How Do Convenience and Unobtrusiveness Influence Urinary Incontinence Patients? An Adoption Model of Wearables in Chronic Disease Management

Extended Abstract

Michael Burkard, Jannik Lockl, and Tristan Zürl
Universität Bayreuth, Universitätsstraße 30, 95447 Bayreuth
(Contact: michael.burkard@uni-bayreuth.de)

Motivation

Urinary incontinence (UI) is a major urological health issue estimated to currently affect 423 million people worldwide (Irwin et al. 2011). Due to its widespread appearance, UI has a huge social and economic impact (Neubauer and Stiefelmeyer 2005; Nitti 2001). The involuntary leakage of urine is characterized by various lower urinary tract symptoms (DeMaagd and Davenport 2012; Irwin et al. 2011; Rizvi and Ather 2017). Conventional aids predominantly contain unhygienic and cumbersome attributes (German Continence Society 2020; Toye and Barker 2020). Mobile health (mHealth) interventions have the potential to significantly improve both the quality of life and the quality of care of those suffering from UI (Silva et al. 2015; Dou et al. 2017; World Health Organization 2011). The mHealth market and the number and variety of mHealth solutions are rapidly expanding (Silva et al. 2015; Jiang et al. 2017; research2guidance 2013). Also, the amount and diversity of research concerning mHealth are quickly growing (Silva et al. 2015; Dou et al. 2017). However, mHealth applications regularly lack in user acceptance and fail when entering the market (Nilsen et al. 2012; Pan and Zhao 2018). Research and practice thereby lack in knowledge of factors that have an impact on chronic disease patients, such as UI patients, to accept mHealth solutions (Jiang et al. 2017). Building upon such knowledge, designing such devices with the objective to ensure later user adoption needs further guidance and structure (Dou et al. 2017).

Objective

In this study, we present an adoption model to explain and derive design principles to support the adoption of mHealth solutions by chronic disease patients. We likewise aim at guiding future developments of mHealth interventions for UI and other chronic health issues.

Methods

At the outset, we conducted a systematic literature review, during which we identified 67 papers, analyzed them using coding techniques from Grounded Theory (Corbin and Strauss 1990; Wolfswinkel et al. 2013), and concluded in an ex-ante adoption model. Based on the initial model, we developed a mHealth solution that noninvasively determines the filling level of the urinary bladder and displays the filling level to a digital end device. Subsequently, we applied an Action Design Research (ADR) approach (Sein et al. 2011) to revise the adoption model and the solution. Equally split in alpha- and beta-cycle, we conducted 20 semi-structured interviews with UI patients and twelve with selected experts in the fields of urology, neuro-urology, paraplegiology, day care of demented patients, physiotherapy, social counseling, and medical technology. To finally test and validate our constructs in a larger setting, we conduct a survey as additional part of the beta-cycle of our ADR approach.

Results

The ex-ante adoption model consists of five categories (i.e., users, perceived benefits, hard- and software, data, environment) and 21 sub-categories. After presenting the initial mHealth solution, we depict transformations of our adoption model and our solution that we performed after each of the two cycles. As a result, we present the ex-post adoption model of factors affecting the intention of UI patients to adopt mHealth interventions that we call the Chronic Disease mHealth Adoption Model (CDmHAM). Introducing and evaluating our revised mHealth solution, we finally derive a catalog of design principles to guide and structure future developments of mHealth interventions for chronic health issues.

Key words

mHealth, wearable sensor system, non-invasive monitoring, chronic disease management, urinary incontinence, adoption model

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