



# Karolinska Institutet

Global Health, Department of Public Health Sciences, Karolinska Institutet

## **Influencing HIV treatment success in India: Do mobile phones really work?**

Academic Dissertation

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By

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## ABSTRACT

**Background:** Sustaining treatment adherence and long-term virological suppression is a global health challenge in HIV management. Mobile phone-based interventions are increasingly harnessed to enhance medication adherence in HIV infection, although supporting evidence for implementation is limited by lack of robust efficacy trials in settings such as India. The overall aim of this thesis was to assess whether customized mobile phone reminders would improve adherence to therapy and thus decrease virological failure among HIV-infected patients initiating anti-retroviral treatment (ART) within the Indian national AIDS control program, and to investigate factors related to the success of this intervention within this population.

**Methods:** To test the feasibility and acceptability of the mobile phone-based reminder system, we conducted a 12-month single center pilot study among 150 HIV-infected ART-experienced patients (Study I). Subsequently we conducted a two-year randomized controlled trial at three sites in southern India (Bangalore, Mysore and Chennai), where 631 eligible ART-naïve patients were enrolled (Studies II, III, IV). The intervention consisted of weekly interactive voice reminders, along with a weekly pictorial text message for two years. Patients were monitored for pill count adherence measurements, adherence barriers, drug toxicity, CD4 counts and viral load every three months.

**Results:** The results of the pilot study indicated good acceptability and feasibility of the intervention, however a definite beneficial effect on adherence was inconclusive. (Study I). Analysis of the randomized controlled trial revealed no observed statistically significant difference in time to virological failure or sub-optimal adherence (mean adherence <95%) between the intervention and control groups, even after adjusting for potential confounders (Study II). Virological failure was associated with lower adherence levels, non-tenofovir drug regimens and primary drug resistance. Adherence levels and barriers varied significantly over time. The commonly reported barrier, 'forgetfulness' was not associated with virological failure. Significant determinants of optimal adherence were older age, higher level of education, greater disclosure status, and patients' satisfaction with health status, medications and healthcare access (Study III). ART toxicity related to zidovudine and nevirapine was associated with lower levels of adherence, particularly in the first 6 months after ART initiation (Study IV).

**Conclusions:** The results of this thesis indicate that mobile phone-based reminders alone may not improve adherence and promote treatment success among HIV-infected patients. Adherence behavior is a complex dynamic process with a multitude of diverse influencing factors. Optimal adherence and treatment success may be better sustained by minimizing drug interruptions for medical reasons, use of safer first-line ART regimens, and strengthening both patient self-efficacy and patient-health provider relationships.