ICT- Enabled Treatment Adherence and Follow-up System Towards Successful Implementation of Revised National Tuberculosis Control Programme (RNTCP), India

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Background
- TB
- RNTCP & DOTS
- Implementation Challenges

Policy Recommendations

The Study
- Methodology
- Findings

Policy Implications & Conclusion
Background

Tuberculosis - India

- Around **330,000 Indians die** due to TB while **2 million new cases** are reported annually
- **Irregular / Incomplete treatment** leads to complications, disease spread (one can infect 10) & emergence of drug resistant TB

RNTCP and DOTS

- Government of India’s **Revised National Tuberculosis Control Programme (RNTCP)** employs Directly Observed Treatment Short course (DOTS) as its operating strategy for the management of TB
- DOTS calls for a standardized treatment regimen for a **minimum period of six months** - take medication under direct observation
- RNTCP reaches out through a network of 0.6 million DOTS providers
- For the increasing number of TB patients, especially in high burden countries like India, **direct observation still remains a challenge** affecting the successful implementation of RNTCP

Can technology intervention be used to facilitate the effective implementation of RNTCP in India?
## Policy Recommendations

<table>
<thead>
<tr>
<th>Real-Time Digitization of Patient Information</th>
<th>Dissemination of TB related information and awareness</th>
<th>Follow-up and Tracking of Treatment</th>
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<tbody>
<tr>
<td>• Digital RNTCP card</td>
<td>• Reminders, alerts &amp; awareness messages</td>
<td>• Digital tracking system - ensures effective monitoring of treatment progress by recording every significant event throughout the period of treatment</td>
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<td>• Information collection during registration and subsequent updates</td>
<td>• Personalized health education content (a critical component of TB control)</td>
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<td>➢ Mobile Phone Forms (Digital equivalent of paper based form)</td>
<td>➢ Simple voice calls in local language</td>
<td>➢ Web – based patient-centric treatment monitoring</td>
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<td>➢ SMS</td>
<td>➢ Checking a patient status on mobile phone form</td>
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All of the above recommendations have been proved to be **technically feasible and evaluated for user adoptability** among 104 TB patients from Vellore District, Tamil Nadu, India.
The Study

**Study Location:**

4 DOTS centres* in Vellore District, Tamil Nadu, India

- District Tuberculosis Centre, Vellore
- Adukkamparai
- Gudiyatham
- Bagayam

**Selection Criteria (Patients):**

- Above 18 years of age
- Tested positive for TB (New, Relapse, Failure, After Default Relapse Failure)
- Starting treatment on or after the day of registration
- Access to mobile phone
- Willingness to participate in the study

**Study Duration:**

Starting April 2012 – May 2013 (covered one entire treatment cycle for all enrolled patients)

*Above mentioned DOTS Centres are a part of a nation-wide network of similar decentralized units, implementing the WHO recommended Directly Observed Treatment strategy for the treatment of TB. In India, there are approximately 12,000 DOTS centres currently, with almost 60,000 DOTS providers spread all over.
mHealth for Drug Adherence and Treatment Follow Up System

Field Officer registers a patient using mobile phone form – Digital RNTCP Card

Patients receive customized reminders and alerts (Tamil) on their day of drug intake at preferred their time

Field Officer updating periodic treatment status and outcome using mobile phone form

Web-based patient centric monitoring
Study Findings

- All 104 enrolled patients were followed-up until treatment outcome was known *

- 88% of enrolled patients completed their treatment

- More than 77% of the patients exhibited greater than 60% of call attendance

- As the call attendance percentage increased, the number of patients who completed the treatment also increased

- 4 patients under the category of ‘after default relapse failure’ have successfully completed their treatment and have been cured

- All HIV co-infected patients (5) completed treatment and cured

* Note: Data analysis presented here is for 100/ 104 patients only as 4 patients were transferred out midway to a DOTS centre beyond the scope of our study

Calls have aided the patients who enroll in the treatment to also complete the course

The finding that the categories of patient who have a higher probability of treatment failure or defaulting have been cured in the presence of our mHealth intervention is noteworthy
Quantitative Analysis

Correlation Analysis

- High degree of correlation (0.848) between the percentages of calls attended to treatment completion

Logistic Regression

- Logistic regression results for treatment completion and factors likely to impact the same were not significant (The factors included gender, age, marital status, patient type, site of TB infection, smoking, alcohol consumption and reminder type preference)

- Logistic regression was carried out for treatment completion and call attendance percentage which was split into intervals of low (0-30% calls attended), medium (30-70% calls attended) and high (70-100% calls attended)

Results showed that patients with a high call attendance percentage were 5 times more likely to complete treatment than those with a low call attendance percentage with significance of .093
Qualitative Analysis

“My daughter usually reminds me to take the tablet without fail, and keeps a watch...but on days that we forget, the messages were extremely useful for us as a reminder”

- Female, 56 years

“They give us useful information about closing our mouth while coughing, not spitting in the open”

- Male, 46 years

“My family did not support me that much, so it was helpful to hear the messages, which is what kept me going”

- Male, 28 years
Policy Implications and Conclusion

- The evidence obtained from this research study places a strong emphasis on the role of ICT interventions in facilitating better implementation and management of RNTCP.

- RNTCP’s ‘National Strategic Plan (2012-2017)’, aimed at strengthening its implementation, recommends the incorporation of ICT - Reinforcing the relevance of our solution.

- Implementing this affordable and simple application involving DOTS providers in a phased manner with an objective to scale will enable follow-up of all the patients who have been enrolled with RNTCP.

- This set up can be customized and seamlessly incorporated into any healthcare system that aims at the control of Tuberculosis and further to any other disease of public health concern.
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Uniphore Software Systems

Thank you