

Improving neglected tropical disease services and their integration into primary healthcare in Ethiopia

Results from a mixed-methods study in Southern Nations, Nationalities, and People's Region

Key messages

- The neglected tropical disease intervention improved the primary healthcare system's capacity to detect, manage and record neglected tropical diseases and was deemed acceptable and cost-effective.
- Many health workers felt that the intervention provided them with adequate knowledge, skills and confidence to perform responsibilities relating to neglected tropical diseases.
- Ongoing dialogues with regional health bureau staff will ensure sustainability of the intervention and can be maintained through adequate planning and budgeting.

Introduction

Neglected tropical diseases (NTDs) are a group of parasitic and bacterial infectious diseases that affect more than 1.7 billion people worldwide. Over 40 percent of global NTD cases are concentrated in sub-Saharan Africa.^[1] The diseases disproportionately affect communities with lower incomes, and marginalised and hard-to-reach communities.^[1] A great deal has been achieved by NTD programmes during the past decade. However, efforts to innovate and intensify the detection and management of NTDs need to focus on integrating these services into national primary healthcare (PHC) systems, with coordination from NTD ecosystem stakeholders, as outlined in the 2030 global NTD Roadmap.^[2]

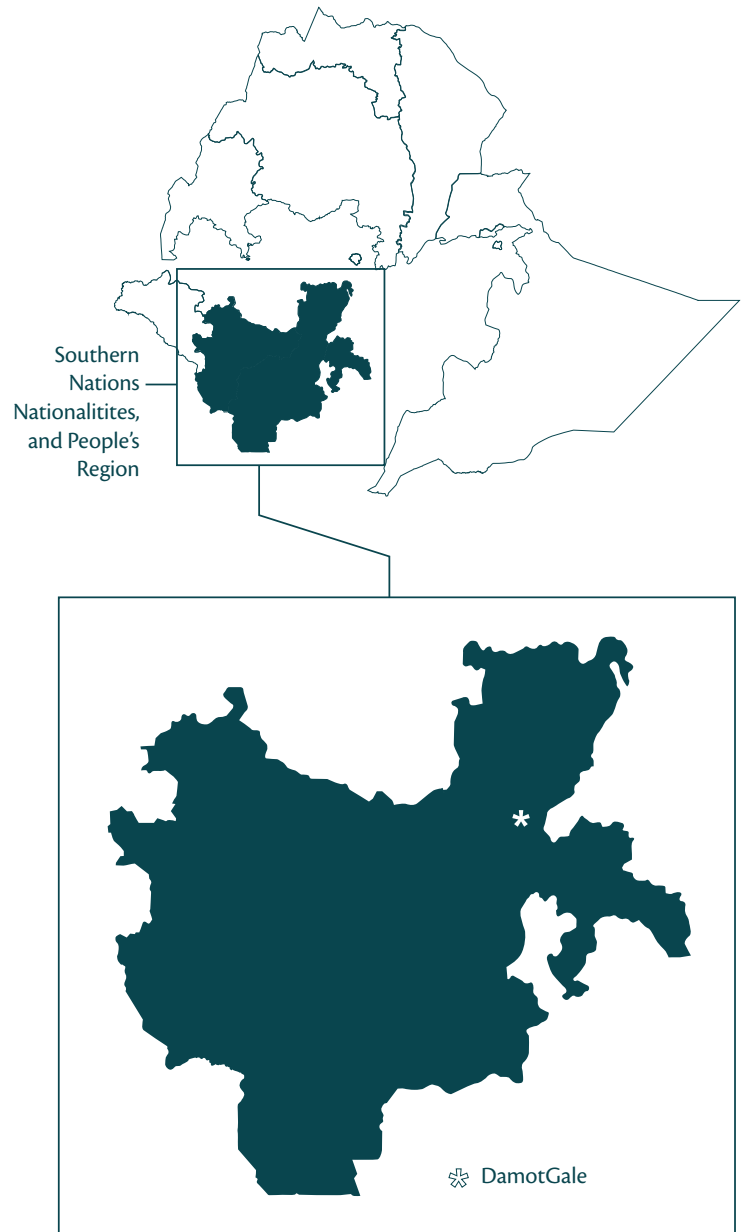
The Ethiopian National NTD Master Plan (2022–2025) acknowledges integration of NTDs within the country's PHC system as a strategic priority. Recent achievements include nationwide NTD mapping and the scale-up of mass drug administration for the control of various NTDs.^[3]

Between 2019 and 2021, Malaria Consortium carried out a small-scale research study in Southern Nations, Nationalities, and People's Region (SNNPR) that aimed to develop and test an intervention to strengthen the integration of NTD services into Ethiopia's PHC system. We selected three NTDs that are considered public health priorities in Ethiopia, owing to their endemicity across the country: trachoma, lymphatic filariasis and schistosomiasis. We designed the intervention in collaboration with the Federal Ministry of Health NTD team to ensure alignment with the latest national NTD Roadmap.

Study objectives:

1. Identify and address current gaps in Ethiopia's PHC system for implementing integrated NTD services
2. Improve health workers' capacity to provide integrated NTD services
3. Test the intervention in selected health facilities for six months and evaluate the feasibility, acceptability and implementation cost.

Figure 1: Map of Damot Gale district, Wolaita zone, SNNPR, Ethiopia





Scientist in SNNPR

Methods

The study took place in Damot Gale district, Wolaita zone in SNNPR. As study sites, we selected Bodity Primary Hospital, Buge Health Centre and five rural health posts. This selection was based on adequate workforce, electricity connection and access to clean water. In this research brief, the term 'health worker' encompasses staff at each of these levels.

In the formative phase, which lasted one year from January 2019, we identified gaps in the PHC system through a situation analysis, health system capacity assessment (HSCA) and community-level key informant interviews (KIIs). Findings then informed the development of a tailored, multi-component intervention to address these gaps. This included clearly outlined staff roles and responsibilities, clear and harmonised NTD case definitions, job aids for detection and management, health worker training, and the provision of drugs and medical supplies (e.g. diagnostic tests for intestinal schistosomiasis). Training materials included guidelines on NTD detection, management and follow-up, manuals, referral forms and

job aids. Health workers used these regularly to assist with NTD detection and management and to determine the appropriate drug dosage. The intervention was validated and pre-tested in an iterative process of engagement with experts and potential users through KIIs.

During the subsequent phase in 2021, we tested the intervention at the chosen study sites for six months. We evaluated the feasibility, acceptability and implementation costs using a mix of methods: HSCA, analysis of routine monitoring and evaluation (M&E) data, health worker observations and a cost-effectiveness analysis. We also conducted KIIs with 10 health extension workers (HEWs) from five health posts; four health centre staff; four hospital staff; four laboratory technicians; two data managers; and five members of the health development army (HDA), a network of volunteers tasked with driving health-related behaviour change within their communities. We additionally held KIIs with community members (six with and six without a target NTD).

Results

Quantitative results

Between baseline and endline, we observed a 5.4 percentage point improvement, from 72.1 to 77.5 percent, in the primary outcome: health workers' adherence to target NTD intervention procedures over time (**Table 1**). Health workers' overall ability to detect NTDs improved from 81.8 to 87.1 percent. Promisingly, the proportion of health workers correctly diagnosing NTDs increased dramatically, from 0.09 to 34.5 percent.

The study introduced circulating cathodic antigen (CCA) tests (sensitivity of 99.5 percent and specificity of 63.5 percent) for detection of schistosomiasis in urine samples in the study health centre and hospital. Previously, these health facilities used microscopy for detection of schistosomiasis eggs in wet mount stool samples. The detection rate of schistosomiasis after introducing CCA tests showed significant change (**Table 2**). The case positivity rate increased from 0 to 18.6 percent at Boditi Primary Hospital and from 1.2 to 35.9 percent at Buge Health Centre.

At Boditi Primary Hospital, there were no reported NTD services before the intervention; however, the hospital began lymphedema management and trichiasis surgery after the six-month period. There were

significant improvements in the delivery of lymphedema management, with an increase in the number of cases managed from 0 to 12 at Boditi Primary Hospital, and 49 to 283 at Buge Health Centre. A slight improvement was observed in the number of trichiasis surgeries correctly performed, with an increase from 0 to five at Boditi Primary Hospital and 26 to 38 at Buge Health Centre. However, there was no improvement in the number of hydrocele cases operated on. These results are summarised in **Table 3**.

At the end of the six-month intervention, an HSCA was conducted for the second time to evaluate changes in the capacity of the study health facilities to detect, manage, record and report the target NTDs. These results are summarised in **Table 4**.

The total financial cost of the intervention, including staff, infrastructure, drugs and training, was 19,708,411 Ethiopian birr (\$450,478). Using a total beneficiary population of 302,842, the per-capita unit cost of the intervention is calculated to be \$1.49. Based on a comparison with the mean per-capita gross domestic product (GDP) prevailing during the period of project implementation, the intervention can be considered cost-effective since the per capita cost is below the GDP per capita (\$936.34). Further analysis of cost-effectiveness would be beneficial.

Table 1: Main outcome measures at baseline and endline

	Baseline (%)	Endline (%)
Primary outcome		
Proportion of NTD assessments demonstrating adherence to intervention procedures by health workers	72.1	77.5
Secondary outcomes		
Proportion change in health workers' ability to detect target NTDs over time	81.8	92.1
Proportion change in health workers' ability to detect and manage target NTDs over time	81.8	81.2
Proportion of health workers and HEWs who can adequately detect and record target NTDs after the intervention period	81.8	87.1
Proportion change of health workers correctly diagnosing NTDs	0.09	34.5

Table 2: Schistosomiasis case positivity rate before and after intervention

Health facility	Stool tests using microscope (Six months before intervention)			Urine tests using CCA (Six months after intervention)		
	Tests performed (n)	Positive cases detected (n)	Positivity (%)	Tests performed (n)	Positive cases detected (n)	Positivity (%)
Boditi Primary Hospital	942	0	0	16	3	18.8
Buge Health Centre	83	1	1.2	181	65	35.9
Total	1,025	1	0.1	197	68	34.5

Table 3: Neglected tropical disease service delivery before and after intervention implementation

Health facility	Number of cases pre-intervention (January 2019)			Number of cases post-intervention (December 2021)		
	Hydrocele cases operated on (n)	Lymphedema cases managed (n)	Trichiasis surgeries correctly received (n)	Hydrocele cases operated on (n)	Lymphedema cases managed (n)	Trichiasis surgeries correctly received (n)
Boditi Primary Hospital	0	0	0	0	12	5
Buge Health Centre	0	49	26	0	283	38
Total	0	49	26	0	295	43

Table 4: Results of pre- and post-intervention health system capacity assessment

Assessment area	Pre-intervention January 2019	Post-intervention December 2021
General infrastructure	No dedicated triage room for NTDs * Trichiasis surgery not available *	Dedicated triage room created * Trichiasis surgery available and five surgeries performed *
Supervision	Supervision checklists did not address target NTDs *†#	Supervision checklists developed by the study that address target NTDs routinely used *†#
Drugs and equipment	No drugs or equipment available for treatment of target NTDs and management of lymphedema *†#	Some drugs and equipment for the treatment of target NTDs and management of lymphedema available, as provided by the study *† Lymphedema management initiated * and intensified †
Laboratory infrastructure and equipment (* and † only)	No circulating cathodic antigen (CCA) diagnostic tests available for schistosomiasis (only wet mount microscopy) *†	CCA tests made available by the study and routinely used, with an increase in detected cases recorded *†
Guidelines and job aids	No job aids and case definitions on target NTDs available *†#	Job aids on target NTD detection, management and recording and case definitions available and routinely used, as developed by the study *†# Guidelines for CCA tests available *†#
Training	Only two doctors attended training on lymphedema management and prevention * Only one health officer and one clinical nurse attended trichiasis surgery training † Most HEWs trained only on trachoma clinical diagnosis and treatment #	Forty health personnel, 29 health personnel and nine HEWs attended comprehensive training on target NTDs *†#

* Boditi Primary Hospital, † Buge Health Centre, # health post

Qualitative results

Acceptability

The health workers interviewed described the intervention training materials as clear, user friendly and informative. They found the materials to be an effective aid for accurate diagnosis and noticed a consequent improvement in patient outcomes. Most agreed that the materials contain a sufficient amount of information and give adequate consideration to non-NTDs (e.g. malaria). Suggestions for improvement were the inclusion of targets (e.g. how much follow-up a case should have), possible complications and other diseases that have overlapping symptoms with NTDs to aid differential diagnosis.

“The source of my confidence was training, which I got recently, and the manual we get from the trainer.”

(HEW, health post)

Among community members interviewed, certain individuals mentioned stigmatisation by fellow community members as a barrier to care-seeking, which suggests a degree of hesitancy around acceptance of the intervention. If individuals feel ostracised by members of their communities for seeking treatment, this could hinder successful uptake of the NTD services provided in the intervention.

Feasibility

Most health workers interviewed felt confident to perform the NTD-related activities specified in the intervention. A small proportion of HEWs did not feel fully confident, indicating that they found the training to be too short. Interviewees raised a shortage of drugs and equipment to perform tasks as their main challenge, which spanned all target NTDs. HEWs also expressed concern about an increased workload, with many feeling it would be difficult to sustain the intervention alongside their existing daily activities. Recommendations to address challenges included hiring more experienced staff, continuous training, procuring additional resources and having a designated focal person for each NTD.

“Services should be given in a continuous manner as part of routine services to sustain the intervention results.”

(Health worker, hospital)

Community members interviewed reported mixed perceptions regarding who should be responsible for NTD management, raising concerns about the intervention's feasibility. Some believed the HDA and HEWs should manage NTDs, while others perceived NTD-related problems to be beyond the capacity of these two groups. Some community members highlighted a lack of available equipment to manage NTDs as a primary challenge.



Children studying illustrations on disease prevention at a primary school in Boloso Sore. Credit: Peter Caton

Discussion

Overall, results from the study were promising. The second HSCA revealed encouraging changes in the performance of the study hospital and health centres after the intervention — notably, improved service delivery. The introduction of focused trainings, job aids and an improved supply of drugs and equipment were all shown to strengthen NTD case management. This reflects a similar result from the recent EnDPoINT study in Ethiopia, which highlighted the need for continuous on-the-job training and supervision to maintain quality of service delivery.^[4] Ongoing advocacy will be important to ensure regional health bureaus include relevant drugs and commodities in their annual planning and budgeting.

Overall, routine M&E data showed remarkable improvements in NTD indicators after the intervention. The number of intestinal schistosomiasis cases reported increased after the introduction of sensitive CCA test kits. However, the number of trachoma cases reported using District Health Information Software2 (DHIS2) was relatively low, considering the area's endemicity. Further investigation for corrective action is needed to fully understand this.

Our study underscores the importance of high-quality reporting. Stakeholders at the national level should consider including NTD case reporting at the health-post level, to support HEWs' ability to accurately capture NTDs and track the proper referral and management of cases. These observations are consistent with those of a recent study conducted in Kenya, which highlighted the need to strengthen surveillance in relation to NTDs going forward.^[5] Similarly, work done by Sightsavers in Ethiopia calls for improved use of surveillance and data integration to eliminate trachoma.^[6]

The improvements in adherence to the intervention procedures did not match *a priori* expectations. This could have been due to the influence of the COVID-19 pandemic, which has impacted on health systems' service delivery.^[7] However, when we look specifically at the ability of the study health facilities to detect the target NTDs over time, we see that there was a significant increase of over 10 percent. This could reflect the intervention's focus on diagnosis and the provision of improved diagnostics and job aids. These results are consistent with findings from other recent work supporting NTD case management.^[8]

Qualitative findings vividly demonstrate widespread acceptability of the intervention by HEWs, with reported increases in knowledge and skills, and positive perceptions of the job aids. During exit interviews at the end of the intervention period, patients and caregivers expressed their general acceptance of the services provided.

Recommendations

- Further work is required to ensure that planning and budgeting include provision for NTD drugs and commodities to promote future sustainability of the intervention and its impact.
- Regular refresher training and supportive supervision for HEWs are needed to continue to strengthen NTD detection, management and recording.
- Districts should continue to offer support for the sustainable, robust routine data collection for NTDs. This will ensure that the local epidemiology of NTDs can be monitored effectively, and services can be tailored accordingly (e.g. investment in DHIS2).
- The evaluated NTD intervention requires further large-scale testing using a hybrid effectiveness intervention evaluation design to explore feasibility and effectiveness outcomes.

References

1. World Health Organization. Integrating neglected tropical diseases into global health and development: Fourth WHO report on neglected tropical diseases. Geneva: World Health Organization; 2017.
2. World Health Organization. Ending the neglect to attain the Sustainable Development Goals: A road map for neglected tropical diseases 2021–2030; Geneva: World Health Organization; 2020.
3. Federal Democratic Republic of Ethiopia, Ministry of Health. Second edition of National Neglected Tropical Diseases Master Plan. Addis Ababa: Federal Ministry of Health, Ethiopia; 2016.
4. Tesfaye A, Semrau M, Ali O, Kinfu M, Tamiru M, Fekadu A, et al. Development of an integrated, holistic care package for people with lymphoedema for use at the level of the primary healthcare unit in Ethiopia. PLOS Neglected Tropical Diseases, 2021; 15(4): e0009332.
5. Ng'etich AKS, Voyi K, Mutero CM. Assessment of surveillance core and support functions regarding neglected tropical diseases in Kenya. BMC Public Health, 2021; 21(1): 142.
6. Kebede BS. Is data integration the answer to eliminating trachoma in Ethiopia?. Sight Savers [online]. 2020 December. Available from: www.sightsavers.org/blogs/2020/12/data-integration-ethiopia.
7. Feldman M, Lacey Krylova V, Farrow P, Donovan L, Zandamela E, Rebelo J, et al. Community health worker knowledge, attitudes and practices towards COVID-19: Learnings from an online cross-sectional survey using a digital health platform, UpSCALE, in Mozambique. PLOS ONE, 2021; 16(2): e0244924.
8. Ortu G, Williams O. Neglected tropical diseases: Exploring long-term practical approaches to achieve sustainable disease elimination and beyond. Infectious Diseases of Poverty, 2017; 6(1): 147.

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