Using mHealth For HIV/TB Treatment Support In Lesotho:
Enhancing Patient–Provider Communication in the START Study


JAIDS Dissemination Event
12 Jan 2017
Context – Lesotho

- Landlocked by South Africa
- Population ~2 million people (73% rural)
- Poverty ~60%
- TB incidence 852 / 100,000
- HIV prevalence 23%
- TB-HIV coinfection 72%
- TB treatment success 70%
- ART coverage in TB patients 53%

Worldbank.org; WHO Global TB report 2015; UNAIDS GAP Report 2014
Context – START Study

- Two-arm cluster randomized trial to enhance ART uptake and adherence in TB/HIV patients
- 12 health facilities randomized to deliver a combination intervention package (CIP) or standard of care (SOC)
- Quantitative data on CIP uptake, effectiveness and cost drawn from all TB/HIV patients over ~2 years (2013-15)
- Qualitative data on CIP acceptability drawn from a sub-sample of CIP patients and HCW over 1 year (2014-15)
## Context – CIP components

<table>
<thead>
<tr>
<th></th>
<th>SOC</th>
<th>CIP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nurses trained on national TB guidelines</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>All TB patients offered <strong>HIV testing</strong> by lay counselors</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>ART</strong> available to TB/HIV patients in integrated clinics</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>TB patients identify <strong>treatment supporter</strong> for TB treatment</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Nurses provided with training and mentorship in TB/HIV co-</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>treatment using a <strong>clinical algorithm</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients and treatment supporters provided with reimbursement</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>for <strong>transportation costs</strong> associated with monthly clinic vis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients and treatment supporters provided with health education</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>by VHWs using <strong>TB/HIV treatment literacy and disclosure flipcharts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients provided with real-time <strong>adherence support</strong> by trained VHWs and through automated SMS text messaging system</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Patients provided with cellphone <strong>airtime vouchers</strong></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
Using mHealth for HIV/TB Treatment Support in Lesotho: Enhancing Patient–Provider Communication in the START Study

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A mixed-methods evaluation of the use and acceptability of the mHealth components of the START Study CIP
Acknowledgements


Study participants, staff and village health workers at study sites

Berea District Health Management Team

Lesotho Ministry of Health

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mHealth components

PATIENTS
SMS reminders*
Airtime $3.7/m

VILLAGE HEALTH WORKERS (VHW)
Airtime $3.7/m
Mobile phones (lead VHW)

NURSES
Airtime $3.7/m

* Daily/weekly adherence reminders + appointment reminders (coded, e.g., did you eat your meal today?) sent to patients and/or treatment supporters
SMS architecture

Hirsch-Moverman et al. JAIDS 2017 - Figure 1
Evaluation methods

**USE of mHealth**
- Program characteristics survey
- Intervention receipt log ('dosage' of airtime + SMS)

6 CIP sites (n=835 patients and supporters)

**ACCEPTABILITY of mHealth**
- Standardized monthly questionnaire

6 CIP sites (n=171 patients)

**EFFECT of CIP**
- In-depth interview

6 CIP sites (n=30 HCW)

**Adherence assessment interview**

6 CIP sites (n=30 patients)

6 CIP sites (n=183 patients)

6 SOC sites (n=166 patients)

**Quantitative**

**Qualitative**

Papers
- **START Study methods**
  Howard 2016, Glob Health Action
- **mHealth use & acceptability**
  Hirsch-Moverman 2017, JAIDS
- **START CIP effectiveness**
  In preparation
Participants

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>CIP Measurement Cohort Participants</th>
<th>Qualitative Patient Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>191</td>
<td>30</td>
</tr>
<tr>
<td>Mean age, yrs (SD)</td>
<td>37.6 (10.4)</td>
<td>38.1 (9.7)</td>
</tr>
<tr>
<td>Female gender, n (%)</td>
<td>79 (41.4)</td>
<td>13 (43.3)</td>
</tr>
<tr>
<td>Education, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not attend school</td>
<td>12 (6.3)</td>
<td>2 (6.7)</td>
</tr>
<tr>
<td>Primary</td>
<td>123 (64.4)</td>
<td>20 (66.7)</td>
</tr>
<tr>
<td>Secondary</td>
<td>35 (18.3)</td>
<td>5 (16.7)</td>
</tr>
<tr>
<td>High school or technical/vocational</td>
<td>21 (11.0)</td>
<td>3 (10.0)</td>
</tr>
<tr>
<td>Marital status, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/living together</td>
<td>103 (53.9)</td>
<td>17 (56.7)</td>
</tr>
<tr>
<td>Divorced/separated/widowed</td>
<td>50 (26.2)</td>
<td>9 (30.0)</td>
</tr>
<tr>
<td>Never married</td>
<td>38 (19.9)</td>
<td>4 (13.3)</td>
</tr>
<tr>
<td>Literacy, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Able to read whole sentence</td>
<td>143 (74.9)</td>
<td>25 (83.3)</td>
</tr>
<tr>
<td>Own mobile phone, n (%)</td>
<td>171 (89.5)</td>
<td>25 (83.3)</td>
</tr>
<tr>
<td>Have electricity in the house, n (%)</td>
<td>69 (36.1)</td>
<td>9 (30.0)</td>
</tr>
</tbody>
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\[\text{no major differences}\]

<table>
<thead>
<tr>
<th>HCW characteristics</th>
<th>Nurse participants</th>
<th>VHW participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Median years ’experience</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>Facility-based</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Community-based</td>
<td>-</td>
<td>13</td>
</tr>
</tbody>
</table>

Quantitative data collected from patients at 6 CIP sites

Qualitative data collected from a purposive sub-sample of CIP patients and HCW

Hirsch-Moverman et al. JAIDS 2017 – Table 1
mHealth use

n = 657 patients + 178 treatment supporters

- 39,258 text messages were delivered to 835 individuals over 29 months
- 92.1% (657 / 731) uptake
  - 455 patients + 24 treatment supporters (+ 178 rec’d both)
  - F~M
- 15.2% switched from daily to weekly SMS reminders

Hirsch-Moverman et al. JAIDS 2017 – Figure 2
mHealth acceptability

n = 171 patients

Q. What makes it easier or helps you to take your TB medicines or ART?

A. SMS messages (41.9%)
mHealth acceptability

n = 30 patients + 30 HCW

- Patients and HCW (nurses + VHW) appreciated the study SMS reminders, airtime and/or phones
- HCWs noted improvements in quality and timeliness of patient-provider and nurse-VHW communication
- mHealth tools were understood to address structural and operational barriers to adherence and patient monitoring
- mHealth acceptability may have been mediated by stigma (HIV non-disclosure), technical know-how (phone use/access), and local infrastructure (network, electricity)
mHealth acceptability

Sample patient quotes – pros

I think the one that remind me to take my medication being the first class [i.e., excellent], I don’t make any mistake with the medication I fear and I can’t miss them at all. (M, 29y)

They don’t cause any problems because each and every one has his [own] phone and is private. (F, 26y)
mHealth acceptability

Sample patient quotes – cons

This little lady [i.e., my daughter] is the one who supports me. She is the one who would be telling me that, “Hey, it’s time”... She has a phone. I don’t have a phone myself... I have not received them [i.e., SMS] personally. (F, 56y)

This phone has issue because at home we don’t have electricity it keeps giving us trouble as to where we charge and what to do like that. (F, 52y)
mHealth acceptability

Sample HCW quotes – pros

The use of SMS is very important... suppose it rains heavily and I am unable to attend him, I text him and say, ‘It is your time now. Have you remembered your food?’ He already knows. I will have taught him that when I say that, I mean it’s time to take his pills. So it is very helpful this SMS thing, it helps us meet our patients.

It is very important... the way it [i.e., SMS] is written. If it says, have you taken medication... [if] you find that someone’s phone is in the wrong hands, then they get to know the patient’s issues too soon.
mHealth acceptability

Sample HCW quotes – cons

When I was initially taught it was a bit of a struggle to understand as quick. But I ultimately got it... ... For others you find that the patient has given you a certain number, in a blink of an eye he has changed it without telling you that he doesn’t use that number anymore.
Overall effect of the CIP

Specific effect of mHealth was not measured

<table>
<thead>
<tr>
<th>Self reported adherence</th>
<th>CIP (n = 183), N (%)</th>
<th>SOC (n = 166), N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement cohort</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average monthly adherence to ART—100%</td>
<td>158 (86.3)</td>
<td>134 (80.7)</td>
</tr>
<tr>
<td>Average monthly adherence to TB medications—100%</td>
<td>163 (89.1)</td>
<td>132 (79.5)</td>
</tr>
<tr>
<td>Patient participants in the qualitative evaluation*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average monthly adherence to ART—100%</td>
<td>27 (90.0)</td>
<td>UK</td>
</tr>
<tr>
<td>Average monthly adherence to TB medications—100%</td>
<td>28 (93.3)</td>
<td>UK</td>
</tr>
</tbody>
</table>

*n = 30.
UK, unknown.
Determinants of mHealth uptake and acceptability

BARRIERS
- Technical challenges
- HIV nondisclosure

REDUCED NEED
- Existing adherence support

FACILITATORS
- Adherence cues
- Airtime vouchers
- Call-text dual capability
- SMS time/frequency choices
- Private, coded messages
- Enhanced communication

Hirsch-Moverman et al. JAIDS 2017 – from Figure 3
## Attributes of the evaluation

<table>
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<tr>
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<th>+++</th>
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<tbody>
<tr>
<td>CIP limited to patients with a mobile phone</td>
<td>Mixed-methods</td>
</tr>
<tr>
<td>Exact dosage of mHealth unclear</td>
<td>Implementation science trial</td>
</tr>
<tr>
<td>Specific effect of mHealth unclear</td>
<td>Heterogeneous sites</td>
</tr>
<tr>
<td>Adherence was self-reported</td>
<td>Good representation of men</td>
</tr>
<tr>
<td>No comparison between daily vs. weekly SMS</td>
<td>Strong local engagement and support</td>
</tr>
<tr>
<td>Treatment supporters not interviewed</td>
<td></td>
</tr>
</tbody>
</table>
Contributions

• Few other studies break down mHealth use and acceptability
  • We identify the role of stigma and target groups for intervention
• Few other studies break down effect of daily vs. weekly SMS
  • We did not compare effect, but patients preferred daily SMS
• Few other studies break down adherence to TB and HIV medicines
Implications for mhealth interventions

1. Keep it flexible (SMS/phone; airtime where feasible; tailor to local infrastructure)
2. Keep it simple (adapt to local norms; frequent training and troubleshooting)
3. Identify target groups in need
4. Stigma may affect uptake
Questions?

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THANK YOU