Title:
HIV and family planning service integration and voluntary HIV counseling and testing client composition in Ethiopia.

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Abstract

Integrating voluntary HIV counseling and testing (VCT) with family planning (FP) and other reproductive health (RH) services may be one effective strategy for expanding VCT service delivery in resource poor settings. Using 30,257 VCT client records with linked facility characteristics from Ethiopian non-governmental, non-profit reproductive health clinics, we constructed multi-level logistic regression models to examine associations between family planning (FP) and HIV service integration modality and three outcomes: VCT client composition, client-initiated HIV testing and client HIV status. Associations between facility FP-HIV integration level and the likelihood of VCT clients being atypical FP client-types, versus older (25+ years), ever-married women were assessed. Relative to facilities co-locating services in the same compound, those offering FP and HIV services in the same rooms were 2-13 times more likely to serve atypical FP client-types than older, ever-married women. Facilities where counselors jointly offered FP-HIV services, and served many repeat FP clients, were significantly less likely to serve single clients relative to older, married women. Facilities offering many youth services were even more likely to provide older, married women with VCT services than youth, which may be explained by these facilities' use of highly integrated service delivery. Younger, single men and older, married women were most likely to self-initiate HIV testing (78.2 percent and 80.6 percent, respectively), while the highest HIV prevalence was seen among older, married men and women (20.5 percent and 34.2 percent, respectively). Compared with facilities offering co-located

services, those integrating services at room and counselor-levels were 1.9 – 7.2 times more likely to serve clients initiating HIV testing. These health facilities attract both standard MCH clients, who are at high risk for HIV in these data, and young, single people to VCT. This analysis suggests that client types may be differentially attracted to these facilities depending on service integration modality and other facility-level characteristics.

Background

Voluntary HIV counseling and testing (VCT) is the primary entry point for HIV/AIDS care and treatment services and may also prevent transmission of the virus by reducing risk behavior (Mola et al., 2006; Painter, 2001; The Voluntary HIV-1 Counseling and Testing Efficacy Study Group, 2000; Wolitski et al., 1997). In developing countries, as anti-retroviral drugs become more accessible for prevention of mother to child transmission of HIV and treating adults and children with AIDS, expanding and improving VCT service delivery becomes paramount.

Integrating VCT with family planning (FP) and other reproductive health (RH) services may be one effective strategy for expanding VCT service delivery, and there are several compelling reasons to consider this approach. HIV and family planning interventions have similar target audiences; for example, nearly half of HIV infected persons worldwide are childbearing-aged women (UNAIDS, 2004). Offering these services jointly may maximize use of scarce resources, improve client access, increase uptake for both service types and capture otherwise missed opportunities by reaching clients not typically targeted with either family planning or HIV prevention and treatment information (Berer, 2003; Bradley et al., 2006a; Dehne et al., 2000; Duerr et al., 2005; Maggwa & Askew, 1997; Maharaj & Cleland, 2005; O'Reilly et al., 1999; Reynolds et al., 2006).

Ethiopia is a largely rural, sub-Saharan African country with poor health care access. Roughly 85 percent of the country's 77.4 million people reside in rural areas (Population Reference Bureau, 2005). While the Government of Ethiopia's HIV policy is supportive of HIV and reproductive health service integration (Government of Ethiopia & Ministry of Health, 2000), these services remain predominantly vertical in terms of program administration, funding and service delivery. As a result of the rapidly growing population and negligible increases in health care funding, Ethiopia's health sector is under growing pressure. The reproductive health situation is dire. According to the recent Demographic and Health Survey, 34 percent of married women have unmet need for contraception, while contraceptive prevalence remains low, at 15 percent. Approximately 1.4 percent of Ethiopians

aged 15-49 (1 million persons) are estimated to be infected with HIV (Central Statistical Agency & ORC Macro, 2006).

There are many legitimate arguments against integrating HIV and other reproductive health services, such as perceived differences in target audiences, health providers' time constraints and structural barriers, such as inadequate space and shortages of equipment (Gichuhi, 2004; Hardee et al., 1999; Hardee & Yount, 2003; Hoke & Reuben, 2006; Mayhew, 2000). Due to the dearth of operations research in this area, however, many of these perceived barriers to integration are anecdotal, with few supporting research findings. Studies that have explored these issues find that health providers are supportive of service integration in theory and that challenges may be overcome with adequate training and structural improvements (Chikamata et al., 2002; Dehne et al., 2000; Hoke & Reuben, 2006; O'Reilly et al., 1999; Reynolds et al., 2003; Reynolds et al., 2006).

VCT services offered by an organization not identifiable with first-line HIV care may reduce the risk of social stigmatization for clients accessing the facilities. Our analysis uses client and facility-level data to examine the following outcomes among VCT clients attending the Family Guidance Association of Ethiopia's (FGAE) facilities: 1) VCT client composition, 2) client motivation for HIV testing and 3) client HIV status. At the time of data collection, FGAE's 28 clinics represented roughly 5 percent of the approximately 570 VCT clinics throughout the country (AIDS Resource Center, 2006). FGAE's VCT clinics use a range of HIV and family planning service integration modalities, depending on programmatic objectives, target population, infrastructure, available resources, and number of trained providers.

Methods

From September – November 2004, we collected approximately 43,000 VCT client records from 28 FGAE clinics, for the 21-month period from January, 2003 – September, 2004. Non-identifying client data were collected from VCT clinic log books, including: testing date, sex, age, marital status, occupation, education level, religion, reason for testing and HIV test result. The data were entered into

Excel spreadsheets at the VCT clinics and then transferred into Stata 8.0 (College Station, Texas) for cleaning, merging and analyses.

Data were coded as follows: (i) Client age: younger than 25 years and 25 years and older. Age was dichotomized using 25 years as the cut-off point, because this is the median age at which Ethiopian women adopt contraception (Central Statistical Authority & ORC Macro, 2001). Clients aged younger than 15 years or older than 49 years were not included in the analyses, because of the focus on integrated use of family planning and VCT services. (ii) Marital status: never-married and ever-married. "Ever-married" includes clients reporting divorced, separated or widowed as their marital status, and this category was chosen over "currently married," in order to capture past use of the facility for family planning services. (iii) Religion: Orthodox, Muslim and Protestant. Those reporting religion as "Catholic" or "other" were excluded from the analyses due to small sample size. (iv) Education: none (0 years), primary (1-8 years), secondary (9-12 years) and more than secondary (more than 12 years). (v) Occupation: manual skilled, manual unskilled, professional, and unemployed. Occupational categories were chosen to correspond to the Ethiopian DHS categories. (vi) Reason for testing: situational and self-initiated. This variable describes clients' self-reported primary reason for attending the VCT clinic. The most common reason cited was "to know status," and this reason was combined with "suspicious" to classify those who initiated obtaining VCT services for themselves. "Situational" test reasons include pre-marital testing, prevention of mother to child transmission of HIV, and travel or visa requirements.

During April, 2005, approximately six months after completing the client data collection, we collected facility-level data via telephone surveys with the 28 facility managers. These data included mode of HIV and family planning service integration, range of available HIV services, VCT counselor characteristics, new and repeat FP client load, availability of other reproductive health services, town and catchment population, facility age and VCT service duration. We verified that no major changes in service delivery procedures had occurred during the time period for which client data were collected.

The primary independent variable of interest, HIV and family planning service integration level, was categorized as facility-level, room-level or counselor-level. These categories are mutually exclusive, and facilities are classified as the highest integration level typically used for HIV and family planning services. Facilities co-locating HIV and family planning services within the same service delivery compound are categorized as offering facility-level integration. Those offering the services in common rooms that are rotated weekly for confidentiality are categorized as integrated at the "room-level," and facilities in which counselors simultaneously offer HIV and family planning services are categorized as integrated at the "counselor-level."

Using information from the facility managers, we summed the numbers of available HIV services (0-4), long term contraceptive methods (0-4), maternity services (0-4), child health services (0-2), pregnancy-related services (1-3), services targeted for special populations (0-2) and youth services (0-12). These count variables were used in the analysis to measure facility-level service capacity that may independently influence VCT client composition. We also constructed variables for new and repeat family planning client loads by averaging each facility's annual client load over the years 2000-2002. Family planning client load was measured during the years prior to VCT client data collection, in order to examine how pre-existing family planning service capacity might affect VCT client composition. New and repeat client loads were averaged separately over three years to adjust for outlying values during the year before the VCT client data collection period began. Both new and repeat client loads were logged in the multivariate analysis to adjust for negatively skewed, non-normal distributions.

We also collected information on VCT counselors' characteristics from the facility managers, who enumerated each VCT counselor working in the facility along with their demographic and work-related characteristics. In order to account for VCT counselors' attributes that may affect client composition in the regression analyses, we created variables measuring the proportion female VCT counselors within each facility, the mean age of VCT counselors in the facility and the number of

months VCT counselors had worked in the facility, averaged across counselors within each facility. Last, we examined contextual factors such as the surrounding town and clinic catchment populations, as well as age of the facility and VCT units. Facility and VCT ages were measured in months since inception of services. Population-size variables were logged in the analysis to adjust for negative skew.

Client and facility characteristics were linked by facility. Four of the facilities were excluded from the analyses because of incomplete facility-level data. Client records from the eligible facilities that were missing data for sex, age, marital status, religion, education level, occupation, reason for testing or HIV test were also excluded due to overlapping missing variables in the multivariate analyses, yielding a final analytic sample of 30,257 clients: 16,043 men and 14,214 women, or approximately 70 percent of the original sample.

We are interested in the likelihood that a VCT client attending a facility with particular service characteristics will be a member of one of six demographic groups: 1) ever-married women ≥ 25 years old (EMF25+, N=2374), which is the conventional client group seeking RH care; 2) ever-married men ≥ 25 years (EMM25+, N=3080; 3) never-married men ≥ 25 years (NMM25+, N=5102); 4) never-married women < 25 years (NMF<25, N=8372); 5) never-married men < 25 years (NMM<25, N=7316); and 6) all others (OTHER, N=4013) which includes ever-married men and women <25 years (N=545 and N=2018 respectively) and never-married women ≥ 25 years (N=1450). Group 2 would be largely spouses of those in group 1 and group 4 likely eventual partners of those in groups 3 or 5. In terms of market segmentation, groups 1 through 5 comprise the largest client groups, with all others combined into group 6.

We use multi-level, multivariate logistic regression to estimate adjusted odds ratios (AORs) for the net association between facility integration level and other covariates on client demographics, self-initiated HIV testing and HIV status. Relative to being in group 1 (EMF25+), which is the usual RH clinic clientele, we separately model the likelihood of a VCT client belonging to group type 2 (EMM25+), 3 (NMM25+), 4 (NMF<25), 5 (NMM<25) or 6 (OTHER). The modeling approach is

similar to a paired comparison in a multinomial logistic regression with the base category being group 1 and with no attention paid to other possible comparisons.

Similar models were constructed to examine associations between facility and client-level variables and client motivation for testing, as well as client HIV status, with the latter assumed to approximate client risk. Client motivation is examined by estimating the adjusted odds of a client self-initiating his/her HIV test. These models are stratified by sex and also include the following client demographic characteristics as independent variables: age, marital status, education level, occupation and religion. The likelihood of a VCT client testing positive is also modeled similarly with reason for client testing added to the model. All models are adjusted for clinic-level and repeat client-level clustering that can affect the standard errors of the estimated coefficients.

Findings

Table 1 shows client characteristics for the 30,257 VCT clients in the analytic sample. Approximately half of the men and three-fourths of women are younger than 25 years old. More than three fourths of the men have never been married compared to just under 70 percent of the women. Both men and women in the sample are relatively well educated, with over half reporting completion of at least secondary education. Women are much more likely to be unemployed than men, while men are more likely to be in manual skilled or professional positions. HIV infection is higher among female (13.9 percent) than male (8.6 percent) clients and considerably higher for both sexes than the national prevalence estimate of 1.4 percent (Central Statistical Agency & ORC Macro, 2006). Just over two-thirds of the VCT clients in our sample self-initiated HIV testing (69.5 percent), as opposed to seeking a test for situational requirements (30.5 percent), such as marriage or travel.

Table 2 provides descriptive information on the VCT clinics, including definitions for facility-level variables used in the regression analyses. Two fifths (42 percent) of the facilities have HIV and family planning services co-located in the same compound, while 16.6 percent offer these services in the same rooms. Another 42 percent offer the highest level of service integration, whereby counselors

provide both HIV and family planning services simultaneously. In terms of service capacity, the facilities offer on average 2.5 out of a possible 4 HIV services – including information provision, prescribing drugs for opportunistic infections, home-based care and condom distribution. On average, VCT counselors are 33 years old, 70 percent female and have almost two years (23.5 months) of experience in their current position. The facilities provide an average of 2.3 long-term family planning methods and serve an average of 6,128.3 new and 7,357.2 repeat family planning clients annually. These facilities also offer a wide range of other reproductive health services – including an average of 1.8 maternity services, 0.9 child health services and 2.2 pregnancy-related services. The facilities offer many youth services – 8.5 on average out of a possible 12 – but few services specifically targeted for unmarried people or men.

Figure 1 shows the distributions of reason for HIV testing and HIV prevalence among the eight sex-age-marital status combinations. Older, ever-married women are most likely to initiate HIV testing, followed by younger, never-married men. Notably, the older, ever-married women have the highest HIV prevalence (34.2 percent), while the younger, never-married men have the lowest (2.3 percent). HIV infection is higher among female than male clients in every demographic category.

Table 3 provides the adjusted odds ratios (AOR) from the five multilevel multivariate regressions of clinic and client characteristics on the client's likelihood of being one of five demographic types (EMM25+, NMM25+, NMF<25, NMM<25, OTHER) relative to being an ever-married woman ≥ 25 years (EMF25+).

Compared with co-located HIV and family planning services, room-level service integration is significantly associated with increased odds (2 to 13 times higher) that a VCT client will be drawn from client demographic groups other than older, ever-married women. The magnitude of the association is largest for NMM<25 (AOR=13.36, $p<0.05$) and NMF<25 (AOR=6.39, $p<0.05$). The association is in the opposite direction and not always statistically significant, however, for counselor-level integration. Facilities where health providers simultaneously deliver HIV and family planning

services are less likely to draw in VCT clients from other demographic groups than from among older, ever-married women, and this association is significant for NMM25+ (AOR=0.77, $p<0.05$) and NMF<25 (AOR=0.81, $p<0.05$).

In terms of service capacity, a wider range of HIV services offered by facilities is positively associated with attracting atypical family planning client types, while capacity to provide other reproductive health services has mixed associations with the client demographic groups. For example, each unit increase in the number of available HIV services is associated with a 61 percent increase ($p<0.05$) in the odds that a VCT client will belong to the NMM25+ or NMF<25 groups, relative to being an older, ever-married woman.

VCT counselors' characteristics also demonstrate significant associations with client composition. Most notably, VCT clients attending a facility with a higher proportion of female VCT counselors are 1.94 times more likely to be NMM<25 and 1.72 times more likely to be NMM25+, compared to the reference client type. Conversely, each additional year of a facility's VCT counselors' average age is significantly associated with a 4-10 percent reduction in the likelihood of serving a never-married client of either sex. An additional month of VCT counselor experience at the facility level is negatively associated with the odds of a client belonging to the NMM<25 and NMF<25 client groups.

The size of the facility's new family planning (logged) client load in 2000-2002 is positively associated with attracting atypical family planning client types to VCT in 2003-2004, while the opposite effect is seen with size of repeat family planning business. For example, each log unit increase in new annual family planning client load (equivalent to increasing from 1000 to 2718 clients) is associated with a 2.5 times increase in the odds that a female VCT client will be young and never-married as opposed to older and ever-married ($p<0.05$). Conversely, a female client is 70 percent less likely to be younger and never-married relative to older and ever-married in facilities with a unit log increase in repeat family planning client load ($p<0.05$). Each additional long term family planning

method offered by facilities is significantly associated with more VCT testing by older men who are either never (AOR=1.36, $p<0.05$) or ever-married (AOR=1.45, $p<0.05$), but with less VCT testing by younger, never-married women (AOR=0.81, $p<0.05$), relative to older, ever-married women.

The availability of other reproductive health services shows mixed associations, not all statistically significant, with the odds of a VCT client being atypical for RH services. For example, numbers of maternity, child health and pregnancy-related services are all significantly and negatively associated with the odds of a VCT client belonging to the NMM<25 group, and the number of pregnancy-related services is also negatively associated with the odds of a client belonging to either NMM25+ or EMM25+. The numbers of child health and pregnancy-related services are significantly and negatively associated with the odds that a client will belong to either NMF<25 or OTHER. On the other hand, each additional child health service is associated with a 23 percent increase in the odds that a client will belong to EMM25+ ($p<0.05$), while each additional maternity service is associated with a 17 percent increase in the odds that a client will represent OTHER, which is largely made up of younger, ever-married women and men.

Paradoxically, facilities offering more services for either youth or special populations are significantly less likely to draw clients from any other demographic group as compared to older, ever-married women. Each additional youth service available is associated with a 20 percent decrease ($p<0.05$)in the odds that a VCT client will be a younger, never-married man and a 17 percent decrease ($p<0.05$) in the odds that a client will be a younger, never-married woman.

Adjusting for client characteristics, we also regressed facility characteristics on clients' reason for testing, to assess the likelihood of a client self-initiating HIV testing versus testing for a situational requirement. These adjusted odds ratios are shown separately for men and women in Table 4. In the adjusted analysis, older men are 31 percent ($p<0.05$) less likely than younger men to initiate HIV testing, while older women are 17 percent ($p<0.05$) more likely to initiate testing than younger women.

Ever-married male and female clients are both significantly more likely to initiate HIV testing than never-married clients.

In terms of integration modality, VCT clients attending RH clinics with room and counselor-level integration are both more likely to initiate HIV testing than those attending facilities where HIV and family planning services are simply co-located. The magnitude of this association is largest for room-level integration, which increases the odds of self-initiated testing by more than four times for male and more than seven times for female clients, compared with co-located services. Each additional HIV service offered by the facility is associated with a 16 to 17 percent decrease in the odds of the client initiating HIV testing. The number of long term family planning methods has a similar but larger influence, with each additional method related to a 50 percent decrease in the odds of client-initiated HIV testing for women and a corresponding 41 percent decrease for men. Facilities with larger new family planning client loads (logged) raise the likelihood of female clients self-initiating VCT services (1.44 times, $p<0.05$), while those with larger repeat family planning client loads (logged) show the opposite influence, lowering the likelihood by 58 percent ($p<0.05$).

Other services demonstrating significant associations with reason for testing are the number of maternity services and services targeted for special populations and youth. An additional available maternity service is associated with a 13 to 15 percent increase in the odds of client initiated HIV testing for men and women respectively. While the association between number of youth services and self-initiated client testing is negative, the number of services targeted for special populations is positively associated with self-initiated testing. Last, having a high proportion of female VCT counselors in the facility is significantly associated with increased odds of male and female client initiated testing but each increase in VCT counselors' average age is associated with a decreased odds of 10 percent for both men and women.

How are these same facility and client factors, along with reason for testing, associated with client HIV infection risk? Do these factors differentially draw in HIV-positive clients for testing? As

shown in Table 5, VCT clients older than 25 years, ever-married and initiating HIV testing are two to four times significantly more likely to be HIV positive. Male clients coming to FGAE clinics with room- or counselor-level service integration are 64 percent and 24 percent less likely, respectively, to be HIV positive than those seen where HIV and FP services are co-located. Female clients seen at facilities with room-level integration are 44 percent significantly less likely to be HIV positive.

There are also several significant associations between the service capacity variables and HIV status. The range of available HIV services is not associated with VCT client risk, with the exception of a marginally significant negative association for women. In terms of family planning, the number of long term methods at the facility level is positively associated with seeing more HIV-positive clients. A history of serving many new family planning clients is negatively associated with attracting HIV-positive clients: each increase in the log of the facility's annual new family planning acceptors significantly reduces the odds of a male client testing HIV-positive by 38 percent and by 28 percent for women. A facility serving a large number of repeat family planning clients in the past is 1.44 times more likely to attract HIV-positive male clients and 1.55 times more likely for female clients, although the statistical significance of these adjusted odds ratios is marginal ($p<0.10$).

Each additional youth service is positively associated with an 8 percent increase in HIV infected men and 5 percent for women. By contrast, each increase in the number of services targeted for special populations is associated with a 40 percent decrease in the odds of a male client testing HIV-positive and a 29 percent decrease for female clients. VCT counselor characteristics demonstrate fewer significant associations with client HIV infection than they have with the other outcomes. Counselor work experience is slightly, positively associated with testing HIV-positive for men, while the facility's proportion of female VCT counselors is negatively associated with the likelihood of female clients being HIV-infected.

Discussion

The findings from this analysis suggest that structural, facility-level factors at RH clinics may differentially attract particular VCT client types. While room-level service integration attracts younger, never-married VCT clients, facilities offering counselor-level integration tend to serve older, married women. Young people may prefer the privacy that room-level integration affords to co-located services, where they are more likely to be recognized waiting for VCT services. Older, married women are those most likely to use family planning and thus may appreciate being able to access multiple services in one visit. Although counselor-level integration may increase client waiting times, older, married women may be willing to accept this cost for "one-stop shopping," while young people may prefer more streamlined VCT services.

Compared with co-located services, both room and counselor-level integration levels are positively associated with client-initiated HIV testing and negatively associated with these same clients being HIV-infected. This suggests that integrated services at RH clinics may appeal to clients from the general population who are motivated to learn their status, rather than only high risk clients. Importantly, the association between counselor-level integration and HIV status is not significant for women, as older, married women are more likely to attend facilities offering counselor-level integration, are highly motivated to learn their HIV status and also have very high HIV prevalence.

There were also notable associations between facilities' service capacity to provide HIV, family planning and other reproductive health services and the client demographic outcomes, as well as client motivation for testing and HIV status. Offering a wider range of HIV services at the facility-level is associated with serving VCT clients atypical for family planning services, relative to married, older women, but the number of HIV services is negatively associated with client self-initiated testing. Facilities offering HIV services, such as prescribing drugs for opportunistic infections and home-based care, may be more attractive to clients who are higher risk and referred for an HIV test, rather than self-initiating the test, but the number of HIV services may also reflect disproportionately less focus on RH services.

On the other hand, facilities offering extensive reproductive health services and those with more repeat family planning business are less likely to serve atypical family planning client types, relative to their mainstream clientele, i.e., older, ever-married women. Facilities with higher repeat family planning client loads are less likely to serve clients self-initiating their HIV test but more likely to see clients testing HIV-positive. We interpret this to mean these facilities most likely are long-standing reproductive health sites, which may appeal to older high-risk clients who are less likely than young people to initiate HIV testing and more likely to be HIV-positive. Accordingly, facilities with larger new family planning client loads are more likely to serve VCT clients who are younger, never-married, self-initiating their HIV test and HIV-negative.

In terms of counselor characteristics, sex and age were both differentially associated with client demographic type. The proportion of female counselors is positively associated with serving never-married men (younger and older) and self-initiated client testing. Average age of the facility's VCT counselors is negatively associated with both of these client types. Single men may feel more comfortable talking about HIV with younger counselors of the opposite sex, but this finding should be interpreted cautiously since many VCT clients are first time testers and thus may not be familiar with individual counselor attributes.

Although associations between VCT uptake and client HIV knowledge, psychosocial influences and perceived HIV risk are relatively well documented, few studies have examined VCT in terms of client preferences for service delivery. The studies exploring this issue corroborate our findings by elucidating general associations between facility and counselor characteristics and VCT readiness, acceptability and uptake (Bond et al., 2005; Cartoux et al., 1998a; Cartoux et al., 1998b; deGraft-Johnson et al., 2005; Perez et al., 2006; Westheimer et al., 2004; Worthington & Myers, 2002). For example, in a study examining HIV testing acceptance among pregnant women in Tanzania, recruitment site had a larger effect on testing acceptance than any client demographic characteristic. In this study, the recruitment site variable included such factors as individual counselor

factors, length of waiting time, size of facility catchment area and facility age, although these measures were not examined for their independent effects (Westheimer et al., 2004).

Facility-level factors may influence VCT uptake through a number of pathways. Previous acquaintance with health services and belief that medical care can influence the disease progression of HIV/AIDS may increase the probability that a client will seek VCT services (Bond et al., 2005; Perez et al., 2006; Sahlu et al., 1999). Associations between knowledge of an accessible HIV testing site and VCT uptake have also been documented (Cartoux et al., 1998a). Among a population-based sample in Malawi, knowledge of a testing site was associated with twice the odds of wanting to be tested among those never tested for HIV (de-Graft-Johnson et al., 2005). By locating HIV testing services within long-standing sexual and reproductive health facilities, FGAE is reaching a wide variety of client types who may trust the services due to prior experience in or knowledge of the facilities.

FGAE is reaching their typical maternal and child health client type – older, married women – with HIV testing services. The 34.2 percent HIV prevalence in this demographic group is alarming both in terms of women's health and the propensity for mother to child transmission of HIV among childbearing aged women. These clients, who are not typically targeted with VCT services, may have extensive unmet need for HIV care. A recent operations research study in Zimbabwe documented desire for HIV testing services at 79 percent among MCH clients. One hundred percent of these clients said they would be more likely to test for HIV if the services were co-located with their MCH services, citing convenience and confidentiality as the main reasons for preferring integrated service delivery (Hoke & Reuben, 2006).

Low education level and older age, combined with potentially low autonomy, make older, married women a particularly vulnerable group for undetected HIV infection. Among these FGAE clients, older, ever-married women are considerably less educated than their single counterparts; over 63 percent of never-married women report secondary education, compared to 38 percent of ever-married women. Low education level may be positively associated with HIV infection (Bradley et al.,

2006b; de Walque et al., 2005; Fontanet et al., 2000; Hargreaves & Glynn, 2002; Khongphatthanayothin et al., 2006; Kilian et al., 1999), but negatively associated with propensity to test for HIV (de-Graft-Johnson et al., 2005; Gage & Ali, 2005; Westheimer et al., 2004). Negative associations between older age and willingness to undergo VCT are also well documented (Fako, 2006; Fylkesnes & Siziya, 2004; Gage & Ali, 2005; Westheimer et al., 2004). Several studies have also cited women's need to seek partner permission or fear of partner reaction as major barriers to HIV testing (Cartoux et al., 1998b; Maman et al., 2001; Perez et al., 2006; Pool et al., 2001). The ability to confidentially seek HIV testing services within facilities they trust for MCH and other health services may help older, married women to overcome these barriers.

FGAE is also reaching single clients who are at risk for HIV infection, likely sexually active and therefore also at risk for unintended pregnancy. By attracting these "atypical" family planning client types to HIV testing services located within sexual and reproductive health service delivery points, FGAE may also be reaching these clients with family planning messages through integrated service delivery. Young, single people may find that they have greater anonymity for HIV testing at reproductive health clinics focusing on MCH services than at youth centers designed for this purpose, which may partially explain our finding that a greater number of youth services offered within the facility is actually associated with decreased odds that young men and women seek HIV testing services there. (Worthington & Myers, 2002).

This analysis is not without limitations. First, both client and facility-level data are largely cross-sectional, making it impossible to draw causal conclusions between facility and client characteristics. While the client data represent service statistics, the facility data are self-reported by facility managers. Also, FGAE VCT clients are not representative of the general Ethiopian population, in terms of demographic factors (Bradley et al., 2006b), and thus these results should be interpreted accordingly. All of the clinics in our sample are operated by the same NGO, which inhibits generalizing the findings to other types of RH or HIV service providing organizations. Last, the client

data are limited to VCT services, and facility-level analysis does not allow us to examine individual client usage of integrated services.

Resource-poor countries face major constraints in providing the needed range and configuration of health services, and structural integration may increase operational efficiencies. Capitalizing upon the attraction that non-profit private RH clinics have for different types of clients, it is possible to incorporate other sexual and reproductive health services to the benefit of new and different client types. With the feminization of the HIV epidemic, reaching more women and their partners through integrated HIV/RH services is a logical programmatic response and will extend coverage and care not otherwise accessible or obtained.

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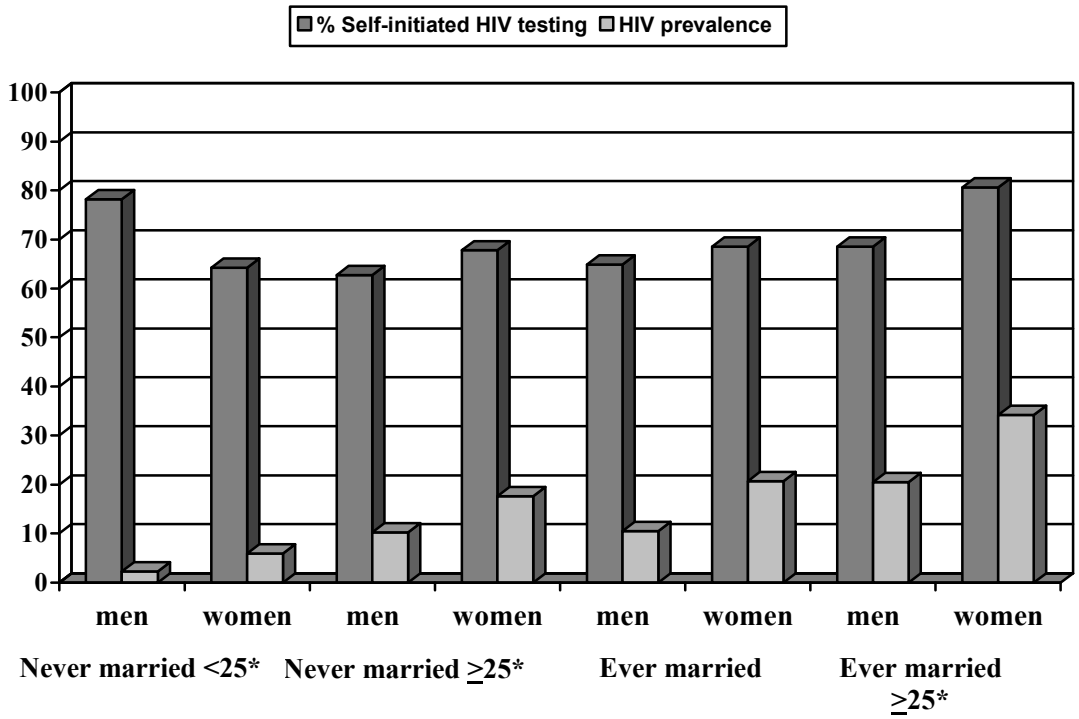
Figure 1. Reason for testing and HIV status by demographic group



*p<0.05 for differences in HIV prevalence within demographic category by sex

Table 1. VCT client characteristics by sex

Characteristic	Overall N=30,257	Men N=16,043	Women N=14,214
Age			
<25 years	60.3	49.1	73.0
≥25 years	39.7	50.9	27.0
Marital status			
Never married	73.5	77.4	69.1
Ever married	26.5	22.6	30.9
Religion			
Orthodox	64.8	63.0	66.9
Muslim	24.8	26.1	23.2
Protestant	10.4	10.9	9.9
Education level			
None	9.4	7.2	11.8
Primary	32.9	33.0	32.7
Secondary	41.6	39.2	44.4
> Secondary	16.1	20.6	11.1
Occupation			
Manual skilled	17.9	29.7	4.7
Manual unskilled	17.2	10.4	24.9
Professional	24.5	31.7	16.3
Unemployed	40.4	28.2	54.1
HIV prevalence	11.1	8.6	13.9
Reason for testing			
Situational	30.5	29.0	32.1
Self-initiated	69.5	71.0	67.9
Demographic group			
Never married <25	51.8	45.6	58.9
Never married ≥25	21.6	31.8	10.2
Ever married <25	18.1	3.4	14.2
Ever married ≥25	8.5	19.2	16.7

Table 2. VCT clinic characteristics and variable definitions (N=24)

Characteristic	Definition	Range	Mean (SD)
Integration			
Facility-level	HIV and family planning services are co-located in the same health facility	0-1	0.42 (0.5)
Room-level	HIV and family planning services are offered in the same rooms which are rotated weekly for confidentiality	0-1	0.17 (0.4)
Counselor-level	HIV and family planning services are offered by the same health provider simultaneously	0-1	0.42 (0.5)
HIV services			
Number of HIV services	Number of HIV services, apart from VCT, offered onsite. Services: information and education, prescribing drugs for opportunistic infections, home-based care, condom distribution box	0-4	2.5 (0.7)
VCT counselors' average age	VCT counselors' ages in years, averaged across facility	27-44	33.2 (4.1)
VCT counselors' average years of experience	Number of months VCT counselors have worked as counselors in current facility, averaged across facility	1-46	23.5 (11.2)
Proportion VCT counselors female	Proportion female VCT counselors in facility	0-1	0.70 (0.3)
Family planning services			
New family planning client load	Annual new family planning clients, averaged by facility from 2000-2002, logged for multivariate analysis	924.3 – 8,065.7	2,193.8 (1,654.6)
Repeat family planning client load	Annual repeat family planning clients, averaged by facility from 2000-2002, logged for multivariate analysis	1,538.7 – 32,888.7	6,128.3 (7,357.2)
Number of long term methods offered	Number of long term contraceptive services offered onsite. Services: Norplant, IUD, vasectomy, tubal ligation	0-4	2.3 (1.3)
Other reproductive health services			
Number of maternity services	Number of maternity services offered onsite. Services: antenatal care, safe delivery, postpartum care, tetanus immunization for mothers	0-4	1.8 (1.2)

Number of child health services	Number of child health services offered onsite. Services: immunization, child health	0-2	0.9 (0.9)
Number of pregnancy-related services	Number of pregnancy-related services offered onsite. Services: pregnancy testing, infertility management, post-abortion care	1-3	2.2 (0.8)
Number of services targeted for special populations	Number of onsite services targeted for special populations. Special populations: unmarried people, men	0-2	0.5 (0.7)
Number of youth services	Number of youth friendly services offered onsite. Services: library, sports, computers, movies, peer education, IEC sessions, anti-AIDS clubs, girls' clubs, drama clubs, music clubs, sexually transmitted infection management, general health	0-12	8.5 (3.5)
Control variables			
Town population (logged)	Population in town where facility is located, logged	10.3 – 14.9	11.9 (1.2)
Facility catchment population (logged)	Facility's catchment population, logged	5.1 – 14.1	11.6 (1.6)
Age of facility	Number of months since facility opened	7-147	90.8 (36.4)
Duration facility offering VCT	Number of months since facility began offering VCT services	10-40	27.5 (9.7)

Table 3. Results from multivariate logistic regression of clinic and client characteristics on likelihood of being in client demographic group

Clinic characteristic	Model I Never married men <25 years	Model II Never married men 25+ years	Model III Ever married men 25+ years	Model IV Never married women <25 years	Model V Ever married <25 years and never married women 25+ years
N	9,690	7,476	5,454	10,746	6,387
Integration					
Facility-level	1.00	1.00	1.00	1.00	1.00
Room-level	13.36**	2.47**	2.02**	6.39**	3.24**
Counselor-level	0.91	0.77**	0.86	0.81**	0.89
HIV services					
Number of HIV/AIDS services	1.54**	1.61**	1.27**	1.61**	1.24**
VCT counselors' average age	0.90**	0.92**	1.01	0.96**	0.98
VCT counselors' average Number of months experience in current VCT facility	0.98**	1.00	1.00	0.99**	1.00
Proportion VCT counselors female	1.94**	1.72**	1.18	0.89	1.28
Family planning services					
Average number of new family planning clients, 2000-2002	1.54**	1.39*	1.38	2.50**	1.87**
Average number of repeat family planning clients, 2000-2002	0.37**	0.65**	0.74	0.30**	0.37**
Number of long term methods	1.03	1.36**	1.45**	0.81**	1.08
Other reproductive health services					
Number of maternity services	0.89**	1.01	0.87*	0.99	1.17**
Number of child health services	0.79**	0.91	1.23**	0.73**	0.73**
Number of pregnancy-related services	0.49**	0.62**	0.68**	0.59**	0.51**
Number of services targeted for special populations	1.18	0.60**	0.63**	1.08	0.85
Number of youth services	0.80**	0.89**	0.93**	0.83**	0.90**

Each model's sample includes client demographic and reference groups (ever married women aged 25 or older)
Models adjusted for town population size (logged), catchment population size (logged), number of months since facility opened, number of months since facility began offering VCT services and client education, occupation and religion
**p<.05, *p<0.10

Table 4. Adjusted odd ratios from multivariate logistic regression of clinic and client characteristics on reason for testing (self-initiated testing=1): Male and female VCT clients

Variables	Men (N=16,043)	Women (N=14,214)
Client characteristics		
< 25 years	1.00	1.00
≥ 25 years	0.69**	1.17**
Never married	1.00	1.00
Ever married	1.67**	2.26**
Integration		
Facility-level	1.00	1.00
Room-level	4.32**	7.24**
Counselor-level	1.95**	1.91**
HIV services		
Number of HIV/AIDS services	0.83**	0.84**
VCT counselors' average age	0.90**	0.90**
VCT counselors' average number of months experience in current VCT facility	1.01*	1.00
Proportion female VCT counselors	2.77**	1.86**
Family planning services		
Average number of new family planning clients 2000-2002 (logged)	0.97	1.44**
Average number of repeat family planning clients 2000-2002 (logged)	0.61**	0.42**
Number of long term methods	0.59**	0.50**
Other reproductive health services		
Number of maternity services	1.13**	1.15**
Number of child health services	1.00	0.94
Number of pregnancy-related services	1.02	0.92
Number of services targeted for special populations	3.70**	4.79**
Number of youth services	0.91**	0.91**

Models adjusted for town population size (logged), catchment population size (logged), number of months since facility opened, number of months since facility began offering VCT services, client education level, client occupation and client religion

**p<0.05, *p<0.10

Table 5. Results from multivariate logistic regression of clinic and client characteristics on HIV status: Male and female VCT clients

Variables	Men (N=16,043)	Women (N=14,214)
Client Characteristics		
< 25 years	1.00	1.00
> 25 years	4.40**	2.36**
Never married	1.00	1.00
Ever married	2.25**	2.39**
Situational HIV testing	1.00	1.00
Self-initiated HIV testing	2.25**	2.99**
Integration		
Facility-level	1.00	1.00
Room-level	0.36**	0.56**
Counselor-level	0.76**	1.1
HIV services		
Number of HIV/AIDS services	1.22	0.85*
VCT counselors' average age	1.00	1.01
VCT counselors' average number of months experience in current VCT facility	1.02**	1.01*
Proportion VCT counselors female	1.46	0.67**
Family planning services		
Average number of new family planning clients 2000-2002 (logged)	0.62**	0.72**
Average number of repeat family planning clients 2000-2002 (logged)	1.57*	1.29*
Number of long term methods	1.25*	1.24**
Other reproductive health services		
Number of maternity services	1.02	0.97
Number of child health services	1.02	1.00
Number of pregnancy-related services	1.44**	1.55**
Number of services targeted for special populations	0.60**	0.71**
Number of youth services	1.08**	1.05**

Models adjusted for town population size (logged), catchment population size (logged), number of months facility opened, number of months since facility began offering VCT services, client education level, client occupation and client religion
**p<0.05, *p<0.10