Title: A Mobile Health Framework for Public-Private Mix in Tuberculosis Prevention and Care in South Western Uganda

Name: Wilson Tumuhimbise || Registration Number: 2018/PhD/030/PS

Abstract

Ensuring that presumptive tuberculosis (TB) patients referred from private hospitals have reached their points of referral without delays or getting lost along the referral pathway is key in achieving better TB control efforts. Although mHealth technologies have been recommended by the World Health Organization (WHO) as emerging opportunities for closing gaps in TB care through enhancing public private mix (PPM), there is lack of frameworks to guide the development of mHealth interventions for following up presumptive TB patients referred from private to public hospitals especially in settings where most private hospitals are not licensed to manage TB cases.

The user centered design approach was adopted in this research to develop an mHealth framework for designing a mobile application to support the follow up of presumptive TB patients referred from private to public hospitals in southwestern Uganda. The research employed mixed qualitative and quantitative methods to carry out four investigations. Investigation one is a scoping review that analysed the existing mHealth interventions for PPM to identify their strengths and weaknesses. Investigation two is a formative qualitative study that explored barriers and motivators of private hospitals' engagement in TB care and the potentials of mHealth technologies to inform the design of a potential mHealth intervention using CFIR (Consolidated Framework for Implementation Research) framework. Informed by investigations 1 and 2, investigation three is a framework design study that developed an mHealth framework for following up presumptive TB patients referred from private to public hospitals. Investigation four is a mixed methods study that explored the initial feasibility and acceptability of the developed mHealth intervention. The research involved 35 in depth interviews with healthcare workers purposively selected from both private and public facilities and 35 Interviewer-administered surveys with the same respondents.

This research reveals several barriers to private hospitals' engagement in TB care which include: concerns regarding the payment of care by patients; indirect income-generating nature of TB management; lack of accreditation from the Ugandan Ministry of Health; limited space for keeping TB patients; lack of proper patient follow-up mechanisms. The findings further indicate that mHealth may lessen some of the identified barriers by offering low-cost alternative approaches for supplementing and enhancing private hospitals' efforts in TB care. A mobile health framework (MOHE) composed of six modules for guiding the design of an mHealth intervention to support the following up of presumptive TB patients referred from private to public hospitals was developed. Subsequently, an mHealth app (known as Tuuka) was developed to demonstrate the potential of the developed framework and to validate it. The Tuuka app was found acceptable and feasible with the mean total system usability scale (SUS) score of 98 (SD 1.97) among healthcare workers. The developed mHealth intervention was perceived to be useful in reminding referred presumptive patients to adhere to referral, notifying healthcare workers at the public health facility about the incoming patients and facilitating the communication across facilities and enhancing patient-based care. TRILI (Train, Restructure, Incentivize, Legalize, and Integrate) policy

framework emerged from lessons learnt and suggestions for implementation of the developed mobile application in Uganda.

This thesis contributes to the body of knowledge by identifying mHealth interventions utilized for PPM, barriers and motivators to private hospitals' engagement in TB care, potentials of mHealth technologies for enhancing PPM, and demonstrating how an mHealth framework for guiding the design of a mobile application to support the follow up of presumptive TB patients referred from private to public hospitals can be developed in low resource settings. The practical contributions include the designed MOHE framework, Tuuka mobile application, and the TRILI policy framework for implementing the developed mHealth intervention.

Keywords: mobile health, public private mix, implementation science, CFIR, barriers, motivators, referral