Health Worker Acceptability of an mHealth Solution for PMTCT in Tanzania

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9-Year CU Denver-CUHAS Collaboration & Partnership
CU Denver-CUHAS Collaboration

- Funded research
  - NIH Project: R21 MH099942-01A1
- GIS training module developed and delivered 6 times in open source software
- 29 CUHAS students and 21 U.S. students have participated in activities
  - 10 independent CU Denver student projects, including 1 masters thesis, 3 honors theses, 5 capstone projects, 2 undergraduate research opportunity projects, and 1 PhD dissertation
  - 6 Tanzanian MPH student theses supervised
Intervention

• The pilot developed and tested a tablet-based record keeping system that interfaced with existing GIS resource maps to facilitate and document delivery of Option B/B+ in Misungwi District.

  - the 2010 WHO recommended protocol for the prevention of mother-to-child transmission (PMTCT) of HIV
Specific Aims

1. Describe T-HIT in terms of key Diffusion of Innovation theoretical elements, i.e. its relative advantage over and compatibility with existing systems, and simplicity and ease of use.

2. Demonstrate T-HIT trialability with HWs over a 3-month period in Misungwi and document system capacity for increased HIV testing; identification of new HIV infections and delivery of ART to mothers and infants.

3. Utilize estimates of increased testing, identification of HIV infections and ART delivery, documenting the treatment cascade for establishing effect sizes that will then be applied to a larger scale efficacy trial for improvement in PMTCT.
Development & Implementation

• Preliminary Work: 2010-2011
• Phase I: September, 2013-December, 2014): Laying groundwork & system development
• Phase II
  – System implementation & data collection over a 3-month period (Feb 23, 2015-May 31, 2015)
  – 7 health facilities in Misungwi District selected as intervention sites and another 7 health facilities served as the comparison/controlled groups
  – The health facility, not the health worker, was the unit of evaluation
mHealth

• “Medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices.” (WHO, 2011)
Health Workers

• “Health workers are people whose job it is to protect and improve the health of their communities.” (WHO, 2006)

• Point of intervention for new technology
Focus of Analysis

- How best to facilitate HW mHealth adoption and system implementation for scaling and sustainability over time

- Acceptability of T-HIT among HWs comparing a pre- and post-pilot survey
Diffusion of Innovation Theory

System Compatibility

Observability

Relative Advantage
Acceptability

confidence  improved-morale
preference-over-non-digital-tool
perceived-improvement-in-job-knowledge
capability-enhancement
positive-acceptance
empowerment
improved-logistics
increased-work-speed
comfort
decreased-travel
social-respect
work-satisfaction
Pre- and Post-Pilot Survey

- 27 HWs at 7 health facilities in the Misungwi District
- T-HIT and tablet technology introduced over a week in February 2015
- 19 question survey administered after the training and again after a 3-month pilot
- Questions to measure 3 domains of acceptability
- Questions scored 1, 2, or 3 with 1 indicating positive acceptability
### Descriptive Table of Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Question Topics Included</th>
<th>Relevant DI Construct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes towards the system</td>
<td>Comfort with system, confidence that use of T-HIT system will constitute an improvement, desire to use the T-HIT system</td>
<td>Compatibility</td>
</tr>
<tr>
<td>Self Efficacy</td>
<td>Ability to better perform job and improve patient outcomes</td>
<td>Relative Advantage</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Specific PMTCT care provision guidelines</td>
<td>Observability</td>
</tr>
</tbody>
</table>
Paired T-Test Analysis of Mean Survey Scores

1.23
1.09
1.19
1.5
1.14
1.03
1.07
1.4
1.0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6

P< 0.05

Total
System Attitude
Self Efficacy
Knowledge

Pre-test
Post-test
## Level of Care Analysis of Means

<table>
<thead>
<tr>
<th></th>
<th>H/HC Pre</th>
<th>H/HC Post</th>
<th>Δ Mean Score</th>
<th>Disp. Pre</th>
<th>Disp. Post</th>
<th>Δ Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>1.24</td>
<td>1.14</td>
<td>.10*</td>
<td>1.21</td>
<td>1.13</td>
<td>.08</td>
</tr>
<tr>
<td><strong>System Attitude</strong></td>
<td>1.09</td>
<td>1.03</td>
<td>.06</td>
<td>1.09</td>
<td>1.02</td>
<td>.07</td>
</tr>
<tr>
<td><strong>Self Efficacy</strong></td>
<td>1.21</td>
<td>1.06</td>
<td>.15</td>
<td>1.15</td>
<td>1.09</td>
<td>.06</td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td>1.53</td>
<td>1.43</td>
<td>.10</td>
<td>1.47</td>
<td>1.36</td>
<td>.11</td>
</tr>
</tbody>
</table>

Pre is pre-pilot survey means, Post is post-pilot survey means
HC is Hospitals and Health Centers, D is Dispensaries
## Distance Analysis of Means

### RESULTS

<table>
<thead>
<tr>
<th></th>
<th>Far Pre</th>
<th>Far Post</th>
<th>Δ Mean Score</th>
<th>Near Pre</th>
<th>Near Post</th>
<th>Δ Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1.27</td>
<td>1.15</td>
<td>0.12</td>
<td>1.21</td>
<td>1.13</td>
<td>0.08</td>
</tr>
<tr>
<td>System Attitude</td>
<td>1.11</td>
<td>1.02</td>
<td>0.09</td>
<td>1.08</td>
<td>1.03</td>
<td>0.05</td>
</tr>
<tr>
<td>Self Efficacy</td>
<td>1.19</td>
<td>1.08</td>
<td>0.11</td>
<td>1.19</td>
<td>1.07</td>
<td>0.12</td>
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<tr>
<td>Knowledge</td>
<td>1.62</td>
<td>1.45</td>
<td>0.17</td>
<td>1.44</td>
<td>1.38</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Pre is pre-pilot survey means, Post is post-pilot survey means
N is Near (.20km from district hospital), F is Far (>20km from district hospital)
Discussion

• Improved acceptability overall* and sub-categories: system attitude, self efficacy and knowledge

• Level of care and distance stratification showed improved acceptability in all areas

• Mean differences were smaller in almost all comparisons of post tests than pre-

• Results demonstrate potential for T-HIT to help remote HW improve their knowledge of PMTCT protocols
Conclusion

• Acceptability of technology use by HWs critical factor in sustainability and scalability of any mobile health system

• Evidence of key acceptability domains by HW of the T-HIT tablet-based system for PMTCT of HIV

• Pilot intervention designed with intention of transitioning to larger scale efficacy trial for improvement in PMTCT and potential scale up of the model in Tanzania and other East African settings
Thank You!!
References

- NovoEd course, Mobile Health Without Borders, By Eric Leroux and Homero Rivas, Stanford University, video Global mHealth by Dr. Paul Farmer