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Mobile Health to Support Ageing in Place: A Synoptic Overview

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Abstract

Technologies for ageing in place may overcome multiple impairments, including declines in cognitive and functional abilities and, consequently, may allow older adults to live safely, independently, autonomously, and comfortably, without being required to leave their own residences. In particular, mobile health (mHealth), due to several factors, has gotten special attention in terms of its potential to support the care provision of older adults in addition to assist professional activities in clinical environments. Therefore, the present article presents a synoptic overview of current state-of-the-art of mHealth applications for ageing in place.

1. Introduction

A concern of the population ageing is related to the unsustainable pressure on public spending, particularly the rising of health and social costs: with public budgets at strain, care systems cannot afford to do less because demands and expectations are increasing. In this context, technological solutions emerge as potentially cost-effective to promote

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the services reorganization. This is the aim of eHealth services (i.e. health services and information delivered or enhanced through the Internet and related technologies)[1].

Mobile applications, due to several factors, including smartphone penetration, availability of applications, wireless broadband access, and the fact of being tethered to the individual, have gotten special attention in terms of their potential to support the care provision (i.e. mHealth[2]). In this respect, the present article aims to provide a synoptic overview of the current state-of-the-art of mHealth solutions to support older adults in their residential environments (i.e. ageing in place[3,4]), which is useful to inform older adults, practitioners, and researchers.

2. Applications

A minimally viable ageing in place infrastructure requires the deployment healthcare services for monitoring and maintenance of physical and psychological wellbeing, mobility and safety[4]. For that, it is necessary the decentralization of healthcare provision, namely the migration from secondary and tertiary care frameworks towards primary and community delivered care[4]. Consequently, mHealth might be used to promote healthy lifestyles, to provide home safety, to decrease loneliness and social isolation or to optimize the care and the respective interventions.

2.1. Healthy Lifestyles

Accordingly the literature, mHealth has been widely used to promote healthy lifestyles, including physical activity, nutrition, and weight management or health education[5-11].

2.1.1. Physical Activity

Physical activity affects health conditions and the current recommendations advice older adults to perform regular physical activity[12]. Therefore, there is an extensive body of research on technological solutions to promote home-based physical activity interventions, since remote interventions removes the barrier of transportation and promotes the integration of physical activity into daily life[5-8].

In particular, smartphones are being considered to promote physical activity with the support of strategies that typically involve 'pushing' the participants with periodic prompts (e.g. messages) from a central source[5,6], physical activity measures and remote feedback[7].

When reported as an outcome, physical activity is being measured through validated questionnaires (e.g. the Short Questionnaire Assessing Health-enhancing - SQUASH, the Baecke Physical Activity Questionnaire, and the comprehensive evaluation of the Minnesota Leisure Time Physical Activity Questionnaire), or quantitative measures. Examples of quantitative measures are steps per day or minutes of weekly exercise that can be performed by different types of devices, namely pedometers or accelerometers[6].

2.1.2. Nutrition and Weight Management

There are several mHealth applications able to capture dietary intake to promote self-monitoring adherence[11], which can be divided into: i) applications that allow participants to select food and portion size; ii) application that process food photograph taken by the users; and iii) applications supporting questionnaires such as the Food Frequency Questionnaire (FFQ) or the MEDFICTS score.

Smartphones present several advantages when compared to desktop computers or notebooks and, in particular, they can be used to record individual dietary intake just after consumption[11]. This can be done by self-administered quantitative questionnaires to record the food intake (e.g. by scrolling through a list of foods or by selecting a food group and then a specific food item), or by taking photos.

Concerning weight management, remote interventions are being delivered using smartphone applications, or even more traditional methods, such as telephone calls[5,9]. The interventions can be delivered to groups or individuals, and they can involve one-off or ongoing interactions between the implementer and the participants that include: counselling and advice, self-directed and prescribed exercises, home-based and facility based exercises, or motivational support.