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Nancy Czaicki Date

Progress and Challenges in Integrating Couples' Voluntary Counseling and Testing into Routine Antenatal Services in Government Clinics and Predictors of 1-Month Follow-up HIV Testing for Couples' Voluntary Counseling and Testing Outside of a Research Setting in Ndola, Zambia

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An abstract of
a thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Science in Public Health
in Global Epidemiology
2012

Abstract

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Background: In 2008, the Ministry of Health in Zambia recommended that HIV testing be provided to partners of antenatal clients. Herein the transition of Couples' Voluntary HIV Counseling and Testing (CVCT) from NGO-sponsored weekend services to integrated weekday services in government clinics in Ndola, Zambia is examined. This examination includes a description of how CVCT data are being recorded using individual-level data collection tools. Additionally, predictors of follow-up HIV testing for concordant negative and discordant couples participating in the weekend services are established.

Methods: Data were extracted from government-issued logbooks in antenatal clinic (ANC) and voluntary counseling and testing (VCT) services in the six largest government clinics for 2010, and in 15 clinics for the first half of 2011. CVCT procedures were documented through observation and counselor interviews. Follow-up data was collected from the databases of the NGO providing weekend service and analyzed by developing a predictive logistic regression model.

Results: In 2010, only one of the six largest clinics tested more than four couples per week. In March-May of 2011, 11 of 15 clinics averaged less than 2.5 couples per week. 77% of couples were seen in the antenatal care (ANC) department with the remainder tested in the voluntary HIV counseling and testing (VCT) department. Obstacles included low participation of men, lack of staff trained to counsel couples jointly, procurement of HIV tests for men in ANC, and non-uniform recording of CVCT in ANC and VCT logbooks. In the follow-up analysis, discordancy (OR = 2.50, 95% CI 1.945, 3.205) and urban clinic location (OR = 4.27, 95% CI 2.973-6.144) were the two strongest predictors.

Conclusions: This study identified several challenges for integrating CVCT into regular clinic services. Recommendations to address these challenges are: implementing new data recording instruments, increasing training of counselors and nurses in CVCT, prioritizing ANC clients attending with partners, and expanding community sensitization using proven models. Follow-up of discordant and concordant negative couples is an important initiative to ensure reduced transmission of HIV between partners and to identify a seroconversion as early as possible. Moving forward, interventions to increase follow-up rates and streamline clinic logistics will be pursued.

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Acknowledgements

I would like to thank Susan Allen for her many ideas, guidance and advocacy for my professional growth. I would also like to thank all of the ZEHRP staff and interns for their assistance and support in this project. This research would not have been possible without the cooperation and openness of the Ndola government clinic staff who shed light on the story behind the data and contributed many suggestions to improve male involvement. A special thank you also goes to my family for their financial and emotional support during my time in Zambia and to my friends both in the US and in Zambia for supporting me throughout this journey. Financial assistance for travel was also provided by Global Field Experience funds.

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Introduction

Sub-Saharan Africa accounts for over 68% of people currently living with HIV[1]. Despite many efforts to halt the epidemic, the virus continues to spread, especially in resource limited communities. In Zambia, with a population of roughly 13 million people [2], one in 8 adults has HIV[3] and approximately 57% of adults ages 15-49 are married[3]. Additionally, in the capital city of Lusaka, approximately 23% of cohabiting couples are discordant (one partner is positive and the other is negative)[4]. However, only 16% of individuals ages 15-49 currently know their HIV status, with up to 20% of Zambian couples unknowingly living with an opposite-serostatus partner[5]. Unknown discordancy carries additional risks among uninfected pregnant women with a positive male partner, since they are less likely to use barrier contraceptives, unknowingly putting themselves and their child at risk for HIV infection. With over 61% of women having had a child by age 20 and considering that 62% of pregnant women are married or cohabiting[3], integrating CVCT into antenatal care to prevent both vertical and horizontal transmission of HIV is a valuable initiative.

Supporting this initiative, current PMTCT guidelines in Zambia specify testing the male partner in addition to the mother[6]. CVCT is a cost-effective way to test both partners [7-9] and has been shown to reduce the risk of transmission between partners by up to two-thirds[10]. In addition, upon review, male involvement in ANC programs was deemed an essential component of PMTCT programs in Zambia[11], with CVCT highlighted as a valuable method of accomplishing this. Though the results on Nevirapine uptake after CVCT during ANC are mixed [12-14], CVCT remains an effective way to prevent horizontal

transmission of HIV by increasing preventative sexual behaviors[15-18] and presents no additional risks when compared to individual VCT[12].

Past studies examining male partner involvement in ANC HIV testing have found that male involvement reduces both the risk of vertical transmission and the joint risk of infant infection and mortality by greater than 40%[19]. Across settings, more than 90% of men attending ANC clinics with their partner accept HIV testing [20,21], suggesting that the main challenge in increasing male participation in ANC-associated HIV testing is increasing male attendance. However, the best way to accomplish that task remains elusive.

Through the Zambia Emory HIV Research Project (ZEHRP), we have been implementing CVCT in the government clinics on the weekends in Lusaka and Ndola, Zambia since 2008. This included providing comprehensive training[22] of current government clinic nurses and lay counselors. These same nurses and counselors that provide CVCT on the weekends also work in those same clinics during the week, thus trained staff is available for CVCT services during ANC visits. In addition, if a clinic is in need of extra personnel to implement CVCT due to a stable increased number of couples, we offer to provide an additional counselor for every 5 couples per weekday. With this policy, we are currently only participating in weekday testing in 1 clinic in Lusaka and 1 clinic in Ndola. In this study we aimed to determine the extent that CVCT was being provided at ANC clinics during the week as recorded in the clinic logbooks. Through this process, we also examined current challenges in integrating these services and in collecting couple-level data using data collection tools designed for individuals.

Methods

Currently, several data collection tools are in use in the Ndola government clinics. Unlike tailor-made weekend data collection tools for couples' counseling and testing in use by ZEHRP, government-issued data collection instruments used during the week are not designed for capturing data on couples. Data for this analysis was extracted from the government issued antenatal care (ANC) or prevention of mother to child (PMTCT) logbook, depending on which book was in use at a given clinic, and the voluntary counseling and testing (VCT) logbook. Data collection was carried out in Ndola government clinics. All data collection was completed between May and August of 2011. This study was approved by the Emory University and University of Zambia Institutional Review boards as well as the Ndola District Health Management Team.

Clinic staff were asked about the protocol used when couples arrived and how data was recorded. When possible, such practices were also observed. The relevant logbooks were located by clinic staff, who explained how data was recorded, walked the researcher through some or all of the data, and remained available for questions. The appropriate logbooks were examined at each clinic in person with the aid of clinic staff and the sister in charge, and couples were counted by day and month. For our purposes a couple was defined as a heterosexual couple that came to the clinic together, received testing on the same day, and received their results and counseling together. It is important to note that the number of couples tested accounted for here is not equivalent to ANC partners tested, as the latter number includes women and male partners who were tested separately, often on different days, without counselor-facilitated

disclosure and joint post-test counseling. Since the effectiveness of CVCT rests on counseling and disclosing results together, these were not counted as couples in our study.

There were several differences across clinics, but data was typically recorded consistently. For antenatal couples, women were recorded in the ANC or PMTCT logbook while male partners were recorded in the VCT logbook. Women who were part of a couple were identified with a check mark or "Y" under "came as a couple" and "tested as couple" in the ANC logbook, and the male partner could usually be identified on the same date in the VCT logbook. Problems arose when some counselors within the same clinic used "N" for negative and "P" for positive, while others used "N" for not tested and "Y" for tested. In these situations "N" could have been not tested or negative and further investigation was required. Although no identifiers were recorded during data extraction, names, addresses, and dates were used to assist in identifying couples. There were discrepancies across and within clinics on this method, with some clinics identifying members of a couple with asterisks, and others marking them as a couple even if the man came in on a later date. Thus, much care was taken to ensure that all couples recorded met the definition of couple stated above. Couples that came in together for VCT were both recorded in the VCT logbook next to each other and were marked as coming as a couple, thus were straightforward to identify. Logbooks were reviewed from 2010 through the time the data was collected.

Results

Overall, the clinics have low levels of CVCT implementation within the ANC clinic setting, as it is not yet an institutionalized procedure. The clinics in both cities have a high degree of autonomy and thus some clinics provide ANC on specific days of the week while others provide ANC services every day. For consistency, we are reporting couples per week, though this may mean all the couples that week were seen on one day or throughout the week depending on the clinic.

In 2010 (Figure 1), there was only one clinic with a relatively high number of couples coming in during the week, New Masala. The number of couples sharply increased in the second quarter, and then steadily declined through the rest of the year. The reason for this drop was investigated, but has yet to be determined. ZEHRP did not begin specifically training staff here until October 2010. Though the other five clinics examined during 2010 did have couples coming in during this time, the number of couples was very low.

In 2011 (Figure 2), 11 clinics averaged less than 2.5 couples per week, with four exceptions: Chipulukusu, Kaloko, New Masala, and Lubuto. Across all clinics, nearly 80% of couples tested come through the antenatal department with most of the testing done on the first antenatal booking, which typically occurs one day per week. Given the population of Ndola and the number of women that are receiving ANC services even having 80 couples per month, thus an average of 20 per week, is still relatively low.

With the goal of improving these services, inquiries were made to ascertain why these clinics were having higher numbers than the other clinics. When examining rough percentages based on ANC patients and catchment area populations (data not shown), these four clinics still rank at the top, implying that the difference in raw numbers is not dependent on catchment area populations or number of pregnant women.

Though New Masala clinic did not have the highest numbers in 2011, it was still outperforming many other clinics, with its numbers consistently increasing. Along with Chipulukusu, Kaloko, and Lubuto, New Masala encourages couples to attend the ANC services through community sensitization, giving couples priority to get service, and personally encouraging women to bring in their partners. In addition, New Masala requests that women call their partners when they come for the appointment. Often, the men are waiting just outside the gate and join their wife or partner inside when a personal invitation is extended from the clinic. This is the only clinic that reported taking such a simple, yet effective, action.

Chipulukusu and Lubuto have had ZEHRP training and weekend involvement since late 2009. The training and involvement of ZEHRP appears to be transferring from weekend services to weekday services at Chipulukusu, but less so at Lubuto, though it remains in the top four in terms of number of couples tested in Ndola. Lubuto's number of couples tested remained fairly constant during this three month period ranging from 20-30 couples per month, thus between 5 and 7 couples per week.

From March to May 2011, Chipulukusu experienced a sharp decline in couples, which was attributable to a decrease in community sensitization, which has proven effective in this community. After sensitization in late 2010, their numbers went up from zero couples in the last months of 2010 to 83 in January, 86 in February, 81 in March, 63 in April, and 25 in May. The clinic notes that continuous sensitization is ideal, but they currently only do sensitization when their numbers begin to decrease.

Kaloko's numbers decreased slightly in April when ZEHRP began training counselors and nurses in CVCT then more than doubled in May. In addition to extensive community sensitization and giving couples priority, they also give the men notes to take back to work to explain their absence. Men may also pick up a note from the clinic before the appointment to get permission to miss work on that day.

All of these clinics also take advantage of the weekend services provided by ZEHRP and refer women who come without their partner during the week to return with their partner for CVCT services on the weekend.

Discussion

Herein we examined the current status of the transition of CVCT from a specialized service offered on weekends in government clinics, to an integrated weekday service. In Zambia, there is political will, and several organizations including Zambia Emory HIV Research Project (ZEHRP), Zambia Prevention Care and Treatment (ZPCT), Centre for Infectious Disease Research in Zambia (CIDRZ), and New Start are working to increase the coverage of CVCT. Though some clinics have comparatively high numbers, in absolute terms the numbers remain low. To truly address the burden of HIV and significantly reduce the incident cases among the highest risk group (heterosexual couples), more couples must receive CVCT services. There are lessons to be learned from these successes, but broadly, there are many changes that must take place to make this transition effective.

This study identified many challenges in integrating CVCT into regular clinic services that fall into three main categories: logistics, male involvement, and data collection and recording.

There are many logistical challenges including, but not limited to, having appropriately trained staff, having a designated space for men, and having a supply chain set up to address the use of rapid tests and other clinic supplies across departments for both men and women. Though the nurses are doing their best to test couples together, they encounter many logistical obstacles. In some cases, men who were present at the ANC visit were not tested since the VCT department ran out of rapid tests and the ANC rapid tests could not be used for men.

Male involvement and numbers of couples tested through weekday services vary greatly by clinic and across cities. Men can be resistant to attend ANC services with their wife due to stigma, lack of a designated space for men, inability to be excused from work, visit length, and lack of knowledge that their results can differ from their partner's. However, we have been successfully implementing CVCT services on the weekend and some weekdays using the same staff in the same populations explored in this study, demonstrating that it is possible to attract men to attend CVCT services. Thus, the low level of male attendance at ANC visits is not principally a product of the staff and clientele. In our interviews, both women and men reported that the men did not feel comfortable in the ANC clinic, which often had one small waiting area filled with women. In an effort to increase male involvement, a small trial in Uganda found that the simple intervention of a letter of invitation from the clinic can increase male attendance by up to 10%[21]. An increase in attendance was also observed in our study at Kaloko clinic as they offered men notes to excuse them from work to attend the ANC visit with their partner. In addition, New Masala clinic found it effective to have the women call their partners when they arrived alone at the clinic to invite them to attend. Often the men were waiting outside the clinic gate or nearby, and only needed the invitation to attend. Though we do not have a baseline to determine the percent increase that these interventions account for since they were implemented directly by the clinic on their time scale, it is clear through examining trends and doing interviews, that these simple interventions can be effective.

The data collection instruments currently in use present a significant handicap to these clinics in their efforts to record couples testing together. Thus, the major limitation of this study was data collection. Though many clinics maintain similar logbooks, each has inconsistencies and different ways of recording couples. Efforts were made to compare our numbers to the monthly DHMT reports submitted by the clinic, however that report counts male partners tested rather than couples tested, so direct comparisons could not be made. Clinic staff was involved in data collection and questions were asked to clarify as best as possible where data was unclear to ensure that our numbers were accurate within the limits imposed by the data collection tools. We acknowledge that our numbers may differ from those previously reported. We faced the same challenges as others in collecting data, and attribute most of these differences to the strict adherence to our definition of a couple.

Conclusion

The main challenges identified in integrating CVCT into ANC services were human resources and capacity: availability of trained counselors, space, logistics, rapid test supply chain, and data collection instruments. Many of these infrastructure-based challenges contribute to the low levels of male attendance.

To address the challenges of integrating CVCT into routine government service, we make the following recommendations, some of which are currently being pursued. New data recording instruments are required to accurately capture couples and to ease clinic logistics of passing partners between clinic departments to accomplish CVCT. Counselors and nurses in all clinics should be trained in CVCT methods and feel comfortable implementing it independently. More community sensitization and education about the possibility of discordance is needed throughout both cities. The influential network agent (INA) model[23] has proven successful towards this end in these locations before and should continue to be implemented. Other clinic level actions such as formal invitations for men and excusing men from work should be recommended, piloted, and funded from the top down to maintain consistency. With the government mandate issued in December 2008 that all pregnant women should be tested with their partners, efforts to address these challenges and successfully integrate CVCT services into existing clinic programs should be increased and supported.

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Figures

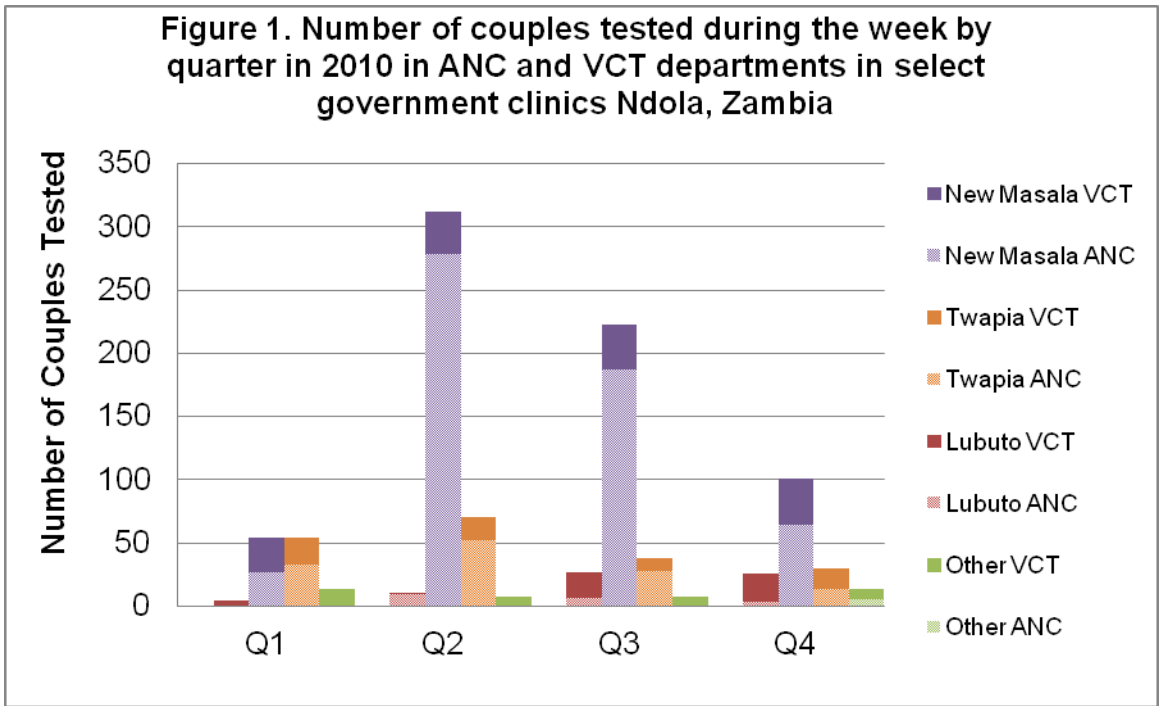

Figure 1. Number of couples tested during the week by quarter in 2010 at select government clinics* in Ndola, Zambia

*other category includes: Chipulukusu, Chipokota Mayamba, Nkwazi

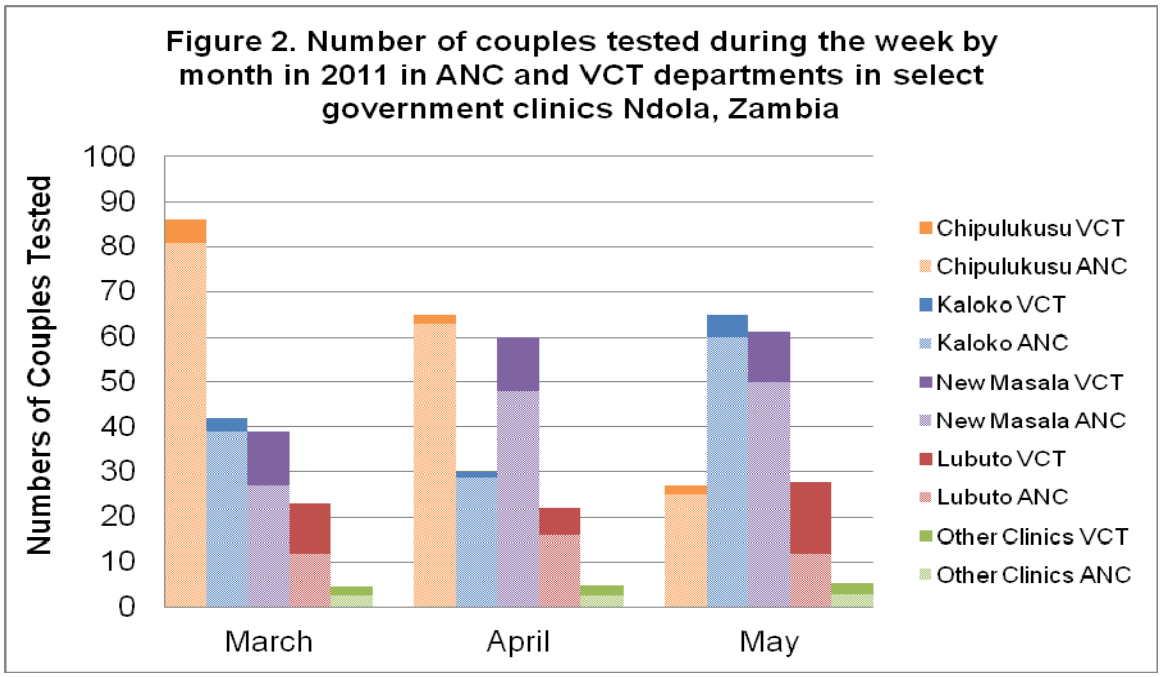

Figure 2. Total number of weekday couples tested in Ndola government clinics** in 2011

**other category includes: Nkwazi, Chipokota Mayamba, Twapia, Kawama, Mushili, Kavu, Kabushi, Pamodzi, Kaniki, Dola Hill, Prisons

Predictors of 1-Month Follow-Up HIV Testing for Couples' Voluntary Counseling and Testing Outside of a Research Setting in Ndola, Zambia

By Nancy Czaicki

Abstract

Background: We describe predictors of 1-month follow-up rates for HIV testing among couples' voluntary testing and counseling outside of a research setting in Ndola, Zambia, where an estimated two thirds of incident infections occur in cohabiting couples

Results: The 1-month follow-up rate was 10.5% for concordant negative (M-F-) couples and 22.2% for discordant (M+F- or M-F+) couples as measured over a 6-month period. Significant couple-level predictors included being discordant (aOR = 2.5), longer years cohabiting (aOR = 1.03), the man having been previously tested for HIV (aOR = 1.36), and the couple having been previously tested together (aOR = 1.56).

Conclusion: Follow-up HIV testing rates remain low outside of the research setting. Efforts to increase these rates are necessary in order to reduce transmission within couples and identify and address seroconversions promptly. Further investigation into behavior and logistical predictors of follow-up is needed and low-cost sustainable incentives should be explored.

Introduction:

The 22.5 million people living with HIV in Sub-Saharan African account for 68% of the world's total [1]. Within this region, Zambia has one of the largest epidemics.[1] Specifically, the Copperbelt region, bordering the Democratic Republic of Congo, has an adult HIV prevalence of 17% [2]. Cohabiting couples in Sub-Saharan Africa currently represent the world's largest HIV risk group [3] since the majority of HIV transmission in this region is heterosexual and occurs predominantly between cohabiting partners [4]. This high rate of transmission is found especially in discordant couples who are unaware that only one partner is positive. The rates of discordant couples vary across African countries from 23-54% [5]. In Lusaka, the capital of Zambia, the rate of discordant couples was found to be 23% [6], which is similar to that found in couples' voluntary HIV counseling and testing (CVCT) centers in the past [7-9].

CVCT has been shown to be a cost-effective [10-12] intervention to reduce the transmission of HIV in this large risk group by up to two-thirds [13]. Additional studies have demonstrated that CVCT leads to an increase in preventative sexual behaviors [9,14-16].

Many studies advocate for an increase in CVCT use due to its effectiveness[6,8,17-21]. Furthermore, a majority of people in Lusaka believe CVCT is good and nearly half of them are willing to test jointly, though less than 1% of couples have been tested [19]. Looking ahead to the expansion and increase in use of CVCT services, follow-up of discordant and concordant-negative couples to monitor for seroconversion should be established. In addition, there has been

demand in the Copperbelt region for more post-test support for those testing HIV negative [22].

Currently, there is no literature published on issues related to follow-up for couples that are not involved in a research study or an ART regimen. We have observed a follow-up rate of 65% for couples with indeterminate results [23] and a rate of 72% for discordant couples who have completed enrollment in a research study [24]. The results of multiple studies suggest that retention in care after testing HIV positive and not being initially eligible for ART is less than 33% [25]. We present here the progress of initiating a follow-up regimen for discordant and concordant negative couples identified through CVCT services at government clinics, the initial follow-up rates, an analysis of follow-up predictors, and future directions to promote and increase retention in CVCT programs in an effort to reduce HIV transmission in heterosexual couples.

Methods

Initial CVCT Visit

All couples completing CVCT procedures, described elsewhere[6,8,26,27], receive an incentive for attending, as CVCT is not yet a routine integrated health service. Couples in Ndola receive one chitenge, a traditional wrap often used as a skirt or child carrier by strapping it on the back, per person.

Follow-up procedure

Following the initial CVCT visit, all concordant negative and discordant couples were referred for 1 month follow-up appointments at the same clinic on a weekend. A subset of discordant couples who were eligible for research was referred to the ZEHRP site for their month 1 follow-up visit through August 30, 2011. Their CVCT ID and phone numbers, if given, were recorded in a follow-up appointment log, and the couples were given a follow-up appointment slip. To ensure that couples were afforded ample flexibility for attendance they could attend follow-up anytime between 8am-12pm on the appointment day. If couples left a phone number for either or both members, they also received reminder text messages prior to the scheduled follow-up visit and at least one phone call if the visit was missed. Couples were informed that the 1-month follow-up visit would be much shorter than the initial CVCT visit. The 1-month follow-up visit consists of an HIV rapid test for the HIV- partner and post-test counseling based on the results. Discordant couples were encouraged to attend together, though only the HIV- partner was retested.

Data Collection and Analysis

Data on age, cohabitation status, prior testing for HIV individually or together, pregnancy, and ARV use were collected for each couple during both the CVCT visit and follow-up or research visit. Data for analysis was limited to couples attending their first CVCT visit from May 2011 through November 2011, and follow-up data was used from through December 2011 in order to capture all of those who attended their one month follow-up visit. All analysis was completed with SAS 9.2. Attending follow-up was defined as a dichotomous variable with yes encompassing both clinic follow-up and research referral attendance. Descriptive analysis of predictors of interest was completed and sorted by serostatus (Table 1) and the follow-up rates across all clinics in Ndola were compiled by couple serostatus (Table 2). Predictors of interest were also examined in bivariate analysis with follow-up as the outcome. Unadjusted odds ratios and p-values are presented in Table 3.

Prior to model development, age and clinic catchment size were divided into quartile categorical variables. Chipulukusu, Kaloko, and New Masala were classified as having functional integration of CVCT into ANC departments based on internal data collected from the clinics, and four clinics (Dola Hill, Kavu, Kaniki, Ndola Mobile) were defined as rural with all other clinics being urban. A backwards elimination strategy was used to create a logistic regression model since all predictors of interest could be considered exposures. Variables showing significance levels of $p < 0.05$ were considered for retention in the model. In the case of linked variables (such as the man's and woman's HIV test results), if one variable was significant, the other was also kept in the model regardless of its

significance. For these models, age quartiles, clinic catchment area quartiles and month were all used as class variables. The final model was used to calculate adjusted odds ratios (aORs) and identify significant predictors of follow-up (Table 5).

Results

Table 1 presents the demographic profile by serostatus of the cohort analyzed for follow-up rates. Concordant negative couples make up 86% of the cohort, and the discordant partner is evenly distributed among genders. This is consistent with previously published literature[6,28]. Though a majority of the women (~70%) were previously tested, the rate was lower for men (48-49%), and very few couples had been previously tested together (8-14%). Interestingly, this rate was higher for concordant negative couples. The average ages and cohabitation duration in this cohort align with previously reported demographic data on larger CVCT cohorts [6] and are similar across serostatus.

As seen in Table 2, a total of 3,775 couples with at least one HIV- partner received ZEHRP administered CVCT services from May to November 2011. Overall, 12.1% of these couples returned to the clinic or their research referral for a 1 month follow-up appointment. Discordant couples had a follow-up rate (22.2%) greater than twice that of concordant negative couples (10.5%). However, both of these rates are still lower than desired

When the relationship between individual predictors and follow-up was examined (Table 3), the woman having been previously tested for HIV, the HIV+ partner using ARV's, and years cohabiting were the only variables that were not significant. However, the significance for some variables changed when others were controlled for, as illustrated in the final model (Table 5).

Variations across individual test sites were also examined and are presented in Table 4. The three test sites with the most CVCT couples, Chipulukusu, Koloko, and Ndola Mobile do not have the highest rates of follow-

up. Lubuto and Chipokota Mayamba make up a small percentage of the total couples tested, but have the highest rates of follow-up – about 30%. Kawama, Kansenshi Prisons, and New Masala all have follow-up rates in the 20% range, but their contributions to total couples tested are all less than 10%.

More generalizable trends are depicted in Table 5. Controlling for other covariates of interest, couples at urban clinics are approximately 4 times as likely to attend follow-up compared to couples at rural clinics (aOR = 4.27, 95% CI 2.973-6.144). On the other hand, couples attending clinics that have functional integration of CVCT into ANC were half as likely to return for follow-up (aOR = 0.50, 95% CI 0.379-0.654). Compared to the smallest clinic catchment size, clinics with medium sized catchment areas were half as likely to have couples return for follow-up, while those with large catchment areas were approximately 40% more likely to have couples return for follow-up. (aOR = 0.56, 95% CI 0.387-0.654; aOR = 0.50, 95% CI 0.323 – 0.740; aOR = 1.38, 95% CI 1.029 1.838, respectively).

In addition to test site, month is also associated with rates of follow-up, showing a general decline in follow-up later in the year as compared to the starting month of May. If the male partner had been previously tested for HIV, the couple was 36% more likely to return for follow up (aOR = 1.36, 95% CI 1.084, 1.694); however the woman being previously tested had no significant influence on follow-up rate. Discordant couples were 2.5 (aOR = 2.50, 95% CI 1.945, 3.205) times as likely to return for 1 month follow-up as concordant negative couples, controlling for other covariates. The data was divided into two time periods (analysis not shown), one where research enrollment was ongoing

and one after enrollment had concluded. The odds ratios for discordant couples did vary slightly by time period (with research aOR = 2.96, 95% CI 2.13, 4.10; without research aOR = 1.98, 95% CI 1.33, 2.96), but were evenly split by the cumulative measure (aOR = 2.50, 95% CI 1.945, 3.205).

Discussion

The majority of new HIV infections occur in cohabiting heterosexual couples[3,4,29], the world's largest risk group for incident HIV infection[13]. While there has been an increase in providing testing and ARV services for this group, there has been an absence of follow-up testing and support services. In this study, we examined the initial 1 month follow-up rates and their predictors for both concordant negative and discordant couples for the 6 month period following full implementation of follow-up procedures. Since CVCT is not yet an institutionalized service, promotion is necessary to increase the number of those attending the first visit [6]. Thus it is not surprising that follow-up numbers are low since there are no material incentives to attend follow-up.

In addition to the predictors explored here the couples' attitudes and perceptions such as fear, gender differences in motivation and power, stigma, and incongruity between perceived and actual risks may have also played a role [30]. Though these attributes were not measured in this study, interpretations of our findings incorporate them.

Several couple level predictors significantly influenced the rate of follow-up among this cohort. Discordant couples had a follow-up rate of 22.2%, while concordant negative couples had a follow-up rate of 10.5%. The follow-up rates for both groups of couples were low, despite much variation among clinics. However, discordant couples were 2.5 times more likely to attend follow-up than concordant negative couples. This result is not surprising, since discordant couples likely perceive themselves at higher risk than concordant negative couples, and higher perceived risk is associated with seeking testing [31].

Follow-up was also higher among those couples who had previously been tested together. This round of testing was in and of itself a form of self-imposed follow-up for them, so it follows that they would have higher rates of follow-up. Since nearly twice as many concordant negative couples had been previously tested together than discordant couples, this second round of testing could have been motivated by knowledge of risky behavior for at least one partner, and thus follow-up confirmatory testing could have been more desirable.

In addition to couple level predictors, clinic level predictors were also influential. It was not surprising that urban clinics had higher rates of follow-up than rural clinics, as clinic access and transportation can often be an issue in rural areas. In addition, the rural clinics in this study have larger agricultural areas than the urban clinics, and seasonal farming demands often interfere with attending a clinic. However, it was surprising to find that clinics with functional integration of CVCT into antenatal clinic services were half as likely to have couples attend follow-up, when adjusting for other covariates. The previously demonstrated ability of these clinics to adapt and take on new tasks would suggest that they would be able to easily integrate these follow-up procedures. For those couples in which the woman is negative, it is possible that she receives her follow-up testing as part of ongoing antenatal care rather than coming for separate testing on the weekend. This could contribute to these clinics having lower rates, but does not account for couples where the man is negative.

Without further qualitative investigation, we are unable to offer any reasonable explanations of why the follow-up rates would be highest in the clinics

with both the smallest and largest catchment areas as compared to those with medium sized areas.

Limitations

Additional demographic characteristics may also serve as important predictors of follow-up rates, but this analysis was limited to the basic demographic data collected for CVCT and follow-up services. Follow-up was also inclusive of couples referred to research and couples referred to basic clinic follow-up. Though this was only for a portion of the follow-up time examined, it potentially could have inflated follow-up rates. However, this inflation is estimated to be negligible as the median follow-up rate at the clinics is 13%, which is similar to the overall average follow-up rate including research referrals of 12.1%. To further investigate this potential bias, the data was divided into two time periods, one where research enrollment was ongoing and one after enrollment had concluded. The discordant couples were more likely to attend follow-up from May through August when research was ongoing compared to after research enrollment stopped, however during both time periods the discordant couples were significantly more likely to attend follow-up than concordant negative couples. Thus, the interpretation remains the same, discordant couples are 2-3 times more likely to attend follow-up than concordant negative couples. The increase in follow-up among discordant couples during the research period is likely attributable to incentives. The discordant couples enrolled in the research study received transportation reimbursement for their visits, while those who attend follow-up at the clinics do not receive any incentives, regardless of serostatus. Couples receive one chitenge (traditional wrap) per person as an

incentive at the initial visit in Ndola, so higher rates of follow-up for May could have been due to the belief that incentives would be provided for follow-up visits as well.

In addition, variables for functional integration of CVCT into ANC services were created based on internal data collected from the clinics and the distinction between rural and urban clinics was based on geographic location of the clinics and knowledge of clinic accessibility based on experience working in this area. Potential misclassification among these variables is a limitation of the predictive ability of these covariates. This study only concerns data collected in the first six months after full implementation of follow-up procedures, and further analysis will be done as evidence-based changes are made to the follow-up protocol.

Conclusion

Follow-up of discordant and concordant negative couples is important to ensure reduced transmission of HIV between partners and to identify a seroconversion event as early as possible. Our aim is to inform other CVCT implementers of the importance of follow-up and provide insight into what factors significantly influence follow-up rates. Moving forward, interventions to increase follow-up rates, investigate low-cost sustainable incentives, and streamline clinic logistics will be pursued.

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Tables

Table 1. Demographic Profile of Follow-Up Cohort by Serostatus

	Concordant Negative N (%)	Discordant N (%)
Serostatus	3252 (86)	523 (14)
Woman Positive	--	268 (7)
Man Positive	--	255 (7)
Woman on ARV	--	45(1)
Man on ARV	--	33 (1)
Man previously tested	1547 (48)	258 (49)
Woman previously tested	2276 (70)	352 (67)
Previously tested as a couple	442 (14)	42 (8)
	(μ, s.d.)	
Man's Age	35.4 (12.5)	36.2 (9.8)
Woman's Age	28.8 (10.9)	29.5 (8.9)
Years Cohabiting	8.5 (9.4)	6.6 (6.9)

Table 2. 1-Month Follow-up Rates May - December 2011 in Ndola, Zambia

	Couples Tested (N)	Attended 1 month Follow-up* (N)	1 Month Follow-up Rate (%)
Discordant	523	116	22.2
Concordant Negative	3252	340	10.5
Total	3775	456	12.1

*Attended 1 month follow-up at clinic or research referral (referred discordant couples through August 30)

Table 3. Bivariate Analysis with Follow-up as Outcome

Variable		Crude Odds Ratio	P-value
Urban Clinic		3.342	<0.0001
Functional integration of CVCT into ANC		1.335	0.0049
Clinic catchment size			
	<18,445	1.00	ref
	18,445-22,146	0.77	0.0001
	22,147-36,649	1.21	0.8574
	>36,650	2.10	<0.0001
Man previously tested for HIV		1.45	0.0002
Woman previously tested for HIV		1.24	0.057
Previously tested for HIV as a couple		1.74	<0.0001
Man is HIV positive		2.74	<.0001
Woman is HIV positive		1.80	0.0003
Couple is discordant		2.44	<0.0001
Using ARVs		2.19	0.01
Month of visit			
	May	1.00	ref
	June	0.71	0.5135
	July	0.60	0.4326
	August	0.49	0.0246
	September	0.72	0.5335
	October	0.60	0.5012
	November	0.57	0.2437
Man's age		1.02	0.0001
Woman's age		1.02	<0.0001
Years Cohabiting		1.02	0.0023

Table 4. Rates of Follow-up by Test Site

Test Site	Follow-Up		Total CVCT Couples
	Yes, N (%)	No	N (%)
Rural			
Kaniki	28 (13)	195	223 (6)
Kavu	21 (8)	235	256 (7)
Dola Hill	13 (5)	254	267 (7)
Ndola Mobile	2 (0.4)	488	490 (13)
Subtotal	64 (5)	1172	1236 (33)
Urban without functional CVCT/ANC integration			
Lubuto	31 (30)	71	102 (3)
Chipokota Mayamba	24 (29)	60	84 (2)
Kawama	35 (27)	97	132 (4)
Kansenshi/Prisons	15 (25)	46	61 (2)
Kabushi	27 (14)	168	195 (5)
Twapia	25 (13)	167	192 (6)
Mushilu	20 (13)	135	155 (4)
Nkwazi	23 (11)	179	202 (5)
Pamodzi	10 (8)	121	131 (4)
Subtotal	210 (17)	1044	1254 (33)
Urban with functional CVCT/ANC integration			
Chipulukusu	67 (13)	455	522 (14)
Koloko	44 (10)	411	455 (12)
New Masala	71 (23)	237	308 (8)
Subtotal	182 (14)	1103	1285 (34)
Total	456	3319	3775

Table 5. Adjusted Odds Ratio Estimates from Logistic Regression Model

Odds Ratio Estimates			
	Adjusted	**95% Confidence Intervals**	
Predictor	**Odds Ratio**	**Lower Limit**	**Upper Limit**
Urban Clinic	4.27*	2.973	6.144
Functional integration of CVCT into ANC	0.50*	0.379	0.654
Clinic catchment size			
<18,445	ref		
18,445-22,146	0.56*	0.387	0.812
22,147-36,649	0.50*	0.323	0.74
>36,650	1.38*	1.029	1.838
Month			
May	ref		
June	0.72	0.493	1.057
July	0.66*	0.455	0.965
August	0.59*	0.391	0.878
September	0.66	0.424	1.035
October	0.57*	0.392	0.837
November	0.50*	0.343	0.726
Years Cohabiting	1.03*	1.016	1.038
Woman previously tested for HIV	1.02	0.8	1.304
Man previously tested for HIV	1.36*	1.084	1.694
Discordant	2.50*	1.945	3.205
Previously Tested as a couple	1.56*	1.174	2.068

* Odds Ratios are significant at an alpha of 0.05