

Adapting a Patient-Centered Tuberculosis Digital Adherence Technology Intervention for New Patient Populations

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Abstract. Tuberculosis (TB) intervention adaptation strategies can be optimized to inform digital health intervention refinement. With experience we improved our strategies during the refinement of tools to support individuals with active TB.

Keywords. Digital Health, tuberculosis, adaptation methods, clinical informatics

1. Introduction

Tuberculosis (TB) is a fully treatable disease, yet it remains a major global health challenge, causing an estimated 10.6 million new cases and 1.6 million deaths each year. Digital adherence technologies (DATs) have potential to enhance medication adherence through real-time tracking and patient-provider communication. However, if not carefully designed and optimized to the context could worsen health disparities and increase healthcare provider burden. Here, we detail the adaptation and refinement of the TB Treatment Support Tools (TB-TST) intervention for a new patient population in Papua Indonesia, which ranks as the second-highest TB burden country globally.

2. Methods

An iterative mixed-methods approach, guided by the Information Systems Research Framework and Design Thinking process, was used to adapt, refine, and enhance our user interfaces [1,2]. First, the app content was translated into Indonesian, and a rebranding competition was conducted to better align the app name and design with Papua's cultural context. Focus groups and interviews were conducted with 28

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participants, including TB nurses, individuals with TB, and local design experts. Participatory design and usability cycles were conducted to iteratively adapt and refine the user interfaces. Lastly, field testing with healthcare professionals was conducted for final testing and to identify issues in preparation for pilot testing with newly diagnosed individuals with active TB.

3. Results

Nurses requested flexibility in accessing the tool, sorting patients by issue, revisions of side effects, and additional educational content. Individuals with TB requested color contrast improvement and a motivational feature for additional support. The intervention was rebranded with a logo design selected from 13 contest submissions through an anonymous voting process. Language and cultural adaptation were verified through cycles of review by nurses, individuals with TB, and local design experts. Changes to the user interfaces included increasing the size of icons, adding daily behavioral motivational messages to the homepage, adding a mobile optimized provider interface to increase flexibility of use, and adding an appointment scheduling function. Usability scores for both interfaces were high, indicating good usability and ease of use.

4. Discussion

By using an iterative participatory approach with individuals with TB, TB, and human-center design experts, the TB-TST intervention was successfully culturally adapted, refined, and rebranded. Several changes and new features were added to meet the needs and preference of a Papuan population. Factors contributing to the success of the adaptation and refinement process include the participatory approach, tailoring for a setting that has historically not been included in the design process, rapid iterations and multiple mixed methods that may serve to make the tool more acceptable and relevant.

5. Conclusions

The comprehensive iterative approach guided by system and design frameworks supported successful adaptation, refinement, and expansion of new features to optimize for the local needs and context. Feedback from TB experts, patients, and design experts resulted in novel design ideas and prepared the tool for next stage evaluation. To harness DAT potential benefits, strategies to ensure context-specific optimization are needed.

References

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