoholic drinks consumed per day. From > 1–0 drinks (Female); > 2–0 drinks (Male).	0–5
Fruit and vegetables consumption	Number of portions of fruit and vegetables consumed per day. Range: 0–≥5 portions.	0–20
Unhealthy foods consumption	Number of portions of unhealthy foods consumed per day (red meat, processed meat, and fatty foods). From > 3 to 0 portions.	0–10
Physical activity level	Physical activity level as measured by the International Physical Activity Questionnaire, short form [30]. From low to high.	0–5
UV radiation exposure	Number of sunburns last week. From > 1 to 0.	0–2
HPV and HBV vaccination	From “no vaccination” to “HBV and HPV vaccination” (Female) or “HBV vaccination” (Male)	0–20
Cervix cancer screening	Cervix cancer screening enrolment according to national guidelines [31]. Only applies to female. From “no screening performed” to “currently screened”.	0–10
Self-exams	Skin, breast (female) and testicular (male) self-exams performed. From “no self-exam performed” to “all self-exams performed”.	0–30
Diet quotient	Ratio between portions of fruit and vegetables and portions of unhealthy foods (Cut point: 0.9).	0–8
BMI	Body mass index calculated using height and current weight. From obesity to normal weight.	0–15

2. Materials and methods

2.1. Happy smartphone app

The development of the smartphone app Happy has been described in detail elsewhere [21]. In brief, Happy uses Fogg Behaviour Model [22,23] as a theoretical framework, and is based on the principle of tailoring [24]. When users access the app for the first time, they are required to answer a questionnaire. The questionnaire has 13 and 14 questions for men and women, respectively, and assesses diet, physical activity, weight, alcohol and tobacco consumption, ultraviolet (UV) radiation exposure, vaccination, screenings and self-exams. This questionnaire allows user profiling and determines the current putative level of cancer prevention, called Happy Score (HSc) in the context of the app. This score was created for the purposes of this app and isn't a clinically validated measure of cancer prevention. HSc summarizes the information about user's behaviours associated with cancer risk/prevention. It is calculated by adding up the points obtained for every self-reported behaviour (Table 1). The points attributed to each behaviour were weighted according to available scientific evidence [25–28]. The resulting score ranges from 0 to 150: the highest the displayed number, the better the overall behaviour in terms of cancer prevention. HSc is represented on the landing page, allowing users to self-monitor their behaviour in a glanceable way (Fig. 1a). This strategy has proven to be effective in influencing health behaviours in other contexts [29].



a



b



c

Fig. 1. Screenshots of the smartphone app Happy: landing page (HSc = 100) (a); Sample question from the behaviour assessment questionnaire (b); Statistics section (c).

Behaviour assessment during app use was done through Ecological Momentary Assessment [32,33]. Each day, 30 min before self-reported bedtime, users were prompted to answer one behaviour question, randomly assigned from the whole behaviour assessment questionnaire (Fig. 1b). They could also report behaviours by taping the button “ + ” on the app's landing page (Fig. 1a).

These behaviour assessments were used to recalculate the users' HSc and change the user profile over time, allowing message tailoring to occur concurrently to behaviour changes. At any given moment, users could assess their behaviour by exploring the statistics section of the app (Fig. 1c).

Happy also sent one tailored message per day within the self-reported waking hours of the user via push notification (Table 2). A total of 1120 messages were developed. Messages followed the European Code Against Cancer guidelines [11] and targeted specific behaviours, providing educational information, reminders, motivators and facilitators. The messages were tailored to the users' profile, and took into account users' context (location, time of day, week and month, weather conditions). All reported behaviours that didn't comply with cancer prevention guidelines, were targeted by the app.

2.2. Recruitment

Individuals were recruited via e-mail and Facebook. The recruitment e-mail was sent to a mailing list from University of Aveiro

Download English Version:

<https://daneshyari.com/en/article/4966532>

Download Persian Version:

<https://daneshyari.com/article/4966532>

[Daneshyari.com](https://daneshyari.com)