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Local Residents Trained As ‘Influence Agents’ Most Effective In Persuading African Couples On HIV Counseling and Testing

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Abstract

Couples in sub-Saharan Africa are the largest group in the world at risk for HIV infection. Couples counseling and testing programs have been shown to reduce HIV transmission, but such programs remain rare in Africa. Before couples counseling and testing can become the norm, it is essential to increase demand for the services. We evaluated the effectiveness of several promotional strategies during a two -year program in Kitwe and Ndola, Zambia. The program attracted more than 7,600 couples through the use of radio broadcasts, billboards, and other strategies. The most effective recruiting technique was the use of local residents trained as “influence agents” to reach out to friends, neighbors, and others in their sphere of influence. Of the estimated 2.5 million new cases of HIV in adults and children in 2009, more than two-thirds occurred in sub-Saharan Africa.¹ In Zambia, the prevalence of HIV among adults in urban and rural areas is estimated at 19 and 10 percent, respectively.² Most HIV transmission in sub-Saharan Africa is heterosexual and occurs between cohabiting partners with discordant HIV test results^{3–5}—that is, only one partner is HIV-positive. Thus, most new cases of HIV occur when someone infects his or her heterosexual partner. Sub-Saharan African couples with discordant HIV test results are the world’s largest risk group for HIV.⁶ Approximately 20 percent of Zambian couples have discordant HIV results, a rate consistent with estimates from Uganda, Rwanda, Tanzania, and Kenya.^{7–14}

Couples counseling and testing as an HIV prevention strategy is effective at changing risky behavior and can be more effective than individual voluntary counseling and testing.^{12,15–18} In a study conducted by Munkolenkole Kamenga and colleagues,¹⁶ 77.4 percent of couples with discordant HIV results reported using condoms during all acts of sexual intercourse 18 months after receiving counseling and testing. That compares with 5 percent of the same couples reporting that they ever used a condom prior to receiving counseling and testing.

Another study of Rwandan women showed that HIV transmission rates decreased by more than 50 percent if the woman and her partner underwent couples counseling and testing, while rates decreased just slightly if only the woman was tested.¹⁵ Individual counseling and testing is not as effective if the result of the test is not disclosed to the person’s sexual partner.¹⁹ Couples counseling and testing reduces risky sexual behavior among couples and

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leads to increased use of modern family planning, particularly methods that are long-lasting and reversible, such as oral or injectable contraceptives.^{13,20–23}

Despite the beneficial impact and demonstrated feasibility of couples counseling and testing in diverse settings,^{5,9,12,15–17,24} very few couples have been jointly tested and counseled for HIV. This is because there is a limited supply of couples counseling and testing services, as well as little demand for them.²⁴

The same factors that prevent some people from seeking counseling and testing—such as stigma and ignorance about where services can be obtained—also drive the low demand for the services.²⁵ Other limiting factors unique to couples counseling and testing include gender inequality and “testing by proxy,” in one partner is tested and the other assumes he or she has the same HIV status because of lack of knowledge about the potential for discordant HIV results within couples.^{11,18,26–30} However, as shown in Zambia and Rwanda, the barriers of low supply and demand can be successfully overcome.²⁵

To increase the use of couples HIV counseling and testing among those at higher risk of sexual transmission (15 – 49 years of age), the services must not only be provided, they must also be promoted. We evaluate the effectiveness of various activities—the influential network agent model developed by the Rwanda Zambia HIV Research Group,²⁵ radio programs, billboards, drama groups, and stakeholder referrals—to promote couples counseling and testing in the cities of Kitwe and Ndola, Zambia. In addition, we examine which demographic characteristics are related to couples’ decision to be tested for HIV and to their test results.

Study Data And Methods

Setting

The Copperbelt Province, so named because of the region’s extensive copper resources, is located in north-central Zambia, near the border with the Democratic Republic of Congo. The province has the third highest HIV prevalence rate (17 percent) in Zambia.² The populations of Kitwe and Ndola, the largest cities in the province, were 363,734 and 374,757, respectively, in 2000.³¹

In July 2004 the Rwanda Zambia HIV Research Group—a research group from Emory University—established centers in Kitwe and Ndola to provide free HIV counseling and testing for couples. The program extended through June 2006.

The group used various promotional strategies, described below, to promote couples counseling and testing in the two cities. All research was carried out with approval from the Emory University Institutional Review Board and the Zambian Tropical Diseases Research Center Ethics Committee. All participants provided informed consent.

Couples Counseling And Testing Program

The couples counseling and testing procedures conducted in Copperbelt Province were analogous to those implemented in Lusaka, Zambia, and Kigali, Rwanda, which have been described previously.^{7,11} Couples counseling and testing was a one-day program, which began with an interactive group discussion led by a counselor. Following the discussion, each couple met with a counselor for pre-test counseling. The counselor recorded demographic data and information about how the couple had learned about the program.

Any couples who then decided not to be tested together were referred to a nearby counseling and testing clinic for individuals. All couples, whether or not they were tested, received lunch and reimbursement for their transportation to and from the testing center.

Couples who requested joint testing signed a written informed consent form and received rapid HIV and syphilis testing. The test results were discussed with them the same day, during a post -test counseling session. The couples received referrals for any additional services that they needed: free treatment of syphilis; antenatal care, including prevention of mother -to-child transmission of HIV; and screening to assess eligibility for antiretroviral therapy.

Couples could be tested again if they came back to the center, but retesting was uncommon. Partners with discordant HIV test results were enrolled in a prospective study that provided regular testing, and couples with both partners identified as HIV -positive were advised that their test results would not change. Even couples with both partners identified as HIV-negative were advised to be retested only in the event of an exposure outside of their partnership. Although retesting was uncommon, some retested couples were included in our study because we did not routinely ask about couples' testing history.

Promotional Activities

Influence Network Agents—The promotions team members at each site selected the strategies that were best suited for their city and the location of their testing center. Both teams implemented the influence network agent approach, based on its previous success in Lusaka and Kigali.^{7,25}

Influence agents are respected community volunteers who invite couples from within their sphere of influence—such as family members, friends, neighbors, work colleagues, fellow members of a church, customers, and patients—to be counseled and tested for HIV. Promotions team members selected and trained the agents, then monitored their activities and performance.

To identify potential influence agents, promotions team members met with Residential Development Committees—groups that regulate activities within their communities—to obtain permission for the team to contact other organizations and approach people about becoming agents. Once the committee had given permission, the promotions team manager contacted the Neighborhood Health Committees—groups composed of community and religious leaders that deal with local health issues such as uptake of HIV services, usage of bed nets to prevent malaria or utilization of antenatal care—and asked their members to nominate people who were influential in the communities to serve as agents.

Those who agreed to serve were given a three -month contract and attended a four -day training session at the center they would be affiliated with. The new agents spent the first two days of their training in a class room. They learned about the history of the project, the importance of couples counseling and testing, how HIV and other sexually transmitted infections are spread and treated, and the logistics, such as frequency and attendance of meetings as well as reimbursement processes, of the influence agent system. They also role-played approaching couples and had a tour of the center's facilities. They spent the third day in the community, observing an experienced agent approach couples about counseling and testing.

Although agents were not required to be tested, the fourth day allowed the trainees to receive HIV testing, either alone or with their spouses. Forty-seven of the 505 influence

agents (9 percent) chose to be tested at one of the two centers. Of the people tested, 30 percent were HIV-positive.

From July 2004 to July 2005, new cohorts of approximately 20–25 influence agents were recruited and trained on a quarterly basis. Beginning in August 2005 new groups were trained on a monthly basis. Training of agents ended in February 2006, when the value of the US dollar against the Zambian kwacha dropped dramatically.

Influence agents approached couples within their sphere of influence, explained the HIV counseling and testing program, encouraged the couples to participate by emphasizing the importance of being tested as a couple, and distributed invitations that included a brief description of the program and gave the center's hours and location. The invitations were coded with unique identifiers representing each influence agent, and when presented by couples coming to the center, the invitations allowed the program staff to monitor the agents' activity. Agents also had receipts for the invitations they handed out, so the staff could track the percentage of each agent's invited couples that came to the center.

Influence agents were paid according to the number of their invitations that couples brought to the center, whether or not the couples decided to be tested. The agents received 15,000 Zambian kwacha (approximately three to five US dollars) per couple. Influence agents met with the promotions team bimonthly to return their invitation receipts, receive their payments and new invitations, and get feedback on their performance. If an influence agent managed to get 10 percent or more of the couples they invited to come to the center, the agent's contract was extended for another three months.

Radio Programs—One thirteen-week radio programs, which was broadcast two times beginning in May and October of 2005, covered the topics of HIV, sexually transmitted infections in general, and their prevention and treatment; couples counseling and testing; the potential for one partner in a couple to be HIV-positive and the other HIV-negative; myths about the drawing of blood for testing; and preventing transmission of infection from mother to child. The programs were in the local language, Bemba, and aired once a week on a local religious radio station, Radio Icengelo, which was heard in both Kitwe and Ndola. Listeners could not call in to ask questions.

Billboards—At the beginning of 2005, four billboards were erected in Kitwe: three at strategic traffic circles where there was heavy foot traffic, and one at the major market in downtown Kitwe. The billboards contained messages in Bemba about the importance of couples counseling and testing, as well as giving directions to and contact information for the testing centers. No billboards were established in Ndola.

In addition, the same messages and information were painted on the walls of five district health clinics offering individual counseling and testing, and services to prevent HIV transmission from mother to child.

Drama Groups—Drama groups performed twice a month in community market areas in Kitwe from July 2004 to February 2006, giving four to five performances in different neighborhoods each day. The performances were in Bemba and included traditional drumming and dancing along with skits showing couples deciding to go for counseling and testing. The performances highlighted the importance of couples counseling and testing and told the audience where to go. No drama groups performed in Ndola.

Stakeholder Meetings—The promotions team held meetings with other community HIV/AIDS organizations and with representatives of private businesses, nongovernmental

organizations, churches, and district health centers to inform them about the program's services and to urge them to refer people to the testing centers. Two meetings in each of the two cities took place every month from July 2004 to April 2006.

The meetings included presentations of basic knowledge about HIV/AIDS and information on the importance of couples counseling and testing. The promotions team distributed brochures about the program at each meeting.

Data Collection

Demographic data—including age, gender, marital status, duration of union, number of children, and pregnancy status—were collected from all couples who came to the testing centers. HIV and syphilis results were recorded for couples who decided to be tested.

Counselors asked all couples—whether or not they were tested—if they had encountered each of the promotional strategies and recorded the answers. Couples could report exposure to multiple strategies. Data were entered at each testing center using Microsoft Access.

Data Analysis

Couples' HIV and syphilis status were categorized as discordant (one partner was positive and the other was negative), concordant positive (both partners were positive), and concordant negative (both partners were negative).

We used chi square tests—statistical tests that look for differences in percentages experiencing an event among two or more groups—to look for differences between couples' HIV and syphilis status and the center they visited. We used logistic regression to test for differences in demographic characteristics between couples who decided to be tested and those who declined. To test for associations of demographic characteristics with the recruitment strategies reported and couples' HIV status, we used multinomial logistic regression models. Both these types of regressions allow for controlling or adjusting for multiple variables simultaneously. Data were analyzed with the statistical software Stata (version 11.1).

Study Results

The couples counseling and testing services were well received, with 3,414 couples attending in Kitwe and 4,274 in Ndola during the two-year study period. Before the centers opened, no couples counseling and testing services were available in either city.

Of the couples who came to the centers, 2,409 (71 percent) in Kitwe and 3,212 (75 percent) in Ndola decided to be tested. Only 52 (less than 1 percent) of the couples who were tested had one or both partners with an indeterminate HIV status. Staff members followed up with these couples to clarify their status, but we did not include them in any of our analyses that involved HIV status.

HIV And Syphilis Test Results

Overall, 3,513 of the couples in our study were concordant negative for HIV and 1,209 were concordant positive. The remaining 847 couples were discordant (Exhibit 1). Kitwe couples were less likely than Ndola couples to have discordant results ($p = 0.0002$). And concordant Kitwe couples were more likely to have both partners test HIV-negative ($p = 0.0001$). The proportion of couples that were concordant positive was virtually the same in both cities ($p = 0.1595$).

Syphilis test results were available for 5,613 couples—the 5,569 whose HIV test results we analyzed and 44 of the 52 couples with indeterminate HIV test results. As with HIV, couples from Kitwe were more likely than couples from Ndola to be concordant negative for syphilis ($p < 0.0001$). Kitwe couples were also less likely to be concordant positive for syphilis ($p < 0.0001$). The proportion of discordant couples was nearly identical in both cities ($p = 0.2$).

Demographic Characteristics And The Effects Of Promotion

Exhibit 2 shows the relationship between demographic characteristics of couples and their decision to be tested. In analyses that do not control for other variables (the unadjusted odds ratios), couples with one or both partners who were older were more likely to choose to test than those who were younger. And couples who had been together longer and those who had more children were more likely to be tested than newer couples and those with fewer or no children, respectively. After adjusting for the other variables, men's age was the only variable that was significantly associated with a decision to be tested. Exposure to different promotional strategies was not significantly associated with the decision and thus is not included in Exhibit 2.

However, the most frequently reported promotion strategy was the use of influence agents, mentioned by 6,157 (80 percent) of the couples who came to the centers (Exhibit 3). The other – strategies—including radio programs, billboards, drama group performances, and stakeholder referrals—were mentioned by 2,250 (29 percent) of the couples. On average, each of the 505 influence agents invited 67 couples for HIV testing. Of those 33,835 invited couples, 18 percent came to one of the counseling and testing centers.

Couples who were invited by influence agents but had no exposure to other promotional strategies were less likely to choose to be tested than couples who had been exposed to other strategies but were not invited by agents ($p < 0.0001$). Nevertheless, influence agents were responsible for the largest number of couples who received HIV testing at the centers. In addition, distinct peaks in the number of couples arriving at the centers with invitations from influence agents corresponded to the training of new agent cohorts. This suggests that each influence agent had a limited period of productivity, after which they had exhausted their sphere of influence.

The second most commonly reported promotion strategy was radio programming, cited by 24 percent of couples in Kitwe. In Ndola, radio was cited by 29 percent of couples, ranging from 10 percent after the first broadcast to over 60 percent following the program's second airing. About 10 percent of the couples who went to the Kitwe center reported seeing a billboard about the counseling and testing program. Just 1 percent of Kitwe couples said they had learned about the program by a drama group presentation.

Demographic Characteristics And HIV Status

The relationship between couples' demographic characteristics and HIV status is shown in Exhibit 4. Compared to those younger in age, couples with one or both partners who were older were more likely to be concordant negative than to have one or both partners HIV-positive. Couples in which the woman was pregnant were also more likely to be concordant negative than having one or both partners HIV-positive.

After controlling for other variables, not being pregnant remained significantly associated with both partners' being HIV-negative. The man's age remained significantly associated with couples' being concordant, but not with their having one partner who was HIV-positive. Compared to couples who had been together for a shorter period of time, couples who had been together for a longer period of time were less likely to have partners with

discordant HIV status than to have partners with concordant HIV status (concordant positive or concordant negative), (adjusted odds ratio 0.47 ; $p < 0.001$; data not shown).

Discussion

As noted at the beginning of this article, African couples are the largest risk group for HIV in the world,⁶ and couples counseling and testing can give people knowledge and skills to make their behavior less risky. It is clear that until new biomedical interventions that prevent transmission are found, strategies to modify behavior will continue to be the foundation of HIV prevention efforts.

Furthermore, research from the past decade has shown that couples counseling and testing reduces HIV transmission and increases the use of modern family planning methods.^{17,20–22,32} However, these findings have yet to be widely translated into public health practice, and as a result very few couples have been tested and counseled for HIV. To increase the use of couples counseling and testing, it is essential to develop a demand for these services through promotional strategies.

Promotional Activities

This article describes the effectiveness of different strategies in promoting a couples counseling and testing program and the association of couples' demographic characteristics with their decisions to be tested and their HIV results. The generalizability of these results to other settings requires careful consideration, as this study was limited to two nongovernmental centers in Kitwe and Ndola, Zambia. However, research in other settings has yielded similar evidence for the effectiveness of the influence network agent approach.²⁵

The program used several different strategies to recruit couples, and participation steadily increased from July 2004, when the program began, to February 2006, when there was a sharp drop in the value of the US dollar against the local currency. That led to the end of all promotional activities except for stakeholder referrals and billboards, and the number of couples who came to the testing centers dropped dramatically. A program of couples counseling and testing in Lusaka had had a similar experience,⁷ and it is clear that ongoing efforts are required to sustain participation in couples counseling and testing.

The use of influence agents was the promotion strategy most commonly mentioned by couples who came to one of the centers for counseling and testing. These results agreed with those achieved by the Rwanda Zambia HIV Research Group elsewhere, using an earlier community worker model involving full-time peer promoters who invited couples to receive counseling and testing.^{7,25} The community workers were selected from among couples who had already sought counseling and testing, but the influence agents were individuals who had influence on people—including business associates, customers, and fellow church members, as well as family, friends, and neighbors.

From July 2004 to July 2005, when influence agent cohorts were trained on a quarterly basis, each spike in couples' attendance at the counseling and testing centers corresponded to a new cohort's beginning work. Within a couple of months, attendance declined again, showing the need to recruit and train new influence agents regularly.

The strong sense of community in Kitwe and Ndola may have had an impact on the effectiveness of the influence network agent model. Communities remained united despite rapid population growth, and because individuals trusted and relied on each other, couples had a high level of confidence in the influence agents. Some of the influence agents were married, and they reported that they were more successful when their spouses joined them in

approaching couples. Couples seemed to be more receptive when another couple approached them.

The radio program was the second most commonly reported promotional strategy. Its advantages included the ability to reach the correct age demographic (15–49 years of age), inform people about the benefits of couples counseling and testing [please provide], and provide endorsement of couples counseling and testing by the religious radio station that broadcast the program. In Kitwe, billboards—which had been placed in areas with heavy foot traffic and in the city market—were the third most commonly reported strategy.

Drama groups tended to attract adolescents and children rather than adults, which may explain why few couples who went to the centers for counseling and testing reported being exposed to the groups. Similarly, few couples reported being referred by community organizations, private businesses, nongovernmental organizations, churches, or district health officers. However, the promotional strategy of referral strengthened support for the couples counseling and testing program among district clinics and nongovernmental organizations and made it easier for the testing centers to refer HIV-positive people to them for continuing care.

Couples who reported being exposed to other promotional methods besides influence agents were more likely to be tested than those who brought an influence agent's invitation to the centers. However, the couples mentioning other methods were fewer in number and were probably more likely to have decided before coming to the centers that they wanted to be tested as they did not need a personal invitation to come to the centers. Couples who came after receiving a personal invitation from an influence agent might not have thought as much about testing earlier and might have wanted to wait before making their decision about being tested.

Lessons For The Future

The fact that couples in which the man was older were more likely to be tested might be a reflection of the decision-making dynamic among couples in this region. It might also indicate that older people better understand the importance of knowing their HIV status. In addition, they might be more confident that their relationship could handle the discovery that one or both of the partners was HIV-positive.

Seven percent of couples who were tested had been together eight months or less, and they were more likely to have partners with discordant HIV-results. This is probably a reflection of the short duration of the HIV-negative person's exposure to his or her partner.

Compared to couples in Ndola, couples in Kitwe were less likely to have discordant results, and of the concordant couples, they were more likely to have both partners test HIV-negative. Given that the couples were not randomly selected from the cities, this difference likely reflects the difference in HIV burden in the communities from which couples were recruited.

Although couples counseling and testing has been shown to be effective at reducing HIV transmission within couples, this innovative public health intervention is not yet widely available in sub-Saharan Africa²⁴. A critical mass of couples must be tested before the counseling and testing becomes a social norm. Until this happens, consistent and ongoing promotion is needed.

The influence network agent model required training, monitoring, and financial resources, but it was the promotional strategy most frequently mentioned by couples who came to a

testing center. Through health promotion, direct contact, and communication with couples within their social network, combined with the support of key community stakeholders, influence agents were able to educate couples on the benefits of couples counseling and testing and increase demand for those services. Now that the World Health Organization has endorsed couples counseling and testing as a prevention strategy, influence agents coupled with these other strategies can be implemented in a variety of settings to increase the utilization of couples counseling and testing and ultimately reduce the transmission of HIV.

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EXHIBIT 1

Tested Couples' HIV And Syphilis Results

Test and site	Couples who came to a testing center	Couples who tested with determinate results	Discordant couples				Concordant couples			
			Male positive, female negative	Male negative, female positive	Total		Positive	Negative		
			n	n	n	%	n	n	%	%
HIV										
Kitwe	3,414	2,388	143	170	313	13	497	1,578	21	66
Ndola	4,274	3,181	235	299	534	17	712	1,935	22	61
Total	7,688	5,569	378	469	847	15	1,209	3,513	22	63
Syphilis										
Kitwe	3,414	2,406	120	154	274	11	58	2,074	2	86
Ndola	4,274	3,207	207	124	331	10	320	2,556	10	80
Total	7,688	5,613	327	278	605	11	378	4,630	7	82

SOURCE Authors' analysis of data from the testing centers.

EXHIBIT 2

Demographic Characteristics Of Couples And The Decision To Be Tested

Characteristic	Unadjusted odds ratio	Adjusted odds ratio
Woman's age ^a	1.28 ***	1.07
Man's age ^a	1.27 ***	1.18 ***
Duration of union ^b	1.33 ***	1.11
Number of children ^c	1.24 ***	1.01

SOURCE Authors' analysis of data from the testing centers.

NOTE Adjusted odds ratio means adjusted for the other variables listed in the table.

^a Comparing couples ten years older in age to couples ten years younger.

^b Comparing couples who had been together eight months or less to those who had been together longer.

^c Comparing couples with two or more children to those with fewer or no children.

p<0.01

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EXHIBIT 3

Exposure To Promotional Strategies Reported By Couples Who Came To A Testing Center

Site and decision	Strategy									
	Influence network agent only ^a		Other strategies only ^b		Influence network agent and other strategies ^c		Total influence agent		Total other strategies	
	n	%	n	%	n	%	n	%	n	%
Kitwe										
Tested	1,265	62	266	13	523	25	1,788	75	789	33
Not tested	680	75	46	5	177	20	857	85	223	22
Total	1,945	66	312	10	700	24	2,645	78	1,012	30
Ndola										
Tested	1,822	63	368	13	677	24	2,499	78	1,045	32
Not tested	837	81	17	2	176	17	1,013	96	193	18
Total	2,659	68	385	10	853	22	3,512	82	1,238	29
Kitwe and Ndola										
Tested	3,087	63	634	13	1,200	24	4,287	77	1,834	32
Not tested	1,517	79	63	3	353	18	1,870	91	416	20
Total	4604	67	697	10	1,553	23	6,157	80	2,250	29

SOURCE Authors' analysis of data from the testing centers. NOTE Of the 7,688 couples who came to the centers, 834 did not report exposure to any promotional strategy.

^aInvited by influence agent, reported no exposure to other promotional strategies.

^bNot invited by influence agent, reported exposure to other promotional strategies.

^cInvited by influence agent, reported exposure to other promotional strategies.

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EXHIBIT 4

Demographic Characteristics And HIV Status Of Couples

Characteristic	Unadjusted odds ratio	Adjusted odds ratio
Concordant positive couples		
Woman's age ^a	0.87 ***	1.00
Man's age ^a	0.85 ***	0.86 ***
Duration of union ^b	1.03	1.14
Pregnancy ^c	0.72 ***	0.67 ***
Discordant couples		
Woman's age ^a	0.94 *	0.95
Man's age ^a	0.94 *	1.01
Duration of union ^b	0.52 ***	0.53 ***
Pregnancy ^c	0.83	0.75 **

SOURCE Authors' analysis of data from the testing centers.

NOTES Concordant positive couples are those in which both partners are HIV-positive. Discordant couples are those in which only one partner is HIV-positive. The comparison group for both is couples who are concordant negative (neither partner is HIV-positive). Adjusted odds ratio means adjusted for the other variables listed in the table. Comparing couples ten years older in age to couples ten years younger.

^b Comparing couples who had been together eight months or less to those who had been together longer.

^c Comparing couples in which the woman is pregnant to those in which she is not.;

* $p < 0.10$

** $p < 0.05$

*** $p < 0.01$