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Research Article

Workable Strategies for Active TB Case Finding among Goldminers in Guji Zone of Ethiopia

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Abstract

Background: Tuberculosis key affected populations (KAP) are those segments of the general population who experience higher TB burden but decreased access to services for the disease. The End TB Strategy recommends the need to cover all KAP with active TB case finding by the year 2020 (xx). In Ethiopia mineral miners are top on the long list of nationally identified TB KAP. Although Ethiopia adopts the global approach to address TB among the TB KAP, there is no nationally standardized guide on active search for TB among KAP in the country. By devising and implementing a series of steps this paper tries to show workable strategies for enhancing TB case finding among goldminers in the Oromia region of Ethiopia.

Design and Methods: The setting for this study was selected traditional goldmining sites in Guji zone of Oromia. The study was conducted from August 03-16, 2021. Two approaches were used to identify presumptive TB among goldminers: 1) field-based search for presumptive TB at mining shafts 2) enhanced triaging among OPD attendants at 3 hospitals. Diagnosis of tuberculosis was made using the WHO approved molecular technique called GeneXpert RIF for TB.

Results: The study covered 37 mining shafts in three selected woredas and enhanced central triaging done at three high client load hospitals. Total of 15,248 (14,952 (98%) aged > 15 years and 296 (2%) aged < 15) miners and their accessible families were screened for TB. 723 (5%) was screen positive for TB from which sputum samples were collected and evaluated at 4 GeneXpert sites. 45 (6.22%) persons are diagnosed with active TB of which 2 are cases of RR-TB. Additionally, from 202 sputum samples collected through enhanced triaging among 3,590 OPD attendants at three hospitals, 42 MTB and 1 RR-TB cases were detected and linked to treatment for TB. Altogether, from the total of 925 presumptive TB cases identified at 37 mining shafts and three hospitals, 88 (9.5%) active TB cases are detected and promptly initiated on TB treatment at nearby treatment centers. Moreover, 46 close contacts of 26 bacteriologically confirmed index TB cases were investigated from which 4 active TB cases were detected among and initiated on treatment.

Conclusion and Recommendation: The result of active search for TB among goldminers in Guji zone of Oromia has shown that goldminers are disproportionately affected by TB/MDR-TB. From the result of the study, we recommend that the procedures employed in the current initiative can be replicated in similar setups of project supported zones in Oromia region and beyond. Yet, initial consensus building, proper activity planning, clarification of roles and responsibilities to main actors and strong system commitment is crucial for the success of similar active TB case finding among goldminers.

Keywords: *Tuberculosis; Key Affected Populations (KAP); TB KAP; Goldminers; GeneXpert RIF*

Background

Despite advances in the diagnostic modalities, access to health care and administrative commitments, most TB high burden countries are not on track to achieve the End TB Strategy targets. Strengthening tuberculosis case finding, especially among the key TB affected population, remains an important parameter in the fight against TB epidemic [1]. Mineral mining is the most dangerous occupation in the world in terms of its risk for tuberculosis in which multiple factors contribute to the higher incidence of TB among mineral miners [1,2]. May mineral miners are engaged in underground works which creates high-risk environment for TB transmission, resulting from silica dust exposure which increases the risk of pulmonary TB, particularly among goldminers [3]. Most mineworkers are migrants which may expose them to variety of TB risk factors including HIV. Their migration not only exposes them to TB but it also facilitates disease transmission to the general population [3,4].

Reaching at least 90% of the key tuberculosis affected populations is embedded into the End TB Strategy. Ethiopia adopts this global approach to end the national epidemic of TB. Building on this national TB prevention and control strategy, USAID|Eliminate TB project took the initiative to address key tuberculosis affected segments of the national population as one of its intermediate result areas. In the Ethiopian context, mineral miners are among the long list of nationally identified key TB affected populations of the country. In Ethiopia, the national TB case finding strategy recommends a targeted and differentiated approach to reach each segment of nationally identified high risk groups (KAP). Thus, the USAID|Eliminate TB project's key affected population interventions builds on nationally recommended TB case finding among KAP to support government efforts to address TB CF among KAP in its supported regions. As the KAP are underserved by the conventional facility-based TB care services, the project devised and employed a targeted and contextually appropriate TB case finding approach for goldminers. This report focuses on the procedure and outcomes of the campaign based active TB case finding implemented among goldminers in Guji Zone of Oromia region.

Figure

Aim and Objectives

This study aimed to investigate workable approaches for active TB case finding among goldminers in Guji zone of Oromia. The specific objectives of the study were to:

- Actively search for TB cases among goldminers at selected mining shafts in the Guji zone of Oromia
- Identify burden of active TB among goldmines
- Propose workable approaches for addressing TB case finding among gold and other mineral miners in project supported zones of Oromia region and beyond.

Design and Methods

Active search for TB cases among goldminers was conducted cross-sectionally through a campaign involving all relevant program actors from health facilities and the immediate health management units (districts). The campaign was conducted from August 3-16, 2021. The activity was conducted at 37 mining shafts and three hospitals found at three purposefully selected woredas in the Guji zone. The three woredas and health facilities within them were selected purposefully with the assumption that they have more traditional mining shafts and migrant goldminers compared to other woredas in Guji zone.

Ethical clearance

All the necessary approval and consent was obtained from Oromia Regional Health Bureau Public Health Emergency Management and Health Research Directorate through ethical clearance letter ref: - BFO/HBFO/1-16/5066 dated 11/01/2022. Moreover, symptomatic TB screening was done using nationally approved screening algorithm.

Data collection and management

Activity and service data were captured using templates and report formats recommended by the national demographic and health information system. Data were analyzed descriptively using Microsoft excel and presented following the aims and intended objectives of the intervention.

Approaches used for active TB case finding among goldminers

The project used the following procedures to guide successful implementation of the campaign based search for active TB cases among miners at priority mining shafts in Guji zone. The procedures employed are outlined as follows:

- Consensus building and identification of relevant stakeholders.
- Inventory of the functionality of selected GeneXpert sites and acquisition of core lab supplies.
- Orientation of the stakeholders on the basic tenet of actively searching TB cases among miners.
- Segmentation of stakeholders (actors) and assignment of roles and responsibility.
- Development of movement plan to guide field activity.
- On-site active search for presumptive TB at selected mining shafts.
- Additional recommendations proposed by ZHD and adopted to maximize campaign outputs.
- Sample transportation arrangements to selected GeneXpert sites.
- Sample processing and result delivery and linkage of TB patients to treatment.
- Contact investigation among households of miners diagnosed with active TB.
- Recommendations on workable approaches for similar project interventions among miners.

Results and Discussion

During the campaign based active search for TB, the campaigners screened 15,248 goldminers found at 37 mining shafts in three selected districts. 723 (5%) of total screened miners were presumptive TB from whom sputum samples were collected and submitted to GeneXpert RIF sites found in the vicinity of the mining shafts. 45 (6.22%) of total presumptive TB identified from mining shafts were diagnosed with active TB; and 2 of the total cases were rifampicin resistant cases of TB. During similar campaign days 3,590 OPD attendants at three selected hospitals were screened through enhanced central triaging. 202 (6%) presumptive TB were identified from the screened OPD attendants, and 43 (21%) active cases of TB were detected. Altogether 85 (9%) of active TB cases were detected from 925 presumptive TB identified during campaign days. 3 (4%) of the total active TB cases were rifampicin resistant.

Days of the campaign	Total # of daily sputum samples collected
August 3, 2021=Day 1	24
August 4, 2021=Day 2	92
August 5, 2021=Day 3	142
August 6, 2021=Day 4	151
August 7-8, 2021	Weekend days
August 9, 2021=Day 5	72
August 10, 2021=Day 6	59
August 11, 2021=Day 7	54
August 12, 2021=Day 8	42
August 13, 2021=Day 9	61
August 16, 2021=Day 10	26
Total samples from mining shafts	723
Total samples from triaging at 3 hospitals	202
Overall # of samples tested for TB	925

Table 1: *Daily trend in the number of sputum samples collected from presumptive TB identified at 37 mining shafts found in 3 woredas of Guji zone, Oromia.*

Name of GeneXpert site	Total # of samples tested	Total # of MTB detected	Total # of RR-TB detected
Adola Hospital	295	13	0
Megado HC	121	17	1
Uraga Hospital	208	7	0
Negele Hospital	99	6	1
Total	723	43	2
Enhanced triaging at Adola hospital	102	24	1
Enhanced triaging at Uraga hospital	45	12	0
Enhanced triaging at Negele hospital	55	6	0
Total samples tested at 3 hospitals	202	42	1
Grand total	925	85	3

Table 2: *# of sputum samples transported to 4 GeneXpert sites, number of TB and RR-TB detected among goldminers at 3 woredas and from OPD screening at 3 hospitals in Guji zone of Oromia, August 3-13, 2021.*

Sample processing, result delivery and linkage of TB patients to treatment

As clearly indicated in stakeholders' roles and responsibility section, sputum samples were processed daily at four GeneXpert sites (Adola, Negele and Uraga hospitals and Megado HC). Figure 1 and 2 below depict a booming trend in the number of daily sputum samples processed and number of active TB cases detected at three of the four GeneXpert sites where sputum samples collected through the campaign is processed (Megado, Adola and Negele) beginning from the date of the start of the campaign (August 3, 2021). NB: GeneXpert data from August 13-16 is not included because of interruption in internet connectivity.

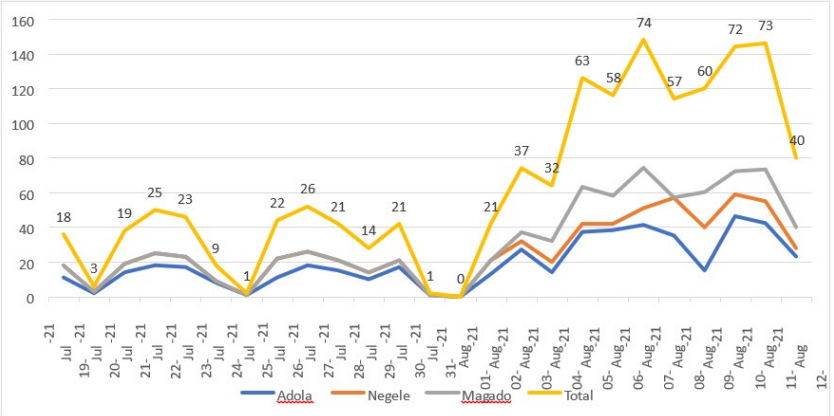

Figure 1: *Increasing trend in the # of sputum samples processed at selected 3 GeneXpert sites after the start of the campaign on August 03, 2021, Guji Zone, Oromia.*

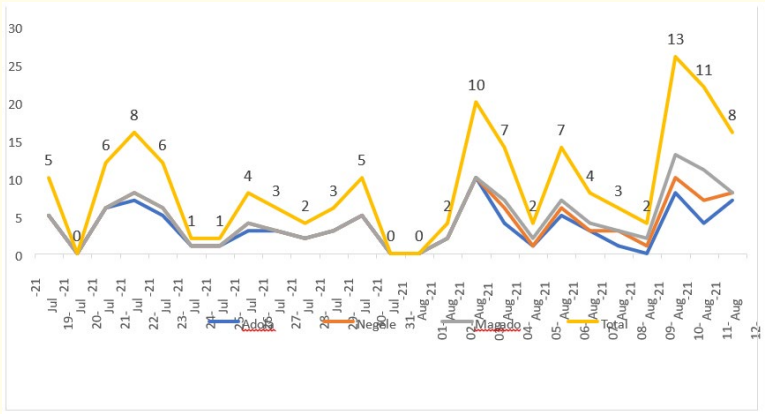

Figure 2: *Increasing trend in the number of active TB diagnosed at 3 selected GeneXpert sites in Guji zone of Oromia, August 3-12, 2021.*

As summarized in table 3 below total of 85 active cases of TB were detected and linked to nearby TB treatment centers. 3 of the total cases were rifampicin resistant cases of TB.

Results of post campaign contact investigation among miners diagnosed with active TB

During the campaign based active TB case finding among gold miners at 37 mining shafts, total of 45 bacteriologically confirmed TB cases were detected and put on treatment. Following the campaign HEWs conducted tracing and investigation of close contacts of miners diagnosed with TB. From total cases household contacts (at least one) were screened for 29 (64%) of index cases.

Activity	Number (%)
Total number of Woredas included in the campaign	3
Total # of miners screened at 37 mining shafts	15,248 (100%)
# of presumptive TB from mining shafts	723 (5%)
Total number of TB from mining shafts	45 (6.22%)
# of RR-TB from 45 TB cases	2
# of OPD attendants at 3 hospitals during campaign days	3,590 (100%)
# of presumptive TB identified at 3 HL HFs	202 (6%)
# of TB cases from enhanced triaging at 3 HL HFs	43 (21%)
# of RR-TB from 43 TB cases detected at 3 HL HF	1
Grand total # of presumptive TB (mining shaft and 3 HL HFs)	925
Overall TB from shafts and hospitals	88 (9.5%)
# of RR-TB from total of 88 TB cases	3
Case notification rate per 100,000 miners' population	451[€]

Table 3: *Summary of campaign result in Guji zone of Oromia, August 3-13, 2021.*

[€]=TB burden among miners 4.14 times higher than the burden in the general population of Oromia region.

For the 29 index cases 46 household contacts were identified and all of the identified contacts were symptomatically screened for TB. 9 (20%) of the screened contacts had sign and symptoms suggestive of tuberculosis; and sputum samples were collected and tested using GeneXpert. 4 (44%) active TB cases were diagnosed from the 9 presumptive TB identified among close contacts of 29 miners with TB.

			Results of Contact screening among miners diagnosed with active TB									
Woredas	# of index cases	# of index whose contacts screen	# of < 15 year contacts	# of contacts 15 years and above	# of contacts screened (< 15 years)	# of contacts screened (15 years and above)	# of presumptive TB identified (< 15 years)	# of presumptive TB identified (15 years and above)	# of presumptive TB tested for TB (< 15 years)	# of presumptive TB tested for TB (15 years and above)	# of TB cases identified (< 15 years)	# of TB cases identified (15 years and above)
O/Shakiso/Megado PHCU	17	11	0	14	0	14	0	4	0	4	0	4
Saba Boru	3	3	0	10	0	10	0	0	0	0	0	0
Agawayu	15	15	5	17	5	17	0	5	0	5	0	0
Total	35	29	5	41	5	41		9		9		4

Table 4: *Summary of results on contact screening among miners diagnosed with TB in Guji zone of Oromia, August 3-13, 2021.*

Linkage of active TB cases to nearby TB treatment centers

Campaign coordinators daily communicated with GeneXpert sites to ensure prompt linkage of active TB to treatment centers. Clinicians assigned at hospitals and health centers referred active TB cases to woreda TB program managers using national tuberculosis case referral and transfer out forms. Woreda level TB program managers daily communicated with health extension workers to locate and retrieve miners diagnosed with active TB/RR-TB and facilitated patients linkage to nearby TB treatment centers. Health extension workers also collaborated with miners with active TB and local community leaders in which TB treatment centers were selected and oriented to provide daily DOT support at mining shafts. The three RR-TB cases were linked to treatment with second-line anti-TB drugs at Adola MDR-TB treatment center or miners.

Challenges encountered and mitigative interventions employed to alleviate challenges

The main challenges faced during the campaign-based search for TB among miners included occurrence of unexpected heavy rain which impacted team travels to remote mining shafts, electric power fluctuation and higher error rate on samples sent to one of GeneXpert sites (Megado health center GeneXpert site). A focus on numbers than quality has led to shortage of falcon tubes as the number of identified presumptive TB exceeded the target in original plan. Inadequate commitment at some of the woredas was observed in timely initiating the campaign to address each of the challenges we took real-time mitigation intervention to ensure success of the intervention. Mitigation measures were implemented by the campaign team to avert challenges encountered. The team hired 3 motor bikes to access the remote mining shafts to collect samples from presumptive TB cases. As the number of sputum samples exceeded the target in campaign plan, samples were transported to Uraga and Negele Hospital GeneXpert sites. In consultation with zonal health office and hospitals more falcon tubes were mobilized from supplies for routine services. End of business day discussions were conducted, and corrective actions taken to alleviate observed gaps on quality of TB screening at mining shafts.

Recommendations for Similar Project Interventions

From Ethiopian National TB prevalence survey and annual TB case reports from Guji Zone, Guji zone has long been considered as high burden area for tuberculosis. Geographically dispersed small scale traditional gold mining is one of the main economic activities in Guji zone, that has been attracting miners from all corners of Ethiopia. Miners are recognized as the group of the general population those disproportionally affected by tuberculosis.

From total of 925 presumptive TB cases identified at mining shafts and at 3 hospitals, 88 (9.5%) active TB cases are detected amounting to CNR of 541/100,000 population, a burden much higher than the TB burden estimated for national population of Ethiopia. The output of the campaign has shown us that Guji is indisputably high TB burden zone and goldminers are disproportionately affected by TB/MDR-TB. From the result of the campaign, we recommend that such initiative can be replicated in similar setups of project supported zones in Oromia region and beyond. Yet, proper planning, consensus building, among stakeholders and strong ownership and commitment by the local health system is crucial for the success of the initiative.

Conclusion

The result of active search for TB among goldminers in Guji zone of Oromia has shown that goldminers are disproportionately affected by TB/MDR-TB.

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