

Community health volunteers' contribution to Tuberculosis patients notified to National Tuberculosis program in Kenya

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Abstract

Background Contact investigation is important in finding contacts who have Tuberculosis (TB) disease so that they can be given treatment and stop further transmission. The main objective of this study was to assess the contribution of community health volunteers (CHVs) to the number of TB patients notified to the National program in Kenya. The specific objectives were to establish the total number of households of TB index cases visited by CHVs for contact screening, identify the total number of household members screened for TB and establish the number of persons referred for further TB investigation and the number identified with TB.

Methods This was a retrospective desk review of project reports submitted to Amref Health Africa in Kenya by the sub recipients implementing activities in the 33 counties with Case Notification Rate (CNR) of less 175/100,000 and Treatment Success Rate (TRS) of less than 88% as per the National strategic plan 2015-2018. Data for this study covered a time period between January and December 2016. Data on the notified TB patients was obtained from the National Tuberculosis Information Basic Unit (TIBU). The study population included all the TB index cases whose households were visited by CHVs for contact screening. Data was analyzed descriptively.

Results CHVs visited a total of 26,307 TB patients in their households for contact screening. A total of 44,617 household members were screened for TB with 43,012 (96.40%) coming from households of bacteriologically confirmed TB patients and 1,606 (3.60%) from households of children under 5 years. The proportion of the persons referred in relation to number screened was 19.6% for those over 5 years and 21.9% from under 5 years with almost the same percentages for male and female at 19.2% and 19.7% respectively

Conclusions This study showed that in the 33 counties of Global Fund TB project implementation the percentage of TB cases identified through tracing of contacts improved from 6% to 10% while the percentage of notified TB cases; all forms contributed through community referrals improved from 4% to 8%. Community health volunteers can play an effective role in household contact screening and referrals for identification of TB.

Background

The World Health Organization, Global Tuberculosis report in 2017 identified TB as the leading cause of death from a single infectious agent, ranking above HIV/AIDS. In 2016, there were an estimated 1.3 million TB deaths among HIV-negative people and an additional 374 000 deaths among HIV-positive people. An estimated 10.4 million people fell ill with TB in 2016 (1)

The End TB Strategy calls for systematic screening of selected high-risk groups including contacts of tuberculosis (TB) cases to facilitate early TB case detection. Studies conducted in high burden areas have shown that active case finding among household Contacts yields substantially more TB cases than passive case detection (2)

Tuberculosis (TB) contacts are people who have close contact with patients with infectious TB, because they are at high risk for infection (and in line with the End TB strategy), TB contacts should be investigated systematically and actively for TB infection and disease (3) Contact investigation is important in finding contacts who have Tuberculosis (TB) disease so that they can be given treatment and stop further transmission(4).

The international development organization, Voluntary Service Overseas has highlighted the benefits of community health volunteering, such as creating links between the formal health system and the community, increasing health care access and community empowerment (5). Community health workers are known by many different names in different countries but according to Community health workers should be members of the communities where they work, should be selected by the communities, should be answerable to the communities for their activities, should be supported by the health system but not necessarily a part of its organization, and have shorter training than professional workers (6) .

The main objective of this study was to assess the contribution of community health volunteers (CHVs) to the number of TB patients notified to the National program in Kenya.

The specific objectives were to: 1) establish the total number of households of TB index cases visited by CHVs for contact screening; 2) identify the total number of household members screened for TB; 3) establish the total number of persons referred for further TB investigation; and 4) assess the contribution of CHVs on the total number of TB cases notified to the national TB program

Methods

Amref Health Africa in Kenya, a Non state Principal Recipient (PR) for Global Fund Tuberculosis (TB) project, implemented TB activities through 29 Sub- recipients in the year 2016. Global Fund supported Amref in Kenya to implement TB activities in 33 counties with Case Notification Rate (CNR) of less 175/100,000 and Treatment Success Rate (TRS) of less than 88% as per the National strategic plan 2015-2018 (ref). In 2015 the percentage of (TB) cases identified through tracing of contacts in these counties was 6% (3,365) of the 59,921 cases notified to the National TB Program while the percentage of notified TB cases, all forms contributed though community referrals was only 4%.

This was a retrospective desk review of project reports submitted to Amref Health Africa by the sub recipients implementing activities in the 33 counties with Case Notification Rate (CNR) of less 175/100,000 and Treatment Success Rate (TRS) of less than 88% as per the National strategic plan 2015-2018. Data for this study covered a time period between January and December 2016. Data on the

notified TB patients was obtained from the National Tuberculosis Information Basic Unit (TIBU) a national platform for all Tuberculosis patients' data.

Study population

The study population included all the TB index cases whose households were visited by CHVs for contact screening between January and December 2016 and reported to Amref. A total of 2,691 Community Health Volunteers (CHVs) in the 33 counties of implementation were taken through a three days training on community TB care management; some of the topics covered during this training included, introduction to TB basic information, drug resistance, TB/HIV association, Nutrition management of TB, Infection prevention and control of TB. The CHVs were also trained on the community based reporting tools with emphasis on data collection and recording from the households, contact screening as well as referral for persons with signs and symptoms of Tuberculosis.

In addition, a total of 2,398 Community Health Extension Workers (CHEWs) were trained on Tuberculosis and supervision of community based activities that included TB control with intensified focus on supervision of the Community Health volunteers. CHVs were then linked to 2,404 health facilities registering at least one TB patient within the 33 counties of intervention. CHEWs generated a list of the bacteriologically confirmed TB patients and allocated them to the CHVs who visited their households for health education, screening and referral for cases with TB signs and symptoms.

Household contact screening was done for all contacts of bacteriologically confirmed TB patients and contact of all children under five years TB patients regardless of the type of TB. Household TB screening included evaluation for possible TB disease with a symptoms questionnaire with six key questions that included: Cough for any duration, History of close contact with confirmed TB patient, body fever, Noticeable weight loss, Chest pain or breathlessness and finally night sweats. In case any of the six questions were answered "yes" then the person was referred to the health facility for further TB investigation. The CHVs ensured that all children under five years who had contact with the index cases were referred irrespective of the screening outcome for further investigations and possible **Isoniazid** preventive therapy (IPT) initiation. Community Health Volunteers were provided The CHEWs were supported with airtime for effective supervision and coordination of the CHVs activities.

The community health volunteers used the Ministry of Health (MOH) approved screening, referral and contact tracing forms, which they filled during household visits. The forms were verified by the CHEWs for completeness. The CHVs then followed up the referred TB contacts and ensured they all arrived at the link health facility (TB clinic) for further investigations.

CHVs together with the HCW at the TB clinic ensured that all contacts were registered in the contacts register and their outcomes updated appropriately. The contacts confirmed with TB were recorded in the

facility TB register and '*referred by*' column updated appropriately to make sure the yield from the CHVs household contact screening was well captured and reported .

For each index case visited and contacts screened, the contact investigation form was attached together with the screening and referral forms. These forms were verified and certified by the sub county TB coordinators and then submitted to the sub recipients (SR) implementing the Global Fund TB project in the specific counties. Original copies of the forms were submitted to Amref the Principle Recipient (PR), second copy remained with the SR and the last copy was filled at the facility. Data from all the verified forms collected by the SR, were entered into the Grants Management Information System, a web based systems that works as the project database for all the implementation data.

Data Validation

The Subrecipient held monthly meetings with the Community Health Volunteers to validate data collected and share any challenges. In addition the Subrecipients held monthly facility meetings with the TB nurse, facility in charge and representatives from the community health volunteers to discuss the work done by the community health volunteers and validate data submitted every month. Amref carried out Quarterly Onsite Data Verification (OSDV) to assess the quality of reported programmatic results. The on-site checks were basically made to provide valuable information to the project team on where potential issues and gaps could be, and allow project to plan appropriate follow up actions to address these issues. Random sampling, which is important to minimize selection bias, combined with purposive selection, was used to select the counties, sub counties and facilities visited. Using the sampled forms submitted to Amref, the project team through the support of the county and subcounty TB coordinators verified the index cases visited for contact screening by checking their names from the TB register to confirm that they were true TB patients. The team worked with the TB nurses at the facility level to confirm that the households were visited for contact screening, the team also verified duplicate copies of the contact screening and referrals forms filed at the facility level.

Variables

The primary outcome variable was TB cases notified to the national program through referral by community health volunteers. When persons with TB signs and symptoms are referred for investigation by CHVs, they start from the laboratory where they are investigated for TB and those who are found infected are enrolled on treatment, data at the facility is collected electronically with mobile computer tablets and uploaded into the central database TIBU. Other covariates in this study include TB index cases visited for contact screening, number screened, total referred for further investigation and TB cases

referred by Community Health Volunteers. Demographic variables of the subjects such as gender and age were also included.

Ethical issues

Amref health Africa was competitively selected as the Principal Recipient for Global Fund TB in Kenya for non-state actors with a mandate to implement community based TB control activities in partnership with the National TB program, Sub-Recipients and communities living with the disease. The data utilized in this study was purely from the project reports submitted to Amref by the sub-recipients. For purposes of data on the total cases notified to the national program; Amref had a discussion with the national TB program the custodian of all TB patients' data and sought approval to use data from the national data base, the national database had data on the patients enrolled on treatment who were to be visited by CHVs for contact screening. For purposes of confidentiality, the data collected was an aggregate of case finding and referrals from the 33 counties generated from Tuberculosis Information Basic Unit (TIBU) without the patient names.

Data processing and analysis,

Data was obtained from the project monthly reports submitted to Amref by the sub-recipients. The project team verified all contact tracing, screening and referrals forms for completeness. The team also verified that all the index cases visited for contact screening were bacteriologically confirmed for patients over 5 years while for those under 5 years contact screening was done for all patients irrespective of the type of TB. Any forms with incomplete details were returned back to the sub-recipients to work closely with the CHVs and verify the missing information. Data for TB patients over 5 years who were not bacteriologically confirmed was excluded from this study. Data was recorded into excel spreadsheets where descriptive analysis was done, proportions calculated and summarized in a table.

Results

Community health volunteers visited a total of 26,307 TB patients (index cases) in their households for contact screening. This included 25,534 (97.1%) bacteriologically confirmed TB patients and 773 (2.9 %) TB patients under 5 years with all forms of TB. The proportion of male to female TB patients visited for contact screening were 13,324 (49.4%) male and 13,324 (50.6%) female [Table 1].

A total of 44,617 household members were screened for TB with 43,012 (96.40%) coming from households of bacteriologically confirmed TB patients and 1,606 (3.60%) from households of children under 5 years. More female contacts were screened for TB giving 23,651(53%) and male contacts were

20,966 (47%) of the total screened. Between January and December 2016 a total of 8,679 persons with signs and symptoms of TB were referred to health facilities for further investigation; this number included 8,357(96.3%) from households of bacteriologically confirmed TB patients while only 322(3.7%) of the total referred were from households of children under 5 years of age.

The proportion of the persons referred in relation to the number screened was 19.6 % for those over 5 years and 21.9 % from under 5 years with almost the same percentages for male and female at 19.2% and 19.7 % respectively. (Refer to Table 1 for more information)

Discussion

This study showed that in the 33 counties of Global Fund TB project implementation the percentage of TB cases identified through tracing of contacts improved from 6% to 10% while the percentage of notified TB cases; all forms contributed through community referrals improved from 4% to 8%. The results clearly show that community health volunteers can play an effective role in household contact screening and referrals for identification of TB. These findings are consistent with other studies which have shown that utilization of community health volunteers through household contact screening can positively affect the total patients notified to the national program (7-12)

The increased number of TB cases reported from the community health volunteers' household screening and referral could be attributed to training of Community Health Volunteers and the Community Health extension workers to support active case finding activities that included Household TB screening. Better documentation of community referrals in the TB register was also observed during this period. The improved documentation may be as a result of Amref quarterly sub county data review meetings supported through the Subrecipient in collaboration with the TB coordinators to review the quality of TB data reported. In addition, the Amref continuously supported lead CHVs in 16 counties that had low case notification rate of less than 175/100,000 population. In these counties, the Community Health Volunteers referred patients were guided to the appropriate facility department and enrolled on treatment where necessary. Amref also supported the CHEWs with a monthly airtime of Ksh 250 for coordination and supervision of community health Volunteers. The community health volunteers were supported with transport and lunch allowance of Ksh 840 for every household visited and family members screened

The number of TB patients under 5 years whose households were visited for screening were very low (2.91%) compared to the those over 5 years bacteriologically TB patient (97.1%); the low number is in line with the Kenya prevalence survey in 2017 that revealed that out of the possible 22,000 paediatric TB cases only 7,714 were diagnosed, representing 35 per cent of all cases in 2016, the survey findings indicated that the use of microscopy for diagnosis, which is a common method of running TB test in Kenya, misses more than 50 per cent of the cases (13) .

From the study results, more female contacts (53%) were screened for TB compared to the male contacts (47%) which implies that there were more female at the household level compared to men available for TB screening. The Kenya prevalence survey in 2016 results showed that prevalence of TB in men is twice as high as those in women, the survey identified men between 25-34 years to bear the highest burden of TB in Kenya yet this programmatic analysis shows that they are not available for household contact screening. The findings from this study show the need for targeted screening and active case finding of men as a TB high risk group.

The findings on the total cases notified to the national program improved from 3,335 (6%) to 5,456(10%) during the study period and therefore the programmatic data by this study strongly supports the intervention of utilizing community health volunteers in TB case finding through household contact screening.

Study limitations

The study did not have major limitations but there was lack of comparison control group which could have helped in controlling for any factors that may have influenced the relationship between the Community Health Volunteers and the number of TB cases notified, the study did not control for any confounding factors, the study results gives clear association between the CHVs but not possible to determine the causation.

Conclusion

The findings on the total cases notified to the national program improved from 3,335 (6%) to 5,456(10%) during the study period and therefore using programmatic data by this study strongly supports the intervention of utilizing community health volunteers in TB case finding through household contact screening. There is need for targeted screening for men since they are missed at the household level, this could include innovative interventions targeting informal labour sector as well as schools and colleges. Investing in CHVs to carry out active contact screening and operationalizing community-based structures in referrals for TB can offer significant gains for TB control in high TB burden countries like Kenya

Abbreviations

AIDs	Acquired Immunodeficiency syndrome
CHEWs	Community Health Extension Workers
CHV	Community Health Volunteers
CNR	Case Notification Rate
HCWs	Health Care Workers
HIV	Human immunodeficiency virus
IPT	Isoniazid preventive therapy
MOH	Ministry of Health
OSDV	Onsite Data Verification
PR	Principal Recipient
SR	Subrecipient
TB	Tuberculosis
TIBU	National Tuberculosis Information Basic Unit
TSR	Treatment Success Rate
WHO	World Health Organization

Declarations

Ethics approval and consent to participate

Amref health Africa was competitively selected as the Principal Recipient for Global Fund TB in Kenya for non-state actors with a mandate to implement community based TB control activities in partnership with the National TB program, Sub-Recipients and communities living with the disease. The data utilized in this study was purely from the project reports submitted to Amref by the sub-recipients. For purposes of data on the total cases notified to the national program; Amref had a discussion with the national TB program the custodian of all TB patients' data and sought approval to use data from the national data base, the national database had data on the patients enrolled on treatment who were to be visited by CHVs for contact screening. For purposes of confidentiality, the data collected was an aggregate of case finding and referrals from the 33 counties generated from Tuberculosis Information Basic Unit (TIBU) without the patient names.

Consent for publication

- This is not applicable, the data utilized in this study was purely from the project reports submitted to Amref by the sub-recipients. For purposes of data on the total cases notified to the national program; Amref had a discussion with the national TB program the custodian of all TB patients' data and sought approval to use data from the national data base. The data was an aggregate of case finding and referrals from the 33 counties generated from Tuberculosis Information Basic Unit (TIBU) without the patient name

Availability of data and materials

- The datasets generated and analysed during the current study are not publicly available because the data belongs to the Kenya National TB program who is the the custodian of all TB patients' data. Data are however available from the authors upon reasonable request and with permission of national TB program.

Competing interests

- The authors declare that they have no competing interests

Funding

- There was no specific funding for this study

Authors' contributions

- **Tabitha Abongo:** Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft,
- **Benson Ulo:** Project administration, Supervision, Visualization, Writing – review & editing
- **Sarah Karanja:** Visualization, Data curation Writing – review & editing

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