



SHORT COMMUNICATION

Pilot implementation of a contact tracing intervention for tuberculosis case detection in Kisumu County, Kenya

T. Volkmann,¹ D. Okelloh,² J. Agaya,² K. Cain,¹ B. Ooko,³ T. Malika,³ D. Burton⁴<http://dx.doi.org/10.5588/pha.16.0032>

Leveraging an existing community health strategy, a contact tracing intervention was piloted under routine programmatic conditions at three facilities in Kisumu County, Kenya. Data collected during a 6-month period were compared to existing programmatic data. After implementation of the intervention, we found enhanced programmatic contact tracing practices, noting an increase in the proportions of index cases traced, symptomatic contacts referred, referred contacts presenting to a facility for tuberculosis screening, and eligible contacts started on isoniazid preventive therapy. As contact tracing is scaled up, health ministries should consider the adoption of similar contact tracing interventions to improve contact tracing practices.

The World Health Organization (WHO) recommends routine tuberculosis (TB) screening of household and other close contacts of persons with TB.¹ The WHO also recommends the administration of isoniazid preventive therapy (IPT) for children aged <5 years and for TB-negative people with the human immunodeficiency virus (HIV) of any age who are contacts of people with TB disease.² In many resource-limited settings, contact tracing is incorporated into national TB program (NTP) policies, but is not widely implemented.³ Barriers to implementation of contact tracing include a lack of tools and a lack of dedicated resources for contact tracing implementation within the NTP.³

Integrating contact tracing into community-based health-care strategies may improve TB case finding by leveraging the close connections of community health volunteers (CHVs) to members of the local community and health system.⁴ The Kenyan Ministry of Health (MoH) employs a community-based contact tracing strategy utilizing CHVs. We introduced a pilot contact tracing intervention package to determine whether its implementation would improve the systematic contact tracing activities conducted by CHVs in Kenya. We report the results of this operational research by comparing contact tracing data collected during the pilot period with data collected prior to implementation of the intervention.

METHODS

A contact tracing intervention was developed and piloted at three facilities in Kisumu County from No-

vember 2014 to April 2015. The sites were purposely selected based on high TB burden and the existence of a community health strategy utilizing CHVs. Pilot activities were embedded within the Kenyan MoH's routine contact tracing program, and no alterations were made to existing MoH forms.

The intervention introduced a package of changes to the contact tracing process, including a pilot contact tracing register and several modified practices at study facilities. The contact tracing register included variables abstracted from facility TB registers and MoH forms used for routine contact tracing, variables collected at facilities and clinics, and notes from the CHVs' notebooks. Other intervention components included retraining CHVs on contact tracing procedures, designating a TB clinic nurse at each facility who was responsible for updating the routine MoH TB register to also maintain the pilot contact tracing register, providing the nurse with a monthly compensation of approximately US\$70 for undertaking this responsibility, and holding monthly progress meetings to review and update CHVs on the progress of their contact tracing work.

Data obtained from each facility via abstraction from routine MoH forms for the 6 months prior to the project period and from the 6-month implementation of the pilot contact tracing intervention were entered into an electronic database. During analysis, electronic database variables were assessed, including the proportions of contacts traced, screened, referred for evaluation, and started on IPT. A before/after comparison of proportions (χ^2 test) was conducted for the three health facilities included in the intervention. Control facilities were not included in the design.

RESULTS

A total of 108 smear-positive index cases were identified retrospectively vs. 75 prospectively (see Table for all results). Of these, 63 (58%) of the retrospective cases and 62 (83%) of the prospective cases were traced, a 42% increase in the proportion of index cases traced ($P < 0.001$). Among the contact investigations initiated, 188 retrospective contacts and 163 prospective contacts were identified, giving an average of 3.0 and 2.6 contacts identified per index case, respectively ($P = 0.14$).

Twenty two (12%) contacts had TB symptoms during the retrospective period and 17 (10%) during the prospective period ($P = 0.85$). Of contacts with TB

AFFILIATIONS

- 1 Division of Global HIV & Tuberculosis, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA
- 2 Kenya Medical Research Institute, Kisumu County, Kenya
- 3 Division of Leprosy, Tuberculosis and Lung Diseases, Ministry of Health, Kisumu County, Kenya
- 4 Division of TB Elimination, CDC, Atlanta, Georgia, USA

CORRESPONDENCE

Tyson Volkmann
Division of Global HIV & Tuberculosis
Centers for Disease Control and Prevention
MS E-10
1600 Clifton Road NE
Atlanta, GA 30329, USA
email: tvolkmann@cdc.gov

ACKNOWLEDGEMENTS

Partners for this project included the Kenya Ministry of Health (MoH), Nairobi, the Kenya Medical Research Institute (KEMRI), Kisumu County, the Kisumu County MoH TB staff, project facilities and their community health volunteers, the United States Agency for International Development (USAID), Washington, DC, USA, and the Centers for Disease Control and Prevention (CDC), Atlanta, GA, USA. The conclusions, findings, and opinions expressed by the contributing authors of this article do not necessarily reflect the official position of the US Department of Health and Human Services, the Public Health Service, the CDC, or the authors' affiliated institutions. Conflicts of interest: none declared.

KEY WORDS

community health volunteer; community health worker; active case finding; sputum culture; contact investigation

Received 5 May 2016

Accepted 30 August 2016

PHA2016;6(4):217-219
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TABLE Documented retrospective and prospective totals, pilot TB contact tracing intervention, Kisumu County, Kenya, May 2014–April 2015

	Retrospective period <i>n</i> (%)	Prospective period <i>n</i> (%)
Index patients, contacts, and demographics		
Index patients with smear-positive TB registered,* total	108	75
Index patients traced*	63 (58)	62 (83)
Contacts identified†	188	163
Contacts identified per index case,† average (range)	3.0 (1–6)	2.6 (1–6)
Visits to household for screening/contact tracing,†‡ average	(<i>n</i> = 29) 1.4	(<i>n</i> = 60) 1.4
Visits to household to ensure referrals presented to a clinic,†‡ average	(<i>n</i> = 29) 0.7	(<i>n</i> = 60) 0.9
Duration from start of contact investigation to final receipt of forms,† average, days [IQR]	(<i>n</i> = 14) 10.1 [0–12]	(<i>n</i> = 60) 11.9 [5–15]
Female contacts†	100 (53)	91 (56)
Male contacts†	88 (47)	72 (44)
Age of contacts, median [IQR]†	13 [7–28]	15 [7–29]
Contacts aged <5 years		
Children aged <5 years†	30 (16)	23 (14)
Of the under fives, those who screened positive via symptomology†	1 (3)	5 (22)
Of the under fives screened, those referred†	24 (80)	20 (87)
All contacts		
HIV-positive†	17 (9)	14 (9) (2 new)
Contacts screened, of those eligible†	187 (99)	163 (100)
Contacts with symptoms, of those screened†	22 (12)	17 (10)
Referred, of those with symptoms†	14 (64)	14 (82)
Referred overall, of those screened†	88 (47)	36 (22)
Reason for referral of contact, of those referred†‡		
TB testing	15 (17)	15 (42)
HIV testing	2 (2)	2 (5)
IPT	17 (19)	17 (47)
Unknown	54 (61)	2 (5)
Presented to a facility within 2 weeks of referral, of those referred§	30 (34)	23 (64)
Eligible for IPT, of those screened†	47 (25)	30 (18)
Started on IPT, of those eligible§	9 (19)	8 (27)
Cases of TB identified, of contacts presented§	1 (3)	0

*Data source: facility TB register.

†Data source: contact tracing forms/register.

‡Data source: CHV notebooks.

§Data source: facility/clinic data.

TB = tuberculosis; IQR = interquartile range; HIV = human immunodeficiency virus; IPT = isoniazid preventive therapy; CHV = community health volunteer.

symptoms, the proportion referred increased from 64% to 82% after initiation of the contact tracing intervention ($P < 0.001$). The proportion of contacts who presented to a facility within 2 weeks of screening and referral increased from 34% during the retrospective period to 64% ($P = 0.01$). Of those eligible for IPT, the proportion that started IPT increased from 19% to 27% ($P = 0.15$). There was one case of TB among referred contacts identified during the retrospective period and no cases during the prospective period.

Children aged <5 years constituted 16% of the contacts during the retrospective period and 14% during the prospective period ($P = 0.67$). Of these, 3% screened positive for TB symptomology during the retrospective period and 22% prospectively ($P = 0.48$). Of the under-fives, 80% were referred during the retrospective period while 87% were referred prospectively ($P = 0.39$).

DISCUSSION

Following implementation of a multi-faceted intervention package to improve routine TB contact tracing conducted through an existing community health strategy in western Kenya, we observed increases in the proportions of index cases traced, symp-

tomatic contacts referred, referred contacts presenting to a facility for TB screening, and eligible contacts started on IPT. The intervention package was acceptable to local stakeholders, and some elements of the package (including use of a new contact tracing register) were incorporated into routine practice at the study sites after conclusion of the pilot. These results indicate that simple and potentially sustainable interventions might improve the effectiveness of routine TB contact tracing activities in high TB burden settings with an existing community health strategy.

Given the intervention design, we were unable to analyze the unique contribution of the contact tracing register to the results, nor were we able to distinguish improvements in the contact tracing process itself from improvements in documentation of the process. The lack of randomization and control groups in the design of the study limited our ability to exclude some potential sources of confounding or the influence of secular trends, such as IPT shortages, which could have affected whether CHVs referred IPT-eligible contacts.

Improvements in multiple measures of contact tracing effectiveness observed during the pilot study nevertheless suggest that the intervention was successful. The intervention relied on existing MoH TB clinic staff (with a modest new financial incentive)

and existing CHVs who participated in contact tracing as part of the MoH-sponsored community health strategy. Identifying and implementing simple, sustainable interventions to improve contact tracing activities in high-burden settings may prevent TB infection and could potentially result in cost savings to TB programs.⁵

CONCLUSION

Simple programmatic interventions can potentially improve the effectiveness of contact tracing and should be considered, especially in areas with an existing community health strategy.

En s'appuyant sur la stratégie de santé communautaire existante, une intervention de recherche des contacts a été pilotée dans des conditions de routine des programmes dans trois structures du comté de Kisumu, Kenya. Les données recueillies sur une période de 6 mois ont été comparées aux données de programme existantes. Après la mise en œuvre de l'intervention, nous avons trouvé des pratiques améliorées de recherche des contacts dans les programmes, notant une

A partir de una estrategia de salud comunitaria existente, se puso a prueba una intervención de investigación de contactos de los pacientes tuberculosos (TB) en las condiciones programáticas corrientes, en tres establecimientos del condado de Kisumu en Kenia. Los datos recogidos durante un período de 6 meses se compararon con los datos existentes del programa. Después de la ejecución de la intervención se observó una intensificación de las prácticas programáticas de seguimiento de los contactos, con un aumento de la proporción de casos iniciales

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augmentation des proportions de recherche des cas index, de référence des contacts symptomatiques, de présentation des contacts référés vers une structure de dépistage de la tuberculose et de mise en route des contacts éligibles sous traitement préventif par isoniazide. A mesure que la recherche des contacts est accrue, les ministres de la santé devraient envisager l'adoption d'interventions similaires de recherche des contacts afin d'améliorer les pratiques de recherche des contacts.

localizados, la remisión de los contactos sintomáticos, la remisión de los contactos que acudían a un centro con el fin de practicar la detección de la TB y un aumento del número de pacientes idóneos que comenzaban el tratamiento preventivo con isoniazida. Al ampliar la escala del seguimiento de los contactos, los ministerios de salud deberían considerar la adopción de intervenciones de investigación de contactos semejantes a la que se ensayó en el presente estudio, con el fin de mejorar las prácticas de localización de contactos.