HHS Public Access

Author manuscript

AIDS Care. Author manuscript; available in PMC 2019 May 22.

Published in final edited form as:

AIDS Care. 2018 December ; 30(12): 1600–1604. doi:10.1080/09540121.2018.1499863.

Increasing partner HIV testing and linkage to care in TB settings: findings from an implementation study in Pwani, Tanzania

Cari Courtenay-Quirk[a], **Sherri Pals**[a], **Andrea A. Howard**[b], **Dawud Ujamaa**[c], **Chris Henjewele**[d], **Godwin Munuo**[e], **Peris Urasa**[f], and **Mwanaisha Nyamkara**[g]

[a]Division of Global HIV and Tuberculosis, Centers for Disease Control and Prevention, Atlanta, GA, USA

[b]ICAP Columbia University, New York, NY, USA

[c]ICF International, Atlanta, GA, USA

[d]THPS, Dar es Salaam, Tanzania

[e]Centers for Disease Control and Prevention, Dar es Salaam, Tanzania

[f]National AIDS Control Program, Ministry of Health and Social Welfare, Dar es Salaam, Tanzania

[g]National TB and Leprosy Program, Ministry of Health and Social Welfare, Dar es Salaam, Tanzania

Abstract

Couples HIV testing for tuberculosis (TB) patients and their partners may be an effective means to identify HIV-positive persons and strengthen linkage to HIV care. We evaluated an intervention to increase HIV testing and linkage to care (LTC) of newly diagnosed persons and re-linkage for TB/HIV patients in Pwani, Tanzania. In 2014, 12 TB settings within two regional clusters participated; each cluster included ≥1 referral hospital, health center, and directly observed therapy center. Three months after introducing tools to record HIV service delivery, TB clinic staff and peer education volunteers in Cluster 1 received training on HIV partner testing and linkage/re-linkage, and staff in the second cluster received training 3 months thereafter. Twelve months after tools were introduced, clinic records were abstracted to assess changes in couples HIV testing, LTC, and relinkage. Staff interviews assessed the feasibility and acceptability of the service delivery model. HIV prevalence was high among TB patients during the study period (44.9%; 508/1132), as well as among others who received HIV testing (19.8%; 253/1288). Compared to pre-implementation, couples HIV testing increased in both clusters from 1.8% to 35.2%. Documented LTC increased (from 5.7% to 50.0%) following the introduction of the tools. Additional increases in LTC (from 57.9% to 79.3%) and re-linkage (from 32.9% to 53.7%) followed Cluster 1 training, but no additional increases after Cluster 2 training. Staff perceived little burden associated with service delivery. This study demonstrated a feasible, low-burden approach to expand couples HIV testing and linkage of HIV-positive persons to care. TB settings in sub-Saharan Africa serve populations at disproportionate risk for HIV infection and should be

CONTACT Cari Courtenay-Quirk CCourtenayquirk@cdc.gov, afv2@cdc.gov.

Disclosure statement

No potential conflict of interest was reported by the authors.

considered key venues to expand access to effective HIV prevention strategies for both patients and their partners. HIV services in TB settings should include HIV testing, condom distribution, and linkage to appropriate additional services.

Keywords

HIV diagnosis; linkage to care; tuberculosis patients; HIV partner testing; adult

Introduction

Despite increases in HIV testing globally, many people living with HIV remain unaware of their HIV status, and sexual partners are often unaware of each other's status (Kenyon, Kirungi, Kaharuza, Buyze, & Bunnell, 2015; UNAIDS, 2016). In order to achieve ambitious international targets (UNAIDS, 2013), HIV testing services must focus on populations with the highest risk of unidentified HIV infection and successfully link HIV-positive persons to antiretroviral therapy.

HIV partner testing in tuberculosis (TB) clinical settings may offer substantial opportunities (Courtenay-Quirk et al., 2015). Counseling partners together as part of a couples HIV testing and counseling (CHTC) strategy increases knowledge about transmission risks and benefits of prevention (Kilembe et al., 2015a; Ngure et al., 2016), knowledge of partners' HIV status (Kenyon et al., 2015), and reduces risk for HIV transmission within couples (Kilembe et al., 2015b; King et al., 2015).

HIV prevalence in Tanzania is 5.1% in the general population and 38% among TB patients (Tanzania National AIDS Control Program, 2012). We evaluated the feasibility of delivering an intervention for clinic-based CHTC and linkage to care (LTC) for TB patients and their sexual partners in Tanzanian TB clinic settings.

Methods

Design

The intervention was implemented in 12 TB clinics in Pwani, Tanzania. The clinics were selected by convenience within two geographical clusters (Cluster 1 comprised four clinics and Cluster 2 comprised eight clinics) with similar catchment populations. Each cluster included at least one referral hospital (district or regional level), a health center, and several directly observed therapy (DOT) centers.

In a modified stepped-wedge design, the HIV prevention training for providers and peer volunteers was staggered across the two clusters, following the introduction of a set of enhanced record-keeping tools (see Table 1). The study was approved by the Ethics Review Boards of Columbia University Medical Center and the National Institute for Medical Research in Tanzania. The Centers for Disease Control and Prevention (CDC) relied on these institutions for approval.

Intervention

The study team developed a unit HIV testing service (HTS) register with several enhanced fields to facilitate documentation of partner/couple status and LTC of clients who tested HIV-positive. A referral logbook was developed to document LTC and re-linkage following completion of TB treatment among TB/HIV patients.

In January 2014, study staff visited all 12 clinics to provide copies of the documentation tools. At the end of March, a 3-day training was offered to all providers in Cluster 1 clinics on CHTC; LTC for newly diagnosed persons; and re-linkage for TB/HIV patients who have completed TB treatment. In parallel with the provider training, a 5-day training was provided to peer volunteers to strengthen their existing supportive activities. At the end of June, the training was repeated for Cluster 2 clinic staff and volunteers.

Study population

Data were collected on two groups of patients: (1) all persons tested for HIV in the TB unit (HTS clients) and (2) patients newly enrolled on TB treatment. All staff who provided patient care at one of the clinics, e.g., clinic managers, physicians, and nurses, were eligible for a mixed-methods post-training survey.

Data collection

Clinic records—Patient-level data were retrospectively abstracted in February 2015 from the unit TB register, the unit HTS register, and the referral logbook. No personally identifying information was abstracted and no patient data were collected beyond that which the facility routinely collected to document service delivery. Study teams conducted monthly site visits to provide supportive supervision on data quality.

Provider surveys—The mixed-methods survey was conducted on-site by Swahili-speaking interviewers from December 2014 to February 2015. The survey took approximately 30 minutes to complete. There was no reimbursement for participation.

Statistical analysis

We categorized data into time points corresponding with key intervention activities (see Table 1). Using unit HTS register data, we examined HIV prevalence among HTS clients, serostatus of partner pairs, and change over time in the proportion of clients with a documented couples counseling service. From the TB registers, we examined change over time in initial LTC of newly HIV-diagnosed TB patients. Using referral logbooks, we examined change over time in the ratio of (a) clients tested HIV-positive to the number documented as linked and (b) TB/HIV patients who completed TB treatment to the number relinked to HIV care. Statistical models were fit using SAS PROC GLIMMIX (http://www.sas.com) to test for a time × cluster interaction. If the time × cluster interaction was not significant, it was dropped from the model, and a model testing for a time effect was fit, pooling across clusters. All GLIMMIX models included a random effect for the clinic, nested within the cluster. Descriptive statistics and qualitative responses from provider surveys were summarized.

Results

Characteristics of HTS clients and TB patients

Among 1288 HTS clients, 253 (19.8%) tested HIV-positive and 25.7% (328/1275) received CHTC. Of clients diagnosed HIV-positive, 39.5% (100/253) had a documented LTC. TB patients were more likely to have an HIV diagnosis (44.9%, 508/1132). Other characteristics of HTS clients and TB patients are included in Table 2.

CHTC in TB clinic settings

Among HTS clients, 140 partner groupings were identified (137 were couples and three were groupings of three partners). The majority of partner groupings (64.3%, $n = 90$) were concordant HIV-negative, 11.4% ($n = 16$) were concordant HIV-positive, and 23.6% ($n = 33$) were HIV-discordant.

The proportion of HTS clients who tested as a partner grouping increased significantly for Cluster 1: Time 1 was significantly different from Time 2 and 3 (Table 3). The proportion of HTS clients who received couples counseling also increased from Time 0 (1.5%) to Time 3 (37.5%) in Cluster 1 ($p < .01$) and from Time 0 (4.6%) to Time 3 (31.2%) in Cluster 2 (Table 3).

LTC and re-linkage

Introducing the enhanced documentation was associated with increased recording of linkages from Time 0 (5.7%) to Time 1 (50.0%), but there was no additional increase associated with the training. The proportion of HIV-positive HTS clients recorded as LTC in the referral logbook increased from Time 1 (57.9%) to Time 2 (79.2%).

LTC among TB/HIV patients was high pre-intervention (94.4%) and did not change over time. An increase in the proportion of TB/HIV cases completing TB treatment to a number of relinked cases in referral logbooks was observed from Time 1 (32.9%) to Time 2 (53.7%), but the additional increase from Time 2 to Time 3 (74.8%) was not significant (Table 4).

Provider surveys

The majority of staff surveyed ($N = 41$) were DOT nurses (58.5%, $n = 24$), but other roles included clinical officers and managers ($n = 14$), lab tech and pharmacist ($n = 3$). Most providers (78.0%, $n = 32$) had experienced diagnosing patients with HIV through the TB clinic. Providers indicated that they asked patients about sex partners and counseled partners about HIV testing. Many also indicated that they had diagnosed partners of TB patients with HIV (36.6%, $n = 15$).

Challenges to testing partners and linking them to care included partner refusal, reporting that their partner already had a screening at another facility, or were not ready to be tested. As one respondent stated, “they need time … to be strong enough for diagnosis”. Other challenges included the time it takes to do the counseling, the stigma that patients may feel in association with being counseled as a couple, or concern about confidentiality, and the

stigma associated with the diagnosis itself. Very little perceived burden related to documenting CHTC and LTC services was reported.

Discussion

Our study is among the first to demonstrate a feasible, relatively low-burden approach to increasing partner HIV testing and LTC in TB clinics in sub-Saharan Africa. While our intervention demonstrated significant increases in these services, improvement did not consistently align with the introduction of the training across the clinic clusters. Potential explanations for this may include other factors that are not easily controlled in a field implementation study, such as limited test kit supplies and staff.

The strongest impact on services appeared to be associated with the introduction of the enhanced documentation tools. In Kenya, revised TB registers have been used to retrospectively assess HIV testing coverage of TB patients' partners (Nyangahu, Muthee, & Langat, 2015). There may be other ways to modify forms to make documentation easier for staff.

Due to resource constraints, our intervention relied on TB patients self-referring their partners for contact tracing. Other, more resource-intensive strategies for delivering partner services to index patients, e.g., provider-assisted partner notification and home-based partner testing (WHO, 2016), may also be feasible and increase rates of serostatus knowledge (Plotkin et al., 2016).

At 19.8%, HIV prevalence among persons tested in these settings was considerably higher than the general population of Tanzania, and a high proportion of partners tested were HIV-discordant. Given such disproportionate rates of HIV infection and reach to populations that have been underserved with other strategies, TB settings are essential venues to increase access to effective HIV prevention interventions. HIV services in TB settings should include HIV testing of patients and their partners, condom distribution, and linkage to appropriate additional services.

Acknowledgements

The authors would like to thank the following people for their many contributions to the development and implementation of this project: Pam Bachanas and Anand Date (Division of Global HIV and Tuberculosis, CDC, USA; Deborah Carpenter and Deogratius Mbilinyi (Centers for Disease Control and Prevention, Tanzania); Redempta Mbatia (THPS, Tanzania), Beatrice Mutaboya and Said Egwaga (National TB and Leprosy Program, Ministry of Health and Social Welfare, Tanzania); and Werner Maokola (National AIDS Control Program, Ministry of Health and Social Welfare, Tanzania). We could not have done this work without the efforts of national trainers, clinical supervisors and program coordinators, and health care staff and volunteers of the Pwani region. This project was reviewed and approved by the Institutional Review Board of Columbia University Medical Center and the National Institute for Medical Research in Tanzania. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Funding

This project was funded by the United States' President's Emergency Plan for AIDS Relief through the Centers for Disease Control and Prevention under the terms of grant #5U2GPS001537.

References

Courtenay-Quirk C, Date A, Bachanas P, Baggaley R, Getahun H, Nelson L, &Granich R (2015). Expanding human immunodeficiency virus testing and counseling to reach tuberculosis clients' partners and families. The International Journal of Tuberculosis and Lung Disease, 19 (12), 1414–1416. doi:10.5588/ijtld.15.0007 [PubMed: 26614180]

Kenyon CR, Kirungi W, Kaharuza F, Buyze J, &Bunnell R (2015). Who knows their partner's HIV status? Results from a nationally representative survey in Uganda. JAIDS Journal of Acquired Immune Deficiency Syndromes, 69(1), 92–97. doi:10.1097/QAI.0000000000000546 [PubMed: 25622056]

Kilembe W, Wall KM, Mokgoro M, Mwaanga A, Dissen E, Kamusoko M, … Abimiku AG (2015b). Knowledge of HIV serodiscordance, transmission, and prevention among couples in Durban, South Africa. PLoS One, 10(4), e0124548. doi:10.1371/journal.pone.0124548 [PubMed: 25894583]

Kilembe W, Wall KM, Mokgoro M, Mwaanga A, Dissen E, Kamusoko M, … Allen S (2015a). Implementation of couples' voluntary HIV counseling and testing services in Durban, South Africa. BMC Public Health, 15(601), doi:10.1186/s12889-015-1959-z

King R, Min J, Birungi J, Nyonyintono M, Muldoon KA, Khanakwa S, … Moore DM (2015). Effect of couples counselling on reported HIV risk behaviour among HIV serodiscordant couples by ART use, HIV status and gender in rural Uganda. PLoS One, 10(9), e0136531. doi:10.1371/journal.pone.0136531 [PubMed: 26384103]

Ngure K, Vusha S, Mugo N, Emmanual-Fabula M, Ngutu M, Celum C, & Heffron R (2016). "I never thought thatit would happen..." Experiences of HIV seroconverters among HIV-discordant partnerships in a prospective HIV preventionstudy in Kenya. AIDS Care, 28(12), 1586–1589. doi:10.1080/09540121.2016.1191610 [PubMed: 27264119]

Nyangahu D, Muthee R, &Langat B (2015). Uptake of partner testing among notified TB cases in Kenya in 2013. Paper presented at the 46th Union World Conference on Lung Health, Cape Town, South Africa http://capetown.worldlunghealth.org/Abstract_Book_2015-Web.pdf

Plotkin M, Kahabuka C, Amuri M, Njozi M, Maokola W, Mlanga E, … Wong VJ (2016). Effective, high-yield HIV testing for partners of newly diagnosed persons in Tanzania. Paper presented at the conference on retroviruses and opportunistic infections, Boston, MA http://www.croiconference.org/sessions/effective-high-yield-hiv-testing-partners-newly-diagnosed-persons-tanzania-0

Tanzania National AIDS Control Program. (2012). National guidelines for the management of HIV and AIDS (4th ed.). Dar es Salaam: Tanzania Ministry of Health and Social Welfare.

UNAIDS. (2013). Ambitious treatment targets: Writing the final chapter of the AIDS epidemic Geneva: UNAIDS.

UNAIDS. (2016). The Gap report Geneva: UNAIDS.

WHO. (2016). Guidelines on HIV self-testing and partner notification: Supplement to consolidated guidelines on HIV testing services Geneva: WHO.

Table 1.

Schematic of orientations for new documentation tools and staff training phases across two TB clinic clusters in Pwani, Tanzania.

Time 0 (pre-intervention)	Time 1	Time 2	Time 3
Cluster 1 (*n* = 4 sites)	New documentation tools delivered in January 2014	Training: providers and volunteers (held in late March 2014)	
Cluster 2 (*n* = 8 sites)	New documentation tools delivered in January 2014		Training: providers and volunteers (held in late June 2014)

Notes: Time 0 = 1 July–31 December 2013 (pre-intervention); Time 1 = 1 January–31 March 2014 (post-document orientation); Time 2 = 1 April–30 June 2014 (post-Cluster 1 training); Time 3 = 1 July–31 December 2014 (post-Cluster 2 training).

Table 2.

Characteristics of HTS clients and TB patients in selected TB clinical settings, Pwani, Tanzania, June 2013–December 2014.

	N	%
HTS clients (*N* = 1288)		
Sex		
Male	673	52.5
Female	610	47.5
Age		
Younger than 15	74	5.8
15–24	218	17.0
25–34	383	29.8
35–44	289	22.5
45–54	178	13.8
55 and older	144	11.2
Marital status		
Married (not plural)	470	37.6
Married (plural)	33	2.6
Cohabiting	265	21.2
Divorced	10	0.8
Separated	65	5.2
Widowed	36	2.9
Never married	370	29.6
Counseling type		
Individual	825	64.7
Couple (CHTC)	328	25.7
Family	116	9.1
Group	6	0.5
HIV status		
Positive	253	19.8
Negative	1020	80.0
Indeterminate	2	0.2
HIV-positive HTS clients (*N* = 253)		
Referred to CTC (linked)	100	39.5
CTC ID recorded	86	34.0
CTC date recorded	71	28.1
TB patients (*N* = 1148)		
Sex		
Male	641	55.8
Female	507	44.2
Age		
Younger than 15	137	11.9

	N	%
15–24	120	10.5
25–34	261	22.7
35–44	286	24.9
45–54	164	14.3
55 and older	180	15.7
TB type		
Pulmonary-bacteriologic (smear) positive	546	48.1
Pulmonary-bacteriologic (smear) negative	321	28.3
Extra-pulmonary	268	23.6
HIV status		
Positive	508	44.9
Negative	624	55.1
TB/HIV patients (*N* = 508)		
ART initiation		
Before TB treatment	184	36.2
Within 2 weeks of TB treatment start	62	12.2
>2–8 weeks after TB treatment start	148	29.1
>8 weeks after TB treatment start	18	3.5
Start date not recorded	96	18.9

Notes: Totals within each characteristic vary due to missing data; ART: Antiretroviral Therapy.

Table 3.

Change in CHTC services in selected TB clinical settings, Pwani, Tanzania, June 2013–December 2014.

Dependent variable	Time 0 *n/N* (%)	Time 1 *n/N* (%)	Time 2 *n/N* (%)	Time 3 *n/N* (%)	*p*
HTS clients who were tested as a partner grouping					0.0020[a]
Cluster 1 (*n* = 620)	0/139 (0.0)	5/56 (8.9)	55/144 (38.2)	108/281 (38.4)	
Cluster 2 (*n* = 645)	4/87 (4.6)	16/97 (16.5)	28/136 (20.6)	59/325 (18.2)	
HTS clients who received couples counseling					0.0024[b]
Cluster 1 (*n* = 613)	2/133 (1.5)	5/56 (8.9)	43/144 (29.9)	105/280 (37.5)	
Cluster 2 (*n* = 640)	4/87 (4.6)	19/93 (20.4)	38/136 (27.9)	101/324 (31.2)	
TB couples linked to a specific TB ID					
Both Clusters (n = 1250)	0/226 (0.0)	9/153 (5.9)	15/280 (5.4)	33/606 (5.5)	.9487[c]

[a]Time 0 could not be included in this analysis because in Cluster 1, 0 participants were tested as part of a group at time 0, and this caused difficulty with model convergence. p-value reported in the table is for the time × cluster interaction (significant). We followed the significant interaction effect with tests of pairwise differences between time points for each cluster. For Cluster 1, time 1 was significantly different from Times 2 and 3. Times 2 and 3 were not significantly different. For Cluster 2, none of the time points differed significantly.

[b]*p*-value reported in the table is for the time × cluster interaction (significant). We followed the significant interaction effect with tests of pairwise differences between time points for each cluster. For both clusters, rates for clients counseled as couples were significantly higher at Times 1, 2 and 3, as compared to Time 0. For Cluster 1, rates were significantly higher at Times 2 and 3 than at Time 1, but not significantly different between Times 2 and 3. For Cluster 2, the rate was significantly higher at Time 3 vs. Time 1, but not significantly different between Times 2 and 1 or Times 3 and 2.

[c]*p*-value reported in the table is for the time effect, pooling across clusters (the time × cluster interaction was not significant).

Notes: Time 0 = 1 July–31 December 2013 (pre-intervention); Time 1 = 1 January—31 March 2014 (post-document orientation); Time 2 = 1 April–30 June 2014 (post-Cluster 1 training); Time 3 = 1 July–31 December 2014 (post-Cluster 2 training).

Table 4.

LTC of newly diagnosed PLHIV and re-linkage to HIV care of TB/HIV patients following completion of TB treatment in selected TB clinical settings, Pwani, Tanzania.

Dependent variable	Time 0 *n/N* (%)	Time 1 *n/N* (%)	Time 2 *n/N* (%)	Time 3 *n/N* (%)	*p*
Linkage to care					
Recorded LTC among HTS clients	3/53 (5.7)	19/38 (50.0)	28/53 (52.8)	49/107 (45.8)	<.0001[a]
Recorded LTC among newly diagnosed (with HIV) TB patients	84/89 (94.4)	34/37 (91.9)	26/29 (89.7)	44/50 (88.0)	0.7630
The proportion of the number of HIV-positive cases in HTS register to the number of newly linked cases in referral logbook	N/A	22/38 (57.9)	42/53 (79.3)	85/107 (79.4)	0.0311[b]
Re-linkage to care					
Proportion of number of TB/HIV cases completing TB treatment to number of relinked cases in referral logbook	N/A	23/70 (32.9)	36/67 (53.7)	77/103 (74.8)	<.0001[c]

[a] *p*-value reported is for the main effect of time (time × cluster interaction was not significant). Times 1, 2 and 3 were significantly different from Time 0, but there was no significant difference between Times 1, 2 and 3.

[b] *p*-value reported is for the main effect of time (time × cluster interaction was not significant). Times 2 and 3 were significantly different from Time 1 but not from each other.

[c] *p*-value reported is for the main effect of time (time × cluster interaction was not significant). Times 2 and 3 were significantly different from Time 1, but not from each other.

Notes: Time 0 = 1 July–31 December 2013 (pre-intervention); Time 1 = 1 January–31 March 2014 (post-document orientation); Time 2 = 1 April–30 June 2014 (post-Cluster 1 training); Time 3 = 1 July–31 December 2014 (post-Cluster 2 training).

PLHIV: Persons living with HIV.