Text Messages as Reminders for Antiretroviral Medication Adherence in Kenya

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Sector(s): Health

Location: Kenya

Sample: 428 patients

Target group: Rural population Adults

Outcome of interest: HIV/AIDS

Intervention type: Nudges and reminders

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Partner organization(s): Chulaimbo Rural Health Center, Academic Model Providing Access to Healthcare (AMPATH), The World Bank Development Research Group, United States Agency for International Development (USAID), The National Institute of Mental Health (NIMH)

Antiretroviral therapy (ART) helps people living with HIV manage the virus, but incomplete medication adherence can contribute to drug resistance, HIV progressing to AIDS, and death. Researchers introduced text message reminders to evaluate their effect on Kenyan patients taking their antiretrovirals consistently and not skipping doses. Patients who received weekly text messages were more likely to take their medicine 90 percent of the time and were less likely to skip doses for more than 48 hours than their counterparts in the comparison group.

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Antiretroviral therapy (ART) has substantially lessened symptoms and reduced deaths caused by HIV/AIDS. However, if people living with HIV do not have the means to take the medicine as instructed, ART may not work as effectively—patients can develop resistance to the medicine, the disease can get worse, and patients may die. Taking ART as directed can also be more cost-

effective than resorting to the rarer, more expensive drugs that are prescribed when the first treatment plan fails. People living with HIV in low- and middle-income countries (LMICs) typically adhere to ART, but there is some evidence from sub-Saharan Africa that as time passes, patients do not keep up their medication regimen as regularly as they did at the beginning. In LMICs, barriers to taking ART as intended include distance from the health clinic or pharmacy and unaffordable medication.

Cell phone reminders in high-income countries help people follow their antiretroviral regimens and manage other chronic diseases, but research on such reminders in LMICs is limited. In one study in Kenya, alarm clock reminders helped women take non-ART medicines. Can mobile phone reminders encourage antiretroviral adherence in LMICs, many of which have a high rate of cell phone coverage?

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This evaluation took place in Kenya's Nyanza Province at Chulaimbo Rural Health Center (CRHC), which started operations in 2005. CRHC is a government health center that runs an HIV/AIDS clinic administered by the Academic Model Providing Access to Healthcare (AMPATH). According to the 2007 Kenya AIDS Indicator Survey (KAIS) and the 2003 and 2008-2009 Kenya Demographic and Health Surveys, 6.3 to 7.4 percent of Kenyan adults were living with HIV. In Nyanza, the 2007 KAIS showed an HIV prevalence rate of 17.95 percent among adults aged 35 years old and over (the study's population of interest).[1]

Forty-five percent of the participants in the study had a cell phone and 97 percent lived in areas covered by mobile phone networks. The participants mostly took the antiretrovirals lamivudine, nevirapine, and zidovudine. The participants were, on average, 36 years old, 66 percent women, and a little under 23 percent completed high school.



A man messaging on his phone in Kenya.

Photo credit: IrenaV, Shutterstock.com

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Researchers conducted a randomized evaluation to test the impact of text message reminders on ART adherence.

CRHC patients were given cell phones to use as they liked. They were directed to a participating pharmacy and provided medication (mostly lamivudine) in bottles with electronic caps to measure how many times they opened their bottles. Research staff used a random number generator to randomly assign 428 CRHC patients to one of five groups:

1. *Weekly long texts (74 patients):* Patients in this group were sent long text message reminders to take their medications along with additional encouragement every week.
2. *Weekly short texts (73 patients):* Patients were sent brief text message reminders to take their medications every week.
3. *Daily long texts (72 patients):* Patients were sent a long text message reminder every day.
4. *Daily short texts (70 patients):* Patients were sent a brief text message reminder every day.
5. *Comparison Group (139 patients):* Patients in this group were not sent text messages.

The text of the four message categories was designed with health center employees. Brief messages simply reminded people to take their medicine, whereas longer messages provided additional encouragement. Daily texts were timed to match when patients were supposed to take their medicine. Patients were required by AMPATH to visit the health center once a month where their phones were examined and their medication bottles scanned.

The enrollment and intervention took place between June 2007 and December 2008. The main outcome of interest was ART adherence or whether a patient had taken their medication at least 90 percent of the time over the course of a 12-week period. A second outcome of interest was treatment interruption or whether the time between two consecutive openings of a patient's medication bottle exceeded 48 hours.

In addition to receiving ethical review and approvals from an institutional review board, researchers made efforts to address and account for ethical questions by ensuring: All messages were less than 160 characters and did not specify HIV or ART in order to maintain confidentiality of HIV status. Participants were asked to specify their preferred language. All participants gave informed consent to participation in the study. Eligible patients were informed about the study and then asked for consent in one of three languages (English, Dholuo, and Kiswahili). However, due to the customary use of mobile phones by more than one individual in some settings, cell phone interventions will need to continue to address issues of confidentiality. For more on the researchers' discussion of ethical considerations, see here on pages 826, 827, and 832.

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Weekly text message reminders were more effective than daily reminders at getting people to take ART as prescribed more often and to reduce skipped doses.

Taking medicine as prescribed 90 percent of the time: Over the course of 48 weeks, patients in who got weekly text message reminders were 13 percentage points more likely to take their medicine 90 percent of the time, in contrast with 40 percent of patients in the comparison group (a 32.5 percent increase). Daily messages did not change ART adherence. Researchers suggest that participants may have gotten used to and started to ignore the daily messages. Additionally, neither short nor long text reminders had any impact on adherence.

Not skipping doses for 2 or more days: Over the course of 48 weeks, patients in the group that got weekly text messages were 9 percentage points less likely to have skipped doses for at least two full days, compared to 90 percent of patients in the comparison group (a 10 percent decrease). Additionally, patients who received long messages were 7 percentage points less likely to have skipped doses for at least two days, compared to 90 percent of in the comparison group (a 7.8 percent decrease). Daily

messages and short messages did not change dose skipping behavior.

Taken together, these results suggest that texts can help people living with HIV in LMICs to take ART as prescribed 90 percent of the time and to stop skipping doses for two days or more. Text message interventions (e.g., medication reminders and monitoring, nudges about doctors' visits, keeping track of adverse reactions to medication, etc.) could cost-effectively reach many people living with HIV, but more research is needed to explore how to best tailor text messages to change medication-taking behavior.

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1. Kimanga, Davies O., Samuel Ogola, Mamo Umuro, Anne Ng'ang'a, Lucy Kimondo, Patrick Murithi, James Muttunga, Wanjiru Waruiru, Ibrahim Mohammed, Shahnaaz Sharrif, Kevin M. De Cock, and Andrea A. Kim. 2014. "Prevalence and Incidence of HIV Infection, Trends, and Risk Factors Among Persons Aged 15–64 Years in Kenya: Results From a Nationally Representative Study." JAIDS Journal of Acquired Immune Deficiency Syndromes 66 (Suppl. 1): S13–S26. https://doi.org/10.1097/QAI.0000000000000124