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Streamlining TB Infection Control and Intensifying TB Screening in Ethiopian Health Facilities

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ABSTRACT

Background: *Prevention and control of TB infection, especially in high transmission environments, is a priority activity for TB control. Ethiopia is a high TB burden country, where despite incidence rates falling in recent years, 30% of cases may be "missing". The design and implementation of TB infection control (TB-IC) interventions were required at all health facilities (HF). Under the USAID-supported Challenge TB (CTB) Project (2014-2019), a package of TB-IC interventions at HF were supported.*

Methods: *Data on the performance of TB-IC measures at HFs were collected using a supervision checklist and the SOC/QUAL TB tool. Data was then compiled and analysed.*

Results: *From June 2016 to December 2018, implementation of TB-IC measures in the assessed HFs improved (e.g. presence of TB-IC plan [25% to 61.2%], TB-IC multidisciplinary committee [48.5% to 63%], prioritization of cough triage [38.4% to 55.8%]). TB screening in hospital out-patient department attendees and amongst health staff led to 5,402 and 179 TB cases being detected respectively – almost 4- and 2-fold higher rates respectively than in the general population.*

Conclusion: *The project support led to an improvement in implementation of TB-IC measures in the HF. Continued monitoring of TB-IC measures is required to maintain the observed improvement.*

Keywords

TB infection control, Ethiopia, Challenge TB Project.

Background/Introduction

Tuberculosis (TB) continues to be the most important cause of death from a single infectious agent [1]. The World Health Organization's (WHO) End TB Strategy highlights the need for prevention of TB, including infection control (IC) in health care services and other settings where the risk of transmission is high [2]. Interrupting transmission is crucial and hence the need to implement interventions to rapidly identify source cases, and stop person-to-person transmission [3]. Ethiopia is among WHO's 30 high TB, TB/HIV and drug-resistant TB (DR-TB) burden countries, with an estimated TB incidence of 164 per 100,000 population [1].

Massive population growth and increasing number of people seeking health care, compounded by the chronic shortage of health care workers (HCW) and poor infrastructure of health facilities in Ethiopia, is resulting in overcrowded waiting areas and corridors of health facilities (HF) across the country. Congestion in HFs facilitates the transmission of TB among HCWs, patients, and visitors [4]. The majority of health care seekers in public health facilities in Ethiopia are people vulnerable to TB, including undernourished people, children, and immunocompromised people, further facilitating the continued spread of TB. The observation of the nosocomial transmission of DR-TB further highlights the situation of TB transmission and its negative impact on public health [5-7]. The situation in Ethiopia called for the design and implementation of effective TB infection control (IC) interventions at all healthcare levels.

The Ethiopian National TB Program (NTP) issued its first national TB-IC guidelines in 2009 immediately after WHO's publication

of its TB-IC guidelines in the same year. Following the guidelines, the NTP in collaboration with the United States Agency for International Development (USAID) TB projects developed a TB IC curriculum and started building capacity at various levels.

Launched on 1 October 2014, the five year Challenge TB (CTB) Project was USAID's global mechanism for the implementation of TB strategy, building and expanding upon previous programs, namely TB CARE I, TB CAP and HEAL TB in Ethiopia [8]. CTB provided support to nine regional states, covering 92% of the population. CTB's focus was on supporting national priorities and identified gaps through comprehensive support from central level to regions, zones, districts, health facilities (HF) and community level in Ethiopia.

Little has been documented on TB-IC related intervention studies in developing countries, including Ethiopia. This paper documents the results of TB-IC measures following CTB's support to the NTP compared to before the implementation of the TB-IC measures in Ethiopia.

Methods

Setting

Ethiopia, the second most populous country in Africa [9], is currently implementing its five-year Health Sector Transformation Plan (HSTP), 2015 – 2020, that includes TB prevention and control [10].

Baseline situational assessments were conducted in the Southern Nations Nationalities and People's Region (SNNPR) and Tigray using a comprehensive tool. The report of the assessment was used as input for planning and support. As CTB's geographical coverage expanded, the HFs supported increased from 555 in 2016 to 2,713 at the end of 2018.

Intervention

The package of TB-IC interventions included a set of capacity development activities (trainings, regular supportive supervision and mentorship on specific TB-IC standards) at national, regional, zonal, and district levels in the CTB-supported regions. Training to health workers covered establishment of a TB-IC committee, HF plan, triage, and HCW TB screening. The project staff that were embedded within the zonal health departments were building the capacity of TB program managers at zonal and district health offices for them to monitor TB-IC interventions in their areas. Each district TB officer supervises at least five health centres in the district every quarter, in collaboration with CTB staff. Supervision was carried out using a standardized checklist and TB Standard of Care-Quality (SOC-QUAL TB) tool. Feedback was provided on spot and implementation of the agreed upon action plan monitored during subsequent supervision visits. In addition to regular supervision, review meetings were conducted on a quarterly basis, where the performance of the HFs were evaluated.

The package also included support to the screening of HCW as per national guidance through training on TB screening of HCWs, providing support to periodic HCW symptom screening, and provision of N-95 respirators to high risk facilities.

Data collection and management

Data on the performance of TB-IC at health facility were collected using: (i) supervision checklist; and (ii) SOC/QUAL TB tool. The findings were then used to compile and synthesize data. The supervision checklist on TB-IC used for assessment and quarterly supervision have components on: (i) adequacy of natural ventilation; (ii) implementation of cough triage/screening and prioritization; (iii) presence of a TB-IC committee; (iv) availability of a TB-IC plan; and (v) regular screening of HCWs and the number who developed TB.

Data collection was performed through observation, review of HF documents including TB registers and minutes of TB-IC committees, and via interviews with HCWs. Data entry was done into the aforementioned tools and description of analysed data performed using frequencies and percentages to describe the trends in TB-IC practices during the project implementation period.

Further disaggregation of data was done by type of HF (health centres, public hospitals, sites providing anti-retroviral therapy [ART] and those not [non-ART]) and screening in outpatient departments (OPD) and amongst HCWs. The disaggregation was to analyse the difference in TB-IC measures between the different levels of HFs and service delivery types.

Results

Overall

At baseline (June 2016), a total of 555 HFs were assessed on their status of implementation of TB-IC measures and by the end of 2018, 2,713 were assessed. Only a quarter (136/555) had a TB- IC plan in place at the time of the baseline assessment. Following CTB's support on scaling up TB-IC measures, the proportion of HF that had a developed TB-IC plan reached 61.2% by the end of 2018 (Figure 1). At baseline, 268 HF (48.5%) had a TB-IC multidisciplinary committee (TB/IC MDC) established and functional. This increased to 63% by the end of 2017.The prioritization of cough through triage at baseline was low with only 213 (38.4%) HFs practicing cough triage. Through intensive support of CTB via training, mentoring, and supportive supervision to HFs, 1,515 out of 2,713 (55.8%) HFs were implementing cough triage by the end of 2018.

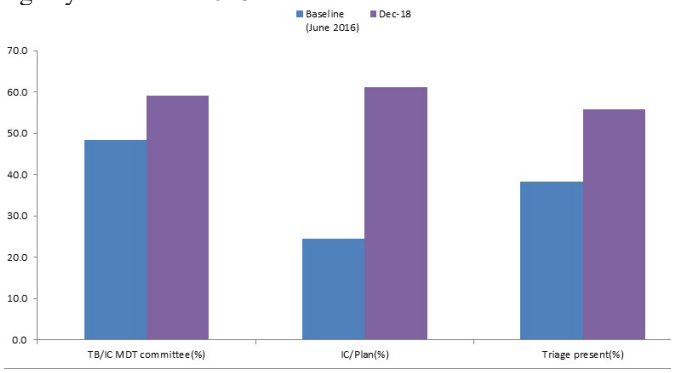

Figure 1: TBIC package monitored in CTB supported regions (baseline vs 2018 results) (Due to unrest in many parts of the country, less HFs were monitored/supervised and data collected in 2018 compared with 2017).

Health Centres

Among 432 health centres (HC) assessed at the beginning of 2016, only 23% (99/432) had a TB-IC plan developed. By the end of 2018, this had increased to 60% (1,535/2,549). TB-IC committees were actively meeting in 48% (208) of HC at baseline and increased to 58% (1,478). Triage of chronic coughers was only present in 36% (155) HC at baseline and through CTB support, the proportion rose to 54% (1,377).

Public Hospitals

Of 123 public hospitals assessed at baseline, only half (61) had functional TB-IC Committees, and this improved to 75% (123/164) by 2018 (As the project coverage increased over time, the number of public hospitals assessed increased, reaching 164 by the end of 2018). TB-IC plans were available in only 30% (37) in 2016, but more than doubled in the next two years to 76% (124/164). Triage of coughers also improved from 47% (58/123) to 84% (138/164) over the project period (Figure 2).

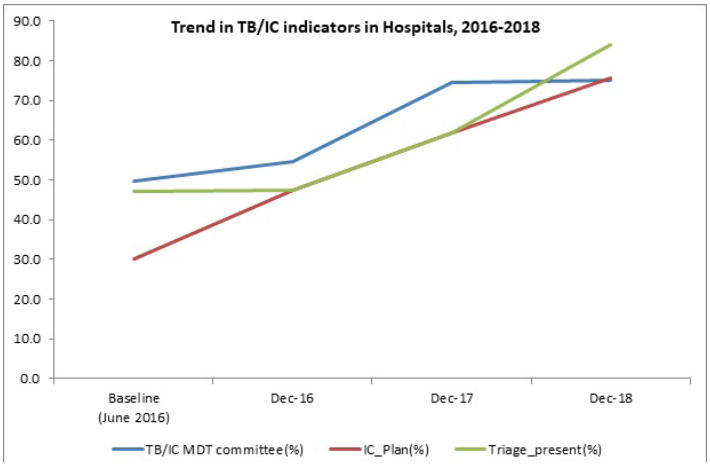

Figure 2: Trend of TB-IC indicators in CTB-supported public hospitals, 2016-2018.

ART and non-ART delivery sites

Improvement in TB-IC measures in the anti-retroviral therapy (ART) sites and non-ART sites was also marked. While there were only 55 out of 179 (31%) non-ART facilities that had functional multidisciplinary TB-IC committees in early 2016, this rose to 53% (986/1,857) by the end of 2018. A similar rise was observed among ART sites - from 57% (214/376) to 72% (615/856). Only a few non-ART facilities had a TB-IC plan at baseline (14.5% [26]) the number rose more than three-fold by 2018 (55% [1,024]).

The proportion of ART sites with a TB-IC plan increased similarly from 29% (110/376) in 2016 to (74% [637/856]) in 2018. Triage of chronic coughers in non-ART sites improved from 30% (54) to 50% (920), while for ART facilities, triage improved from 42% (159) to 70% (595) over the project period (Figure 3).

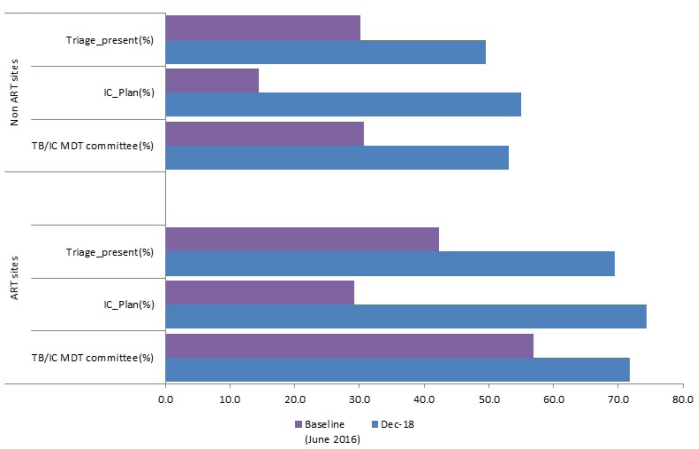

Figure 3: Improvement in TB-IC measures by type of ART service delivery site, 2016-2018.

Screening in out-patient departments (OPD)

As part of TB IPC activities, CTB started supporting OPD TB screening in 2017, and the support subsequently was expanded to 263 hospitals in CTB-supported regions. From April 2017 until March 2019, out of over 6.5 million outpatient visitors from HF supported by CTB, 90% were screened for TB, and 37,029 all forms of TB were diagnosed (contributing 16% of all the TB cases notified nationally).

For hospitals, there was a total of 959,502 hospital OPD attendees, of which 899,047 (94%) were documented to have been screened for TB, and 5,402 (0.6%, 601 per 100,000 population) cases of TB diagnosed. The number of TB cases notified via the initiative of screening OPD attendees for TB has been increased over the intervention period (Figure 4).

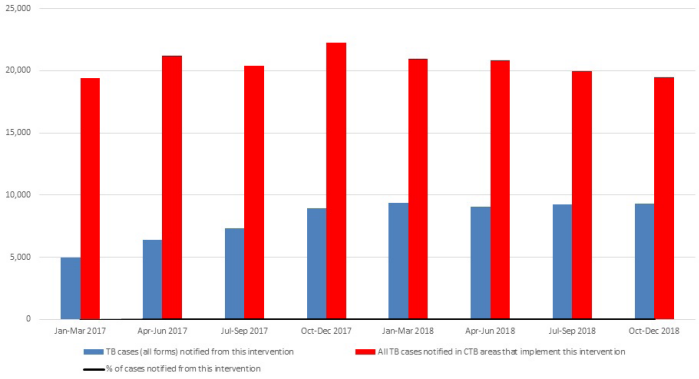

Figure 4: OPD TB screening in CTB-supported health facilities, 2017-2018.

Screening of health care workers

CTB, through training and mentoring, supported local experts to carry out periodic TB screening of the staff as per the national guidance – initial symptom screening and if screen positive, to be evaluated accordingly by GeneXpert testing. Data collected from 393 HF in 2017 and 2018 in CTB-supported regions indicate that out of 49,032 HCW screened, 179 were diagnosed with TB equivalent to a rate of 365 per 100,000 population, more than twice the general population TB prevalence estimate (164 per 100,000).

Over the project period, there has been a declining national trend in TB case notification, falling annually on average 7% over the past 4 years. Improvement in TB-IC in the HF may have been a contributory factor, although the contribution cannot be quantified.

Discussion

The baseline assessment indicated that TB-IC measures were being poorly implemented in Ethiopia. The implementation of CTB improved the capacity of health facilities in addressing TB-IC issues. The improvement in the development of TB-IC plan was much higher than other TB-IC measures. This is possibly because, according to WHO, the establishment of a TB multi-disciplinary committee and development of a TB-IC plan precede the other measures [11].

Although only a quarter of HF had a TB-IC plan available, close to half of the HF already had a committee established. Hence, with CTB's intervention, it was possible to build the capacity of the TB-IC committees in order to develop a TB-IC plan, resulting in an increase to 61% of the HF having a TB-IC plan developed. The effect of CTB's intensive capacity building is also reflected in the marked improvement of the implementation of chronic cough triage from 38% to 56%. This is a result of the close follow up by the zonal TB officers, and of CTB regularly monitoring the implementation of TB-IC measures using the SOC-QUAL TB tool.

The baseline finding of about half of HF having a TB-IC committee is much higher than what was reported in Nigeria, where only 16.7% of the TB/HIV facilities had such committee [12]. The likely reason for this is that there was prior support provided to HF on TB-IC activities through the support of the USAID funded TB project in the two largest regions of Ethiopia, Oromia and Amhara [13]. However, despite the presence of such committees, the availability of TB-IC plans in Ethiopian HF which was 25% at baseline, was lower than that observed in Mozambique (48%) and Uganda (31%) [14,15]. But with CTB's interventions, the proportion rose to 61% over the project period.

Similar to the other TB-IC measures, triage of presumptive TB patients was better practiced (38%) in Ethiopia at baseline than some sub-saharan African countries (e.g., 16.7% for Nigeria) [12]. However overall, there is still more work to be done to ensure that the whole package of TB-IC measures is implemented in all HF. The establishment of TB-IC committees and development of TB-IC plans should be immediately followed by implementation of the other managerial and administrative TB-IC measures if TB transmission is to be halted in the HF.

In general, hospitals performed better than health centers on implementation of TB-IC measures. By the end of the CTB, over three-quarters of hospitals had a TB-IC committee and plan and were implementing triage. The difference could be because of better trained HCW at hospitals and more intensive support provided to hospitals compared to health centers for ease of access. Similarly, comparing non-ART and ART delivering HF indicated that ART HF were better performing TB-IC measures than non-ART sites – given that ART sites received more attention regarding TB-IC because they provide services to people living with HIV, vulnerable groups for acquiring TB [16,17]. Hence the improvement seen following CTB's support to these sites was an important contribution.

The strategic investment of CTB support to the screening of all OPD attendees for TB should be recognized as facilitating implementation of TB-IC measures in the HFs as it is aimed at rapid identification of TB cases and thereby reducing transmission of infection. The yield of TB cases from this activity is much higher (601 per 100,000) than the general population estimate (164) and contributed a significant proportion of cases notified by the NTP.

The regular screening of HCW in HF was not adequately implemented in general at the beginning of CTB. Following interventions that supported HF, more HCW were screened: reports from 393 HF in 2017-2018 showed that 179 HCW were diagnosed with TB and that the rate of TB amongst HCW was more than twice the general population TB incidence estimate. This is similar to the findings of previous studies done in Ethiopia and South Africa where HCWs were found to be more than twice more likely to acquire TB [18,19]. If the complete range of TB-IC measures are implemented in all HF, hopefully the rate of TB amongst HCW will be reduced closer to that of the general population.

There were a number of limitations to the TB-IC intervention of CTB and hence to this analysis. A number of TB-IC measures that it would have been of value to report and monitor (e.g. adequacy of natural ventilation) were not analyzed because of the project's dependence on the quarterly data sources which did not capture such data/indicators. Additionally, several confounders (e.g. past TB-IC support, HCW make up of each HF, regional/administrative factors) may have impacted on the result as HF were not randomized to receive CTB support or not.

The interventions of CTB on TB IC activities have contributed in the decline of TB case notification during the implementation period of CTB. The TB case notification and incidence have fallen on average at a rate of 7% over the past 4 years period. We recommend that the contribution of TB IC improvement and other interventions will have to be quantified through mathematical modeling.

Conclusion

The support of the CTB project led to an improvement of the implementation of TB-IC measures in the health facilities in the CTB supported areas. Through the strengthening of the capacity of district TB experts and introducing the appropriate monitoring tool (i.e SOC QUAL TB), TB-IC practices in the respective health facilities were improved. However, more resources and continued monitoring of TB-IC measures are required to continue improving the implementation of TB-IC measures whereby all health facilities in Ethiopia are fully implementing TB-IC measures in full capacity and up to the international standards.

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