

## Chapter 6

# Application of Health Behavior Frameworks in the Design of an Oral Anticancer Medication Adherence App

### **ABSTRACT**

*This chapter describes the application of the Intervention Mapping (IM) framework through a case study of the development of an in-house medication adherence mHealth app for oral anticancer medications (called MedFC). Using the behavioral intervention frameworks described previously, this chapter discusses how patients' medication adherence needs, mobile app usage, perceptions and experiences with the prototype helped inform the development of MedFC. Through iterative evaluations, this chapter will illustrate how a mHealth intervention can be developed in a holistic manner, involving its target audience in the design process.*

### **INTRODUCTION**

The advancement of smartphone technologies and its ubiquitous distribution in various parts of the world have presented a great opportunity for effective interventions that can be used to address patients' needs (E. E. Ali, Leow, Chew, & Yap, 2018; Car, Tan, Huang, Slood, & Franklin, 2017; Deloitte, 2015; Haase, Farris, & Dorsch, 2017; Pew Research Center, 2016; Spoelstra

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& Sansoucie, 2015). This has resulted in a plethora of apps that have targeted medication adherence, but majority of these apps have deficiencies that limit their usefulness for patients with medication adherence issues (E. E. Ali, Teo, Goh, Chew, & Yap, 2018; L. E. Dayer et al., 2017; Santo et al., 2016). One of the reasons for the suboptimal quality of these apps is because of the lack of involvement from potential end-users in the development process (Ahmed et al., 2018). There are limited studies in the literature on what makes an ideal adherence app. Research work done in this domain have either focused on specific aspects of interventions (e.g. side-effect management, education) (Hsu et al., 2017), or only provided a listing of potentially relevant app features (E. E. Ali, Leow, et al., 2018; Fishbein et al., 2017). Although studies have suggested that the usability and relevance of an mHealth app is greatly impacted by the way the health or drug information is presented to patients (Fraccaro et al., 2018; Groshek, Oldenburg, Sarasohn-Kahn, & Sitler, 2015), there is little work being done to identify the details of the app interface design. This chapter discusses how health behavior frameworks can be applied through a case example of the design requirements of a medication adherence app prototype for oral anticancer medications (OAMs), known as MedFC (E. E. Ali et al., 2019; E. E. Ali, Leow, et al., 2018). This app was developed for use by clinicians to monitor patients with cancer and on multiple medications. The system utilized near-field communication (NFC) technologies for medication labeling, and was designed to have different features with separate interfaces for clinicians, patients and caregivers (E.E. Ali et al., 2016).

MedFC was developed in accordance to IM framework, BIT-Tech, and UCD theory (E. E. Ali, Chan, Leow, Chew, & Yap, 2019; E. E. Ali, Chan, Poh, et al., 2019). The IM approach advocated an iterative process that involved six essential steps in the development of theory-based and evidence-based behavioral interventions (Please refer to Chapter 3, Figure 4) (Bartholomew, Parcel, Kok, Gottlieb, & Fernandez, 2011; Kok, 2014). Components of the BIT model that complemented the IM approach, particularly with respect to the technical instantiation of theory-based interventions, were consulted. More specifically, the development process described in this section matched with the first four steps of the IM approach and the BIT-Tech components of the BIT model.

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