

Four-country evaluation of digital adherence technologies linked to a web-based platform to support adherence to TB treatment

Submission date 05/11/2020	Recruitment status No longer recruiting	<input checked="" type="checkbox"/> Prospectively registered
Registration date 18/11/2020	Overall study status Completed	<input checked="" type="checkbox"/> Protocol
Last Edited 18/03/2025	Condition category Infections and Infestations	<input type="checkbox"/> Statistical analysis plan
		<input checked="" type="checkbox"/> Results
		<input type="checkbox"/> Individual participant data

Plain English summary of protocol

Background and study aims

Tuberculosis (TB) is a bacterial infection that mainly affects the lungs. In 2017, an estimated 10 million people fell ill with TB. Not adhering to treatment leads to unfavourable outcomes, relapse, drug resistance, disease transmission and increased health system costs. Innovations are therefore needed to improve TB treatment adherence. Digital adherence technologies (DAT) may be a major step forward. The aim of this study is to measure the impact of DATs for daily monitoring of adherence for adult TB patients in the Philippines, Tanzania, South Africa and Ukraine.

Who can participate?

All adults (according to country definition) receiving treatment for TB in participating health facilities.

What does the study involve?

Facilities in each country will be randomly allocated to employ either a DAT intervention or the standard of care. At intervention facilities, health care providers will enrol patients receiving treatment for drug-sensitive TB who are willing to use the DATs. Patients who decline will be offered the standard of care. Over the course of the participant's treatment at these facilities, TB healthcare providers will monitor a patient's adherence pattern generated from the DAT using a web-based platform. This will enable daily monitoring and give healthcare providers the ability to provide a tailored response to those patients requiring more treatment support, including the use of messaging and reminders supported by the platform and possibly home visits. The study will evaluate the treatment outcome of patients, comparing the intervention facilities to standard of care facilities. In addition, several sub-studies will assess how the intervention may work in patients receiving treatment for both drug-sensitive and drug-resistant-TB.

What are the possible benefits and risks of participating?

By participating patients who need it may receive more support to complete their treatment for TB as intended while allowing patients demonstrating good adherence, greater autonomy and

freedom to self-manage their own care. This may include a decrease in the burden of visits to the health facility compared to those receiving the standard of care. This may benefit both those on TB treatment as well as their healthcare providers. Possible risks to participants include inadvertent disclosure of TB status, and possibly inferred HIV status in some settings by use or possession of tools (smart pill boxes or medication sleeves) associated with TB.

Where is the study run from?

KNCV Tuberculosis Foundation (Netherlands) with support from the London School of Hygiene and Tropical Medicine (UK)

When is the study starting and how long is it expected to run for?

November 2020 to December 2022

Who is funding the study?

Unitaid (Switzerland)

Who is the main contact?

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Contact information

Type(s)

Public, Scientific

Contact name

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Additional identifiers

Protocol serial number

2020-0001

Study information

Scientific Title

Adherence Support Coalition to End TB (ASCENT): four-country evaluation of digital adherence technologies for TB treatment

Acronym

ASCENT

Study objectives

It is hypothesized that implementing digital adherence technologies (DATs) with daily monitoring using a web-based platform and a differentiated response to patient adherence among adult patients receiving drug-sensitive TB therapy will decrease poor end of treatment outcomes relative to the standard of care.

Ethics approval required

Old ethics approval format

Ethics approval(s)

1. South Africa: Approved 23/04/2020, University of Witwatersand (Johannesburg Secretariate, Suite 189 Private bag x2600, Houghton 20141, South Africa +27 (0)11 274 9200; email: not available), ref 2001102
2. Ukraine: Approved 04/09/2020, Public Health Center MoH of Ukraine (41 Yaroslavska Street, Kyiv, 04071, Ukraine; tel: not available; irb@phc.org.ua), ref IRB2019-33
3. Tanzania: Approved 10/06/2020, The United Republic of Tanzania (3 Barack Obama Drive, PO Box 9653, 11101 Dar es Salaam, Tanzania; +255 (0)22 2121400; nimrethics@gmail.com), ref NIMR /HQ/R.8a/Vol. IX/3431
4. Philippines: Approved 03/07/2020, Republic of the Philippines Department of Health Single Joint Research Ethics Board (contact details not available), ref: SJREB-2019-57

Study design

Multicountry multicenter interventional open health-facility-based cluster randomized trial

Primary study design

Interventional

Study type(s)

Treatment

Health condition(s) or problem(s) studied

Tuberculosis

Interventions

Randomization of the clusters, health facilities or rayons (in Ukraine), to the intervention arm or the standard of care arm in a ratio of 1:1, will be conducted using stratification and restriction in order to reduce the intra-cluster correlation (former) and help ensure a balance between study arms. One row of a sample frame of 10,000 randomly selected possible allocations of facilities /rayons to the treatment or control arms after restriction will be randomly selected by an NTP official. In facilities randomized to the intervention, TB medication adherence monitoring will be done using digital adherence technologies (DATs) linked to a web-based adherence monitoring platform. Control facilities will use adherence monitoring employing the standard of care.

In facilities randomized to the intervention, TB medication adherence monitoring will be done using digital adherence technologies (DATs) - either 99DOTS medication sleeves or Evrimed smart pill boxes - linked to a web-based adherence monitoring platform. Control facilities will use adherence monitoring employing the standard of care. In three countries intervention

facilities will themselves be randomized to receive either the 99DOTS or smart pill box. In Ukraine, only the smart pill boxes will be employed.

Facilities in each country will be randomized to employ either a DAT intervention or the standard of care in a ratio of one to one. At intervention facilities, health care providers will enroll patients receiving treatment for drug-sensitive TB who are willing to consent to use the DATs. Patients who decline will be offered the standard of care. Over the course of the participant's treatment at these facilities, TB health care providers will use a single user interface on tablets to view a patient's adherence pattern generated from the DAT via a web-based platform. This will enable daily monitoring and give healthcare providers the ability to provide a step-wise differentiated response to those patients requiring more treatment support, including the use of messaging and reminders supported by the platform and possibly home visits. The particular differentiated care algorithm in each country will be worked out during the study preparatory phase.

The intervention will be employed over the course of their participant's treatment at these facilities (approximately 6 months). The follow-up is limited to the duration of their treatment. The study will evaluate the treatment outcome of patients, comparing that in the intervention facilities relative to the standard of care facilities in an intent-to-treat analysis. In addition, several sub-studies will include process evaluation components in order to provide an understanding of how the intervention may work in patients receiving treatment for both drug-sensitive and drug-resistant-TB.

Intervention Type

Device

Phase

Not Applicable

Drug/device/biological/vaccine name(s)

99DOTS medication sleeves, Evrimed smart pill boxes

Primary outcome(s)

The proportion of adult DS-TB patients with poor end of treatment outcome, defined as having documented treatment failure, lost to follow-up or death as reported in the facility/rayon TB register upon completion of treatment (approximately 6 months)

Key secondary outcome(s)

1. The proportion of adult DS-TB patients who are lost to follow-up during treatment as reported in the facility/rayon TB register 6 months after the initiation of therapy
2. Time to treatment completion among DS-TB patients calculated from start and completion date as reported in the facility/rayon TB register upon completion of therapy
3. The proportion of adult DS-TB patients with poor treatment outcomes, as reported in the facility/rayon TB register upon completion of therapy

Intervention arm only:

4. Patterns of longitudinal technology engagement in the intensive and continuation phase, to be characterized, at a minimum, as the proportion of days upon completion of a patients treatment phase (intensive and continuation) with a dose being reported (adherence) to the platform
5. The proportion of patient events upon completion of treatment who had a differentiated

response (either reminder SMS, home visit or facility visits) due to non-adherence as reported on the platform, among all patients and among non-adherent patients

6. The proportion of patients who received phone calls, home visits, and motivational counselling due to a non-adherence event as reported on the platform over the course of a patient's treatment

Impact modelling:

7. The change in the number of adult DS-TB patients with poor treatment outcome at the time of treatment completion compared to the current standard of care if the intervention were to be scaled up nationally, projected using simple cohort model using study data

8. The cost-effectiveness of DAT compared to standard of care from health system and societal perspectives, relative to country-specific cost-effectiveness thresholds

DR-TB patients:

9. Patterns of longitudinal technology engagement in the intensive and continuation phase to be characterized, at the minimum, as the proportion of days through the end of treatment with a dose being reported (adherence) to the platform

10. The proportion of adult DR-TB patients with poor treatment outcomes as reported in the facility/rayon TB register at the interim (6 months) or completion of DR-TB treatment

Completion date

31/12/2022

Eligibility

Key inclusion criteria

Adult (based on country) pulmonary DS-TB patients initiated on TB treatment

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Adult

Sex

All

Total final enrolment

25606

Key exclusion criteria

Does not meet inclusion criteria

Date of first enrolment

01/01/2021

Date of final enrolment

30/06/2022

Locations

Countries of recruitment

Philippines

South Africa

Tanzania

Ukraine

Study participating centre

Public Health Center of the Ministry of Health of Ukraine

41, Yaroslavska St

Kyiv

Ukraine

04071

Study participating centre

Oblast Clinical TB Dispensary

10, Kyrylkina St., Kramatorsk

Donetska Oblast

Ukraine

84333

Study participating centre

Mykolaiv Regional Physiology and Pulmonology Medical Center of Mykolaivska Oblast Council

4, Veselynivska St., Nadbuzke, Mykolaivskyi rayon

Mykolaivska oblast

Ukraine

57130

Study participating centre

Lviv Regional Physiology and Pulmonology Clinical Treatment and Prevention Center of Lvivska Oblast Council

477, Zelena St.,

Lviv, Lvivska oblast

Ukraine

79000

Study participating centre

Odeska Oblast Center of Socially Significant Diseases of Odeska Oblast Council

9/1 Leontovycha St.

Odesa, Odeska oblast

Ukraine

65014

Study participating centre

Oblast Clinical Physiology and Pulmonology Treatment and Prevention Center of Zakarpatska Oblast Council

4, Nakhimova St.

Uzhhorod, Zakarpatska oblast

Ukraine

88000

Study participating centre

The Provincial Health Office (PHO) - Bulacan

Provincial Capitol Building

Malolos City, Bulacan

Philippines

3000

Study participating centre

The Provincial Health Office (PHO) - Pampanga

Pampanga Provincial Capitol

San Fernando, Pampanga

Philippines

2000

Study participating centre

Ministry of Health, Community Development, Gender, Elderly and Children

PO BOX 119

Mwanza

Tanzania

-

Study participating centre

Ministry of Health, Community Development, Gender, Elderly and Children

PO BOX 315

Geita

Tanzania

-

Study participating centre

Ministry of Health, Community Development, Gender, Elderly and Children

PO BOX 3092

Arusha

Tanzania

-

Study participating centre

Ministry of Health, Community Envelopment, Gender, Elderly and Children - Manyara

PO BOX 577

Manyara

Tanzania

-

Study participating centre

Gauteng Department of Health

45 Commissioner Street

Johannesburg

South Africa

2001

Study participating centre

Cape Town Department of Health

20th Floor, 4 Dorp Street

Cape Town

South Africa

8000

Sponsor information

Organisation

KNCV TB Foundation

Funder(s)

Funder type

Research organisation

Funder Name

Unitaid

Results and Publications

Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study will be stored in a publicly available repository. The researchers will provide a participant level (de-identified and anonymized) dataset on OpenTrials (<https://explorer.opentrials.net/>) sufficient to reproduce analysis upon publication of the principal findings related to the primary objective. Consent from participants is available for the adherence data only. Outcome data will be available for those patients who did not opt-out.

IPD sharing plan summary

Stored in repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	Adherence	11/03/2025	18/03/2025	Yes	No
Protocol article		14/03/2023	15/03/2023	Yes	No
Other publications	A cross-sectional survey among adults with drug-sensitive tuberculosis (DS-TB), participating in pragmatic cluster-randomized trials, including this study	20/02/2024	11/03/2024	Yes	No
Study website	Study website	11/11/2025	11/11/2025	No	Yes