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An Exploration of Factors Increasing Male Involvement in Couples' HIV Testing in Malawi

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AN EXPLORATION OF FACTORS INCREASING MALE INVOLVEMENT IN COUPLES' HIV TESTING IN MALAWI

by
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ABSTRACT
MARY MARGARET PETERSON: An Exploration of Factors Predicting Male Involvement in Couples' HIV Testing in Malawi
(Under the direction of Laura Johnson)

Each year HIV is responsible for approximately 75,000 deaths in Malawi and for creating 550,000 (75%) of Malawi's orphans (UNdata, 2006). UNAIDS and the World Health Organization recommend HIV testing as an important measure in preventing transmission to future sexual partners and children. However, only 20% of Malawians aged 15 years and above had ever participated in HIV testing (Machinjili, 2006, p.13). Heterosexual contact is the primary mode of HIV transmission and is responsible for 90% of Malawi's HIV infections, making couples an important target for testing (Zanera & Miteka, 2004, p.185). In Malawi, 93% of pregnant women receive antenatal care, making this a significant healthcare entry point for HIV testing (Zanera & Miteka, 2004, p.133). Malawian men are not traditionally involved in seeking family healthcare. Acceptance of male involvement in reproductive health programs remains low despite Malawi's male championship initiative recently introduced to antenatal clinics (Republic of Malawi, 2007, p.71).

This study seeks to better understand how to increase male involvement in HIV testing by exploring the relative roles of socio-demographic characteristics, contextual factors and culturally congruent interventions in predicting male testing in antenatal clinics. Culturally congruent interventions including personalized male invitation letters,

individual encouragement, and specialized male recruitment were implemented in four antenatal clinics in Lilongwe, Malawi across a five month time period. These clinics varied in degree of urbanization and degree of cultural congruency of layout. Through the duration of the five month study, male involvement increased from 0.38% to 3.79%. Findings indicate that the interventions were correlated with an increase in access of couples' HIV testing. Combinations of interventions as well as the total number of interventions a woman received were found to be a major factor in successful male recruitment. The degree of cultural congruency and urbanization of each clinic was also found to be a significant factor. The socio-demographic characteristic of gestation in weeks was found to be significant. The relative success of these interventions suggests that further research should be conducted to increase male involvement using similar strategies and taking into consideration contextual and socio-demographic factors found significant in this study.

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LIST OF ABBREVIATIONS

ABCCC	African Bible College Community Clinic
AIDS	Acquired Immunodeficiency Syndrome
ANC	antenatal Clinic
ART	antiretroviral therapy
ARV	antiretroviral
CD4	cluster of differentiation 4
CDC	Center for Disease Control
CHCT	couples' HIV counseling and testing
COM	Malawi College of Medicine
FHI	Family Health International
HIV	Human Immunodeficiency Virus
KCH	Kamuzu Central Hospital
MACRO	Malawi AIDS Counselling and Resource Organization
MoHP	Malawi Ministry of Health and Population
NAC	National AIDS Commission of Malawi
NGO	non-governmental organization
PMTCT	prevention of mother to child transmission
STD	sexually transmitted disease
STI	sexually transmitted infection
TB	tuberculosis

UNAIDS	Joint United Nations Programme on HIV/AIDS
UNC	University of North Carolina
U5	under five
VCT	voluntary counseling and testing
WHO	World Health Organization

INTRODUCTION

According to the UNAIDS 2008 Report on the Global AIDS Epidemic, 33 million people were living with human immunodeficiency virus (HIV), 2.7 million became infected with HIV, and 2 million died of HIV-related causes in the year 2007 alone (UNAIDS, 2008, p.16). Since its discovery in 1985, HIV has been responsible for an estimated 25 million deaths throughout the world (UNAIDS, 2008, p.31). Sub-Saharan Africa accounts for 67% of all HIV infections and 75% of HIV-related deaths worldwide. As a sub-Saharan African country, Malawi remains devastated by the growing epidemic. The prevalence of HIV in Malawi's adult population (15-49 years) is estimated to be 14% with a range of 18% in urban areas to 11% in rural areas (UNAIDS/World Health Organization, 2007, p.7). HIV is responsible for approximately 75,000 deaths per year in Malawi and for creating 550,000 (75%) of Malawi's orphans (UNdata, 2006).

UNAIDS, The Joint United Nations Programme on human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), and the World Health Organization (WHO) recommend HIV testing as an important measure in preventing transmission to future sexual partners and children. However, many people avoid testing because they fear the associated stigmatization and discrimination. Only 20% of Malawians aged 15 years and above had ever participated in voluntary counseling and testing (VCT) for HIV (Machinjili, 2006, p.13). Heterosexual contact is the primary mode of HIV transmission and is responsible for 90% of Malawi's HIV infections,

making couples an important target for VCT (Zanera & Miteka, 2004, p.185). In Malawi, 93% of pregnant women receive antenatal care, making this a significant healthcare entry point for individual and couples' VCT (Zanera & Miteka, 2004, p.133). Malawian men are not traditionally involved in seeking family healthcare. Acceptance of male involvement in reproductive health programs remains low despite Malawi's male championship initiative recently introduced to antenatal clinics (Republic of Malawi, 2007, p.71).

There are many cultural and economic barriers preventing couples from seeking couples' HIV counseling and testing (CHCT) offered at antenatal clinics. These include stigma associated with HIV, fear of the consequences of status disclosure, the inappropriateness of male involvement in maternal health, lack of time and money required for transportation, and lack of adequate staff and supplies at the antenatal clinics (Allen et al., 2007, p.8). Promotion of couples' HIV counseling and testing is a relatively new introduction to Malawian culture and it is important to test suggested methods for effective recruitment and education. Given the extensive barriers related to culture and context, determining characteristics and methods that successfully recruit couples for testing is vital to the future of CHCT and to countries such as Malawi that have been devastated by the HIV epidemic. This study seeks to better understand how to increase male involvement in testing by exploring the relative roles of socio-demographic characteristics, contextual factors and male-targeted interventions in predicting male testing.

BACKGROUND

Malawi

Malawi is a developing country in Sub-Saharan Africa, bordered by Zambia, Tanzania, and Mozambique. Malawi is landlocked, covering 118,484 square kilometers, 20% of which are contained by Lake Malawi. The country has an estimated population of 12.3 million and is divided into three regions, North, Central, and South. These regions are further divided into a total of 28 districts, which are subdivided into Traditional Authorities. The Traditional Authorities, presided over by chiefs, are comprised of villages with each village presided over by a village headman. The capital city, Lilongwe, is located in Malawi's Central region. The Malawi Population and Housing Census conducted in 1998 reported that 87% of Malawians live in rural areas (Machinjili, 2006, p.3). Almost half of Malawians are under the age of 15 (47%). Among these, 12% (738,000) are orphans (Machinjili, 2006, p.8). Agriculture is Malawi's primary occupation, 90%, followed by industry and service occupations, 10% (CIA, 2008). Malawi's main export commodities include tobacco, tea, and sugar. Fifty-three percent of Malawians have an income below the poverty level and the literacy rate is 62.7% for the total population with the percentage of literate women much lower than that of men (CIA, 2008). Malawi was a British Protectorate from 1891 until it gained independence in July 1964 and is currently a multiparty state with three main parties,

Alliance for Democracy, Malawi Congress Party, and Democratic Progressive Party which is the current ruling party (Microsoft® Encarta® Online Encyclopedia, 2008).

HIV Epidemic

According to the UNAIDS 2008 Report on the Global AIDS Epidemic, 33 million people were living with HIV, 2.7 million became infected with HIV, and 2 million died of HIV-related causes in the year 2007 alone (UNAIDS, 2008, p.16). The number of children under the age of 15 years infected with HIV globally increased from 1.6 million in 2001 to 2 million in 2007. Ninety percent of these infected children live in sub-Saharan Africa. Women account for 60% of HIV infections in sub-Saharan Africa (UNAIDS, 2008, p.33). However, recently collected data suggests that in 14 African countries, the percentage of HIV-positive pregnant women aged 15-24 has declined since 2001 (UNAIDS, 2008, p.30). Sub-Saharan Africa accounts for 67% of all HIV infections and 75% of HIV-related deaths worldwide. Since its discovery in 1985, HIV has been responsible for an estimated 25 million deaths throughout the world (UNAIDS, 2008, p.31).

As a sub-Saharan African country, Malawi remains devastated by the growing epidemic, despite the efforts of organizations such as UNAIDS and numerous non-governmental organizations (NGOs) to provide treatment and increase awareness of HIV. The prevalence of HIV in Malawi's adult population (15-49 years) is estimated to be 14% with a range of 18% in urban areas to 11% in rural areas (UNAIDS/World Health Organization, 2007, p.7). HIV is responsible for approximately 75,000 deaths per year in Malawi (UNdata, 2005). Although this number may seem comparatively small, it is responsible for creating 550,000 (75%) of Malawi's orphans to date (UNdata, 2005). The

UNAIDS/WHO's most recent update on the AIDS epidemic in Malawi reported that comprehensive knowledge about HIV is very low (UNAIDS/World Health Organization, 2007, p.7). Knowledge of the existence of HIV is almost universal throughout Malawi. However, only one in three adult men (39%) and one in five adult women (22%) were able to recall two ways of preventing infection and held no major misconceptions about the virus (Zanera & Miteka, 2004, p.191). An increase in public education on subjects such as the modes of transmission and the importance of testing for HIV are key steps to curving the deadly epidemic.

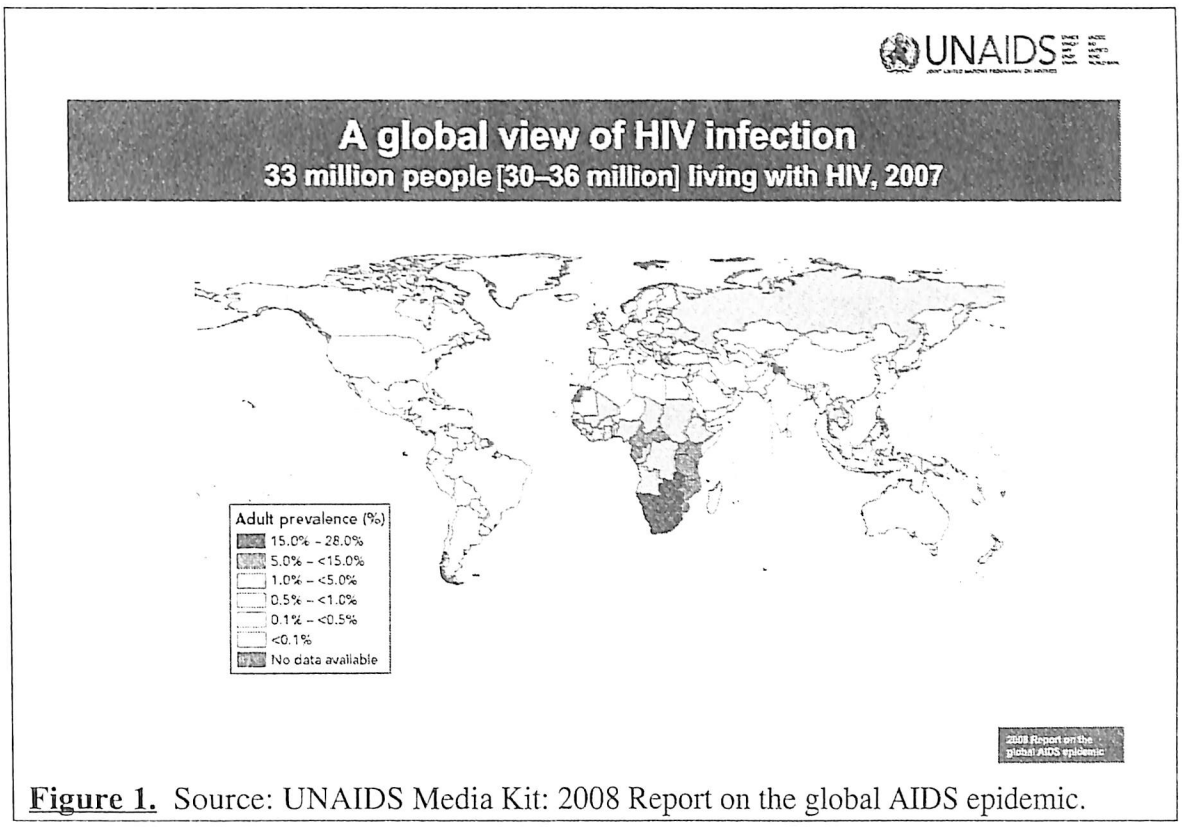

Figure 1. Source: UNAIDS Media Kit: 2008 Report on the global AIDS epidemic.

Importance of HIV Testing

UNAIDS and the WHO recommend testing for HIV as an important measure in preventing transmission to future sexual partners or children. Awareness of HIV

serostatus allows individuals to seek needed healthcare necessary for improving and extending life. Counseling is instrumental in reducing risk behavior. Open discussion of HIV status facilitates long-term changes in sexual behavior to prevent HIV transmission. Counseling also provides knowledge and encourages communication skills that are beneficial to future decision making, such as condom use and limiting the number of sexual partners. Counseling and testing for HIV is promoted in settings such as antenatal clinics, premarital counseling, and specialized HIV testing centers (UNAIDS, 2001, p.15). HIV counseling and testing provide numerous benefits for recipients, yet many who fall into what are considered high risk groups do not seek testing. This is attributed to several common reasons such as a lack of self-perceived risk, an inadequate supply of testing materials and trained personnel, as well as limited access to testing facilities (Jereni & Muula, 2008).

HIV testing facilities in Malawi. Awareness of HIV status and education gained from counseling enables individuals to make necessary decisions to increase safer sex practices and therefore reduce the risk of contracting HIV (Zanera, Miteka, 2004, p.202). Only 20% of Malawians aged 15 years and above had ever participated in voluntary counseling and testing for HIV by the year 2006 (Machinjili, 2006, p.13). In an effort to increase accessibility of HIV VCT for all of its citizens, Malawi's Ministry of Health and Population (MoHP) works hand in hand with many NGOs including the National AIDS Commission of Malawi (NAC), Family Health International (FHI), Malawi AIDS Counselling [*sic*] and Resource Organization (MACRO), UNAIDS, and several local healthcare providers such as Partners in Hope and African Bible College Community Clinic (ABCCC) in Lilongwe.

MACRO operates one large HIV VCT center in Lilongwe and sends monthly mobile clinics to rural areas that otherwise would not have access to HIV testing. MACRO targets clients aged 10-49 years and the demand for their services has increased dramatically from 21,411 in 2000 to more than 40,000 in 2001 (USAID/Umoyo network, 2002). MoHP funds a program, The Lighthouse Trust, which provides VCT, Antiretroviral Therapy (ART), and follow-up healthcare and support for HIV-positive patients (Phiri, Weigel, Housseinipour, Boxshall, Neuhann, 2003, p.2). Despite the presence of HIV testing facilities, 80% of Malawians have not participated in VCT. This large number can be attributed to the lack of adequate services provided in many facilities as a result of understaffing and lack of supplies. Due to ominous cultural and logistical constraints, accessing HIV VCT services requires strong personal motivation.

Motivation for testing. There are several notable motivations for accessing HIV VCT. A recent study conducted in Blantyre, Malawi, surveyed clients' motivations for attending HIV VCT at six public health centers. The primary reason for seeking VCT was reported to be recent information about HIV. The second most prominent motivation was feeling unwell/illness. Twenty-three percent of those interviewed held the opinion that an HIV test was necessary only once they began to feel ill for extended periods of time. Perception of own risk followed closely as the motivation for testing for 16% of the study population (Jereni & Muula, 2008, p.19). Relying solely on perception of own risk is not an adequate measure in determining when to access VCT. Often, self-evaluation of perceived risk is misguided and highly inaccurate. Those who perceived themselves as having a zero risk lifestyle in a 2003 study were actually determined to be at a medium-level risk after close evaluation (Klein, Elifson, & Sterk, 2003, p.47).

Motivation for participation in HIV VCT varies and often these motivations are overshadowed by fear of discrimination and stigma traditionally attached to HIV.

Stigma and discrimination. The stigma and discrimination associated with HIV in Malawi is a product of the culture's collectivist nature. In his book *Individualism and Collectivism (New Direction in Social Psychology)*, Harry Triandis noted that collectivism is very strongly present in Africa (p.143). Triandis also emphasized that outgroups, groups that are harmful in some way or groups that disagree on valued attributes, are likely to be mistreated in collectivist cultures, stating examples such as the Nazi Holocaust in 1940-1945 and the ethnic cleansing in Bosnia in 1991-1994 (Triandis, 1995, p.28). Those associated with HIV are members of an outgroup in Malawi's collectivist culture due to the fact that HIV is incurable, fatal and most often considered to be the result of immoral behavior.

Many people avoid testing because they fear the stigmatization and discrimination they will endure if found to be HIV-positive. This stigmatization and discrimination is deeply rooted in Malawi's culture. President Hastings Kamuzu Banda, who ruled in Malawi from 1964 to 1994, paid little attention to the growing HIV epidemic in Malawi, even going as far as banding public discussion of sexual matters, causing HIV/AIDS to become a taboo subject for all Malawians (AVERTing HIV and AIDS, 2009). Historically, HIV has been predominately associated with immoral and socially unacceptable behaviors such as sex work, adultery, and injection drug use. Intolerance and ignorance are two main reasons HIV infection has been so widely stigmatized. As a result of stigmatization and discrimination many who are HIV-positive have been rejected by family and friends, some losing jobs, homes, and even their lives. Fear of the

stigma that is attached to HIV prevents individuals from accessing VCT and also inhibits those who know they are HIV-positive from seeking treatment or disclosing their status (UNAIDS, October 2008).

Recent research has suggested that the stigma associated with HIV can be reduced through community-based information and counseling (Brown, Trujillo, & Macintyre, 2001, p.1). It has also been suggested that normalizing HIV/AIDS as well as HIV testing holds the key to reducing stigma in Malawi. Achievement of this normalization will require sensitizing and familiarizing communities to HIV/AIDS through outreach education sessions. Mediums through which the education sessions are conducted include radio, television, newspapers, and local forums aimed at informing the public of the importance of HIV testing and explaining the rationale of routine testing in settings such as antenatal clinics. To be most effective, these forums include audience participation, interactive learning, and open dialogue (Thorsen, Sundby, & Martinson, 2008, p.47). In Malawi, antenatal clinics are a major healthcare arena in which these culturally congruent methods of HIV normalization through education are being introduced.

Antenatal Clinics in Malawi

Worldwide, antenatal clinics are the main entry point for preventing children from acquiring HIV (Thorsen et al, 2008, p.44). Malawi's Ministry of Health and Population (MoHP) reported an average of 6 births per woman in 2004 with a median age at first birth of 19 years (Zanera & Miteka, 2004, p.65). Forty-five percent of births in Malawi's Central region take place in a setting other than a health center, clinic, or hospital and only 6% of deliveries were attend by a doctor or clinical officer (Machinjili, 2006, p.31).

Although many deliveries may not take place in a medical facility, antenatal clinics are a major component of Malawi's healthcare system and provide desperately needed education and health services for pregnant women. Malawi's MoHP recommends that women attend a minimum of four ANC visits throughout each pregnancy with the first visit preferably taking place during the first trimester. Only 57% of women meet the MoHP recommendation of four visits before delivery (Zanera & Miteka, 2004, p.133).

Women of all ages attend antenatal clinics where their general health status as well as the health status of their unborn or newborn child is monitored and the mothers are given information about pregnancy, labor and delivery, and how to care for newborn and young children. With informed consent, the women who attend ANC are tested for HIV and those who have positive test results are enrolled in a program to monitor the mother's health status and implement precautions that lower the chance of HIV transmission from the mother to the child (Thorsen et al, 2008, p.44). This program is referred to as prevention of mother to child transmission (PMTCT) and the number of Malawian women using the available PMTCT services has risen from 5,000 in 2002 to 53,000 in 2005 (Zanerea & Miteka, 2007, p.191).

Antenatal clinics not only provide an opportunity for PMTCT, but also for monitoring the nation's HIV status. UNAIDS has calculated the incidence of HIV infection in a country's population to be 20% lower than that of the country's antenatal clinic attendees (UNAIDS, 2008, p.32). In Lilongwe, the National Aids Commission of Malawi reported a 19% HIV prevalence among women using antenatal services in 2005 (UNAIDS/World Health Organization, 2007, p.7). Antenatal clinics also provide postnatal care for new mothers. The MoHP recommends that all mothers and children

receive a postnatal checkup by the forty-second day following delivery. However, in 2004 only 31.2% of women utilized this service (Zanerea & Miteka, 2004, p.145). In Malawi, 93% of pregnant women receive antenatal care, making this an important healthcare entry point for HIV VCT as well as the prevention of HIV transmission (Zanera & Miteka, 2004, p.133).

The University of North Carolina (UNC) Project in Lilongwe operates numerous clinical care programs and research studies. For example, the UNC Project provides PMTCT services to over 20,000 women per year at four of Lilongwe's antenatal clinics (Bwaila Hospital, District Health Centres in Area 25, Area 18, and Kawale) accounting for approximately half of all PMTCT services offered in Malawi. Data indicate that 98% of women who attend antenatal clinic accept HIV testing (UNC Project, 2008). Although the women tested have the advantage of knowing their status and knowledge from the counseling, they are still at risk and are putting their family at risk of HIV infection if they do not know the status of their partner.

Couples' HIV Counseling and Testing

Heterosexual contact is the primary mode of HIV transmission and is responsible for 90% of HIV infections in Malawi (Zanera & Miteka, 2004, p.185). Data suggests that 10% of Malawian couples are discordant, meaning that one partner is HIV-positive and the other is HIV-negative (Princeton University, Office of Population Research, 2007, p.3). Previous studies have shown high rates of HIV transmission between discordant couples who are often in a stable relationship, but are unaware of either partner's HIV serostatus. Couples with knowledge of their discordant status were three times more likely to practice safe sex including an increased use of condoms and spermicides (Allen

et al., 1992, p.1608). In 2007, a study of discordance among couples who participated in HIV counseling and testing was conducted at 12 sites in Eastern and Southern Africa. This study discovered across all sites that for couples in which at least one partner was infected with HIV, 49% were HIV discordant, leading to the conclusion that HIV discordant couples are an important target for HIV prevention, given that high rates of HIV transmission exist between couples that do not know or are afraid to disclose their HIV status (Lingappa, 2008, p.e1411).

Many couples are not aware of their HIV status. Individuals accessing HIV VCT may opt against disclosing test results to their partners. In a recent study conducted in Tanzania, it was found that HIV serostatus strongly influenced an individual's decision to share results with his or her partner. Disclosing an HIV-positive status to a partner can lead to rejection and violence. The study asked women to explain the consequences of disclosing an HIV-positive status to a male partner. One woman replied, "If a woman tells the man she tested and has the virus most men will say, 'That AIDS, you got it where? There where you got your AIDS go back there.'" Another woman cited her own negative experience saying, "When I informed him of the results there was endless violence in the house" (Maman, Mbwambo, Hogan, Kilonzo, & Sweat, 2001, p.599). Although disclosure from HIV-positive men does not make them prone to physical abuse, men are faced with fear of rejection by their partner, extended family, and friends. Maman et al. also found that community-based efforts and education are necessary to improve women's limited capacity to initiate responsible and preventative health behaviors, such as HIV testing (Maman et al., 2001, p.601).

Male involvement. Malawian men are not traditionally involved in seeking family healthcare. If a man is ill, he will seek care from a health center or hospital without consulting his partner. However, the woman must first receive permission from her partner before seeking healthcare for herself or her children (Maman et al., 2001, p.598). If she is granted permission, seeking the care is then wholly her responsibility. Malawi's most recent report to UNAIDS stated that community education is increasing male involvement. Acceptance of male involvement in reproductive health programs is increasing as Malawi's MoHP male championship initiative is increasingly introduced through antenatal clinics and PMTCT programs. The male championship program utilizes community organizations as well as newspapers and radio programs to broadcast educational information concerning the importance of male involvement in reproductive health (Republic of Malawi, 2007, p.71).

Recruitment for couples' HIV testing. Promotion of couples' HIV VCT (CHCT) for HIV was recently studied in Kigali, Rwanda and Lusaka, Zambia. Fourteen percent of couples invited accessed CHCT. Predictors for successful invitations were slightly different in the two countries. In Zambia, couples were more likely to seek CHCT after receiving an invitation in their home compared to receiving the invitation at a community reference group. In both countries there was a higher response rate when invitations were delivered following public endorsement of CHCT. Also, it is important to note that invitations given to couples who were personally known by the person distributing the invitation produced substantially higher response rates (Allen et al., 2007, p.7).

The Centers for Disease Control and Prevention (CDC) published a manual in 2007 for most efficient recruitment of couples. The manual also provides training

guidance for local community leaders and peer educators. Suggested methods for recruitment include community outreach, door-to-door outreach, media outreach, outreach through antenatal clinics and PMTCT programs, and outreach in the workplace. Community outreach involves recruiting and training influential community members and leaders. Community outreach can also be achieved through fictional dramas that portray stories about CHCT in order to increase acceptance of CHCT in the community. Dramas also assist couples by creating role models, initiating discussions, reinforcing key messages, and providing motivation for testing and behavioral changes. Antenatal clinic staff can encourage women to bring their partners to access CHCT. Personalized letters sent home with the women to invite couples are also successful recruitment tools. Outreach methods directly targeted to men, such as workplace outreach, are important because men are predominately the decision makers for the family (Centers for Disease Control and Prevention, 2007, p.93). Media outreach has been the least successful method and the suggestion follows that media outreach be combined with other strategies to be most effective. The uptake of CHCT services is dependent upon a variety of factors, many of which are beyond the control of the CHCT service itself (UNAIDS, 2001, p.59).

Cultural barriers. There are many cultural barriers preventing couples from seeking CHCT offered at antenatal clinics. These include, but are not limited to, the stigma that is attached to HIV, fear of the consequences of status disclosure, and the inappropriateness of male involvement in maternal health. Fear of stigma is common among couples and data shows that women tested for HIV at antenatal clinics have the lowest rates of disclosure (16.7%-32%) when compared to an estimated average rate of

disclosure of 49% (World Health Organization, 2004, p.2). In regards to male involvement in maternal health, antenatal clinics face two major challenges. A cultural stigma is attached to men who are seen entering a building traditionally labeled as permissible only for women to visit (Thorsen et al, 2008, p.49). Along with this cultural stigma is the discomfort caused to the men by large crowds of women and young children waiting to be seen in the clinic. The men feel a substantial amount of discomfort because such close proximity to a large number of women and children is a culturally unacceptable action.

Economic barriers. There are many economic barriers preventing participation in CHCT. Among married couples, lack of time and money required for transportation often prove to be insurmountable barriers (Allen et al., 2007, p.8). More than half of all Malawians have an income lower than the poverty level (CIA, 2008). This constraint leaves little time and funds for activities other than work. Antenatal clinics also face economic barriers such as limited availability of staff trained to lead CHCT sessions. Providing CHCT requires more time than individual VCT due to the need for addressing relational issues and concerns, such as stigma or violence. Antenatal clinics are often understaffed making it difficult for the existing staff to spend additional time counseling couples or undergoing training for CHCT (Lingappa et al., 2008, p.e1411). Although many cultural and economic barriers currently exist, participation in CHCT is vital to preventing HIV transmission between discordant couples.

Current Study

Rationale. The HIV epidemic is overwhelming sub-Saharan Africa. Workforce depletion and thousands of orphaned children are a result of the epidemic in developing

countries such as Malawi (Machinjili, 2006, p.8). Voluntary counseling and testing programs have been designed to inform individuals of their HIV-status and to educate the individuals on how to prevent HIV transmission. Although participation in voluntary counseling and testing has improved the lives of many Malawians, only a small portion of the total population has accessed VCT (Machinjili, 2006, p.13). Heterosexual contact is the leading cause of HIV transmission, making couples an important target for VCT (Zanera & Miteka, 2004, p.185). Prevention of mother-to-child transmission programs offered by antenatal clinics provide VCT for thousands of women each year and have been selectively chosen for CHCT promotion in Lilongwe, Malawi. Promotion of couples' HIV counseling and testing is a relatively new introduction into Malawian culture and it is important to test suggested methods for effective recruitment and education. Determining characteristics and methods that successfully recruit couples is vital to the future of CHCT. A 2004 assessment of couples attending VCT in Lilongwe, Malawi primarily targeted men for CHCT recruitment through workplace outreach and education. Over 14 months, only 120 couples accessed VCT (Masingi et al., 2004, ThPeD7776).

Goals and objectives. Previous studies in countries surrounding Malawi have provided information for the compilation of a CHCT recruitment manual. The manual includes several suggestions for effective CHCT recruitment such as community outreach and outreach through antenatal clinics and PMTCT programs (Centers for Disease Control and Prevention, 2007, p.93). The goal of this study was to analyze the success of suggested CHCT recruitment interventions including community sensitizations, personal invitation letters, and individual encouragement when CHCT services are offered in

combination with the male championship program at antenatal clinics. Due to previously discovered low recruitment outcomes following workplace outreach this intervention was not included in the study. This study sought to determine the suggested interventions that best overcame existing cultural and economic barriers as well as the extent of influence each antenatal clinic's setting factors contributed to men's decisions to attend CHCT with their partners. Analysis provides data and suggestions for improvement of current interventions and formulation of future interventions. IRB approval was granted by the University of Mississippi for analysis of the data. See APPENDIX A-5 for a copy of the notification of approval letter.

Hypotheses. This study was discovery-oriented, as no previous studies have analyzed the outlined CHCT recruitment interventions in antenatal clinics in Lilongwe, Malawi. Hypotheses were proposed to explore socio-demographic characteristics of antenatal clinic attendees who brought partners for CHCT, characteristics of antenatal clinics that received the largest numbers of CHCT clients, and recruitment intervention outcomes. This study tested the following seven hypotheses:

H1: The number of couples accessing couples' HIV counseling and testing services offered at antenatal clinics will increase over time as programmatic efforts are introduced through the clinics.

H2: Socio-demographic characteristics of women, including age, marital status, parity, and HIV status will be associated with use of couples' HIV counseling and testing.

H3: There will be differences in rates of male involvement in testing based on setting characteristics of antenatal clinics, such as whether they are rural or urban, and how conducive the clinic layout is to male testing.

H4: Different intervention methods encouraging male involvement will be associated with increased male involvement in testing.

H5: Differences will be found in rates of male participation based on type of intervention received, with a combination of individual encouragement and specialized male recruitment being more strongly associated with participation.

H6: A higher number of interventions received will be associated with increased rates of participation in CHCT.

H7: In a model predicting male involvement in CHCT, interventions and the degree to which a clinic's layout is culturally conducive to male patients will account for more variance than socio-demographic characteristics of women and the clinic's degree of urbanization.

METHODS

Study Setting

Lilongwe. The study took place in Malawi's capital city Lilongwe. Lilongwe has a calculated population of 866,272 (World Gazetteer, 2008). Lilongwe is a bustling city, continually growing as rural villagers and orphans seek work and opportunities in the city. Twelve percent of Malawi's population lives in urban areas. Only 26% of urban residents are aged 50 and over compared to rural residents, 42% of whom are aged 50 and over. Malawi's Ministry of Health and Population oversees one central hospital, Kamuzu Central Hospital, four smaller hospitals, and thirty health centers in the Lilongwe area (Ministry of Health, 2008). Four antenatal clinics were chosen as the setting for this study. The antenatal clinics were located at Bwaila Hospital and the District Health Centres in Kawale, Area 18, and Area 25. Although most departments of the health centers were staffed by MoHP nurses, each antenatal clinic chosen for this study had existing PMTCT and antenatal care programs staffed by nurse employees of UNC Project. The nurses work in the clinic nearest to their home to lower transportation costs. The same nurses work at each clinic every day.

Every morning upon opening of the clinics before the first patient is seen, each health center and hospital conducts a large group "health talk" lead by the nurses. These health talks are designed to educate the clients on basic health issues such as the importance of HIV testing and family planning. Once the nurses are ready to see clients,

the women are shuffled from one room to the next to have vitals, health history, and HIV tests taken. All of these results are recorded in a small yellow booklet which is a government issued "health passport." Each woman is responsible for bringing her health passport and those of her children to every health center and hospital visit. Newborns are issued a health passport at delivery. The antenatal clinics use rapid HIV testing and the women are informed of their status before leaving the clinic. This process can take several hours and usually requires a full day commitment from the clients. The antenatal clinics are open Monday through Friday 7:30 AM to 4:30 PM. Each antenatal clinic has a unique setting and encounters unique cultural and economic barriers to male involvement.

Area 25 District Health Centre. The Area 25 District Health Centre is located in a rural setting and most patients who attend the Area 25 health center reside in rural villages just outside of Lilongwe. The women who attend antenatal clinic here are escorted to the health center by their male partners who then continue into the city for business. The men make this journey once a week or once a month depending on the season. For example, during the tobacco harvest, the men and women are busy working in the fields and do not travel to the city often, but once the tobacco is fully harvested and dried and it is time to sell the crop, the men will travel into the city several times within a few weeks.

To reach the Area 25 health center, clients must walk down a single-lane, dusty driveway, past vendors selling boiled ground nuts and Coca Colas. Area 25 health center is composed of several buildings that when connected by wide sidewalks form a 'U' shape. The buildings in the left wing are staffed by government nurses and occasionally

a clinical officer where patients seek treatment for tuberculosis (TB), malaria, HIV, and other common illnesses. An open pavilion which is commonly crowded with women and young children for family planning and education sessions connects the general ward to the antenatal clinic where nurses in white dresses and blue sweaters busily sort through a long line of women and babies waiting to be seen. Typically three UNC Project nurses work the antenatal clinic during the busiest morning hours and one or two nurses will work through the afternoon, depending on the patient load. The Area 25 PMTCT nurses are reserved, yet friendly and eager to perform their duties. Due to the patient to nurse ratio, the nurses are constantly busy and rarely have time to break for lunch. The layout of Area 25 District Health Centre is such that the antenatal clinic location is semi-conducive to visits from male patients. The antenatal clinic partially adjoins the other health center buildings, thereby providing a level of ambiguity upon entry. However, there is constantly a line of women waiting to be seen at the antenatal clinic.

Area 18 District Health Centre. The Area 18 District Health Centre is located in a periurban setting. For those on foot it is only minutes away from the main road into Lilongwe from the east. The partners of women who attend the Area 18 antenatal clinic generally commute to Lilongwe's business district for work every morning. After entering the gate to the Area 18 health center clients must scale a steep, rutted, single-lane driveway. The driveway leads past a family planning pavilion to a maternity ward and a large, multi-department building. The multi-department building contains several adjacent rooms along a back wall. These rooms are used for different purposes, including a pharmacy, TB treatment, general medicine, an ARV program, and PMTCT. Although women slightly outnumber men, the lines of patients waiting to be seen are very diverse

and generally fill the entire building from opening in the morning, through lunch, and to closing hours in the afternoon.

Three UNC nurses work in one small PMTCT room. They are friendly and well seasoned. The nurses are also very competitive and seek to fulfill their obligations and reach any goal which may be set. Due to much efficient, hard work, these nurses are able to successfully complete each day's work without becoming overwhelmed. The Area 18 District Health Clinic was designed in such a way that the antenatal clinic location is very conducive to visits from male patients. The antenatal clinic is conducted in a room surrounded by other health care specialties. Men who attend the antenatal clinic for CHCT wait in line with an equal number of women and men who have come to the health center to be seen by other departments.

Kawale District Health Centre. The Kawale District Health Centre is located in Lilongwe's Area 7, which is an urban setting adjacent to Lilongwe's Old Towne business district. Many of Kawale's health center clients work in Kawale or in the neighboring Area 2 which is home to Lilongwe's old town business district. Although Kawale's health center is located between Lilongwe's Old Towne business district and the relatively new Capital City, many of the roads leading into and throughout Kawale are unpaved and at times nearly impossible to pass. Upon entering Kawale's gates, there is usually a large crowd of women and children waiting in line for Under Five Clinic (U5). U5 clinics provide checkups, immunizations, and other basic healthcare for children under the age of 5 years as well as education for their mothers on how to provide the best care for young children. All immunizations are recorded and growth and development is monitored using the child's health passport. The women who attend U5 clinics utilize

song and dance as a means of learning how to best care for young children as well as other general healthcare issues. After pushing through this large crowd of women, antenatal clients must make their way down a narrow pathway past the TB treatment department and into a small three room area used for PMTCT. Rarely are there more than 10 women waiting to be seen at any one time.

There are generally four UNC nurses working at this antenatal clinic. The nurses are all friendly, yet reserved and are not often pressed for time to complete all of the duties required for each day. The Kawale District Health Clinic was designed in such a way that the antenatal clinic location is semi-conducive to visits from male patients. The antenatal clinic is physically separated from other departments and the male patients must pass through a large number of women and small children to reach the clinic. However, after arriving at the antenatal clinic, men do not face the obstacle of waiting in a line surrounded by women.

Bwaila Hospital. Bwaila Hospital is located in the center of Lilongwe's bustling Old Towne business district. This urban setting brings over 400 women to Bwaila's antenatal clinic per week. The hospital is relatively old and every ward is consistently crowded with patients. Due to lack of staff, one nurse can be in charge of caring for as many as 50 critically ill patients. To cope with this issue, patients are often accompanied by relatives who take on the role of providing for their basic needs such as changing and feeding them. Although this solution is necessary, it often causes crowding on the hospital grounds and unsanitary conditions as caretakers cook and sleep on the hospital grounds wherever space is available. After entering Bwaila's gates, the antenatal clinic is located in the first building on the left. In front of the building is a large covered seating

area where morning health talks are conducted and women wait in line when all seats inside the building are occupied.

Upon entering the clinic, women are registered and weighed at a large front desk. They are then directed to the left for family planning and to the right for PMTCT. Mothers and children sit shoulder to shoulder on benches that line both sides of a narrow hall that leads to many rooms. These rooms are used for history taking, vitals, VCT, receipt of results and further tests for HIV-positive women, such as CD4 counts. There are eight UNC nurses assigned to Bwaila antenatal clinic as well as several nurses employed and trained by MoHP. The UNC nurses are friendly and engaging. However, due to the large number of patients seen every day, the nurses are able to spend little if any time speaking with the women one-on-one. Pre-HIV-test counseling often occurs in groups of five or more women with one nurse. Despite the overwhelming pressure of job and time constraints, the nurses at Bwaila antenatal clinic exhibit a positive and enthusiastic attitude. These nurses work hard to complete their job as efficiently as possible. The Bwaila Hospital is designed in such a way that the antenatal clinic location is not at all conducive to visits from male patients. The antenatal clinic is physically separated from other hospital buildings and almost one hundred women wait in line to be seen daily.

Patient Population

Approximately 20,000 pregnant women attend ANC at Area 25 health center, Area 18 health center, Kawale health center, and Bwaila hospital every year. The mean age of these women is 24 years with a range of 10 to 56 years and a mean parity of 2 children. Parity refers to the number of times a woman has given birth to a fetus of

gestational age 24 weeks or more, regardless of the outcome of the birth (Borton, 2007). Ninety-nine percent of women self-reported as married (both monogamous and polygynous). The remainder of women reported a marital status of single (never married), separated, divorced, or widowed. Of those who consented to an HIV test, 15.4% were HIV-positive and 84.6% tested HIV-negative. Before initiation of interventions, 0.5% of women regularly attending ANC accessed CHCT at their antenatal clinic.

Table 1. Characteristics of female antenatal clinic attendees from June 2006 through June 2008.

	Area 25	Area18	Kawale	Bwaila	Total
Total attendance	8319	6116	9717	15250	39402
Mean age (years)	25	24	24	24	24
Mean parity	2	2	2	2	2
Married	99.4%	99.2%	99.0%	98.9%	99.1%
HIV- positive	13.3%	12.3%	13.2%	19.5%	15.4%
HIV-negative	86.7%	87.7%	86.8%	80.5%	84.6%

Male Involvement Interventions

Sensitizations. Community sensitizations are scheduled weekly to be held in various areas of Lilongwe. The sensitizations are organized by a Community Action Team based at Tidziwe. The team coordinates with local chiefs and leaders to perform fictional dramas or discussion groups with the intent of increasing awareness of the importance of HIV VCT, CHCT, and other health services offered at UNC Project's Tidziwe and antenatal clinics, thus sensitizing men and women of the community. The

fictional dramas include singing, dancing, and acting. Sensitizations have been an important part of UNC Project's community awareness strategy for several years. An intense focus on CHCT was integrated into the existing sensitization program beginning in January 2008, and continuing through the month of June 2008.

Invitation Letter. An invitation letter was given to every woman who attended each antenatal clinic beginning in February 2008. The letter was translated into Chichewa and edited by several Malawian nurses. The letters were formatted to one half page to easily fit into the health passports of the antenatal clinic attendees. Two versions of the letter were created. The first version extends a personal invitation to the partners of every pregnant woman to come back to the antenatal clinic for counseling and education in the following areas: 1) care for a woman during pregnancy, labor, and delivery, 2) breastfeeding, 3) maternal and infant nutrition, 4) sexually transmitted infections (STIs), and 5) HIV and ARV (antiretrovierals). The second version of the letter is addressed specifically to the partners of women attending antenatal clinic for postnatal services. These men are offered the same services with the exception of education in care for a woman during pregnancy, labor, and delivery. The letter also informs men of the availability of CHCT services at Tidziwe, the UNC project headquarters on the campus of Kamuzu Central Hospital (KCH). This option was offered for men who may feel more comfortable attending a VCT center than an antenatal clinic as well as those who may find the KCH campus a more convenient location. The letter was distributed to every attendee of all four antenatal clinics beginning in February 2008 and continuing through the month of June 2008. See APPENDIX for sample invitation letters (Figure A-1).

Individual encouragement. Antenatal clinic nurses were encouraged to spend time counseling women one-on-one as to the importance of CHCT and male involvement in family health. Individual counseling is rare in busy antenatal clinics. This counseling created in the women a greater trust of the nurse. The women were able to ask personal questions and the nurses were able to answer these questions providing more in-depth information. A meeting with each head-nurse at Bwaila, Kawale, Area 18 and Area 25 antenatal clinics was held in the month of May 2008. The nurses then informed and explained the intervention to every UNC nurse working at the antenatal clinics. This allowed for the individual counseling to be fully understood and implemented by every nurse for the entire month of June 2008.

Specialized strategies. Characteristics unique to the Area 18 antenatal clinic and Bwaila's antenatal clinic allowed specific strategies created for these clinics to be successfully created. Area 18 developed a strategy for specialized male recruitment. This strategy utilized the clinic's convenient location for couples commuting to the business district of Lilongwe. After escorting their partners to the antenatal clinic, men usually continue on their way into the city for business. At the morning health talk the nurses announced that any woman who could catch their husbands on the way to work and bring them back to the clinic to participate in CHCT would be seen before any other client. The major advantage this offers to the antenatal attendees is a quick visit as traditional antenatal visits often consume an entire day. Comparatively, this new practice allows for patients to be seen quickly therefore permitting these patients to resume their normal day's activity. The specialized male recruitment strategy was implemented from March 2007 through June 2008.

A specialized strategy was also developed for Bwaila's antenatal clinic featuring Saturday clinics conducted for couples only. This strategy was designed to assuage the negative effects of Bwaila's weekday atmosphere, which is extremely unconducive to male patients. Saturday clinics also allow ample time for nurses to conduct thorough CHCT. Women are encouraged to make appointments for the date and time they are able to attend CHCT with their partners. Awareness among antenatal attendees concerning these clinics was promoted during the month of May 2008 and a Saturday clinic was held in the month of June 2008.

Table 2. Interventions and setting factors tested for increasing male involvement in CHCT in four antenatal clinics.

	Area 25	**Area 18**	**Kawale**	**Bwaila**
Individual Interventions	Community sensitization	Community sensitization	Community sensitization	Community sensitization
	Invitation letter	Invitation letter	Invitation letter	Invitation letter
	Individual encouragement	Individual encouragement	Individual encouragement	Individual encouragement
Setting Factors	--	--	--	Saturday clinic
	--	Specialized male recruitment	--	--
	Rural	Periurban	Urban	Urban
	Clinic layout semi-conducive to male patients	Clinic layout conducive to male patients	Clinic layout semi-conducive to male patients	Clinic layout not conducive to male patients

Data Collection

Data were collected by antenatal clinic PMTCT nurses employed by UNC Project. After giving consent, women attending the antenatal clinic were routinely tested for HIV and patient history and current information was recorded in a composition notebook by the attending nurse. Each patient was assigned a unique identification number and personal information was collected including date of visit, age, home village, HIV status (as well as WHO stage and CD4 count if applicable), marital status, parity, gravidity, gestation in weeks at visit. A similar procedure was used for recording male patient information. Each man was assigned an identification number corresponding to that of his female partner. A small number of men requested to remain anonymous but consented to an HIV test and the collection of other personal information. Information recorded for men included date of CHCT, age, HIV status, couple status, and WHO stage and CD4 count if applicable. See APPENDIX for sample data log (Figure A-2).

Data Analysis Procedures

Random selection was used to create a sample of three hundred women who attended Bwaila, Kawale, Area 18, and Area 25 antenatal clinics from June 2006 to March 2007. Similarly, a second sample was created of three hundred women who attended these antenatal clinics from March 2007 through June 2008 (Mohr, 2004). A total of three hundred thirty men attended CHCT from February through June 2008 and were included in the analysis. Descriptive statistics (e.g. means and standard deviations) were calculated to obtain an overall picture of female characteristics and testing involvement through the clinics. Bivariate correlations (phi and point biserial) were used to examine the relationships between female characteristics and the number of

interventions with rates of male testing. Non parametric statistics (chi square and crosstabs) were used to examine differences in rates of male involvement based on clinic setting factors and type of intervention received. Logistic regression was used to examine the relative influence of factors predicting male involvement in testing. Chi square tests associated with each step of the regression were examined to test the significance of the prediction that intervention factors will account for more variance than other factors, such as age, marital status and HIV status. Beta weights and Wald chi squares were examined to further explore the contribution of specific interventions.

RESULTS

Overview of couples accessing CHCT. February through June 2008, 330 couples attended CHCT at Bwaila, Kawale, Area 18, and Area 25 antenatal clinics. In March 2007, 0.38% of women who attended one of the four antenatal clinics accessed CHCT. This number increased to 3.79% by June 2008. A Pearson product moment supports H1, predicting that rates of couples' accessing CHCT services would increase over time. There was a positive correlation between intervention month and the number of couples accessing CHCT, $r = 0.632$, $N = 918$, $p = .000$.

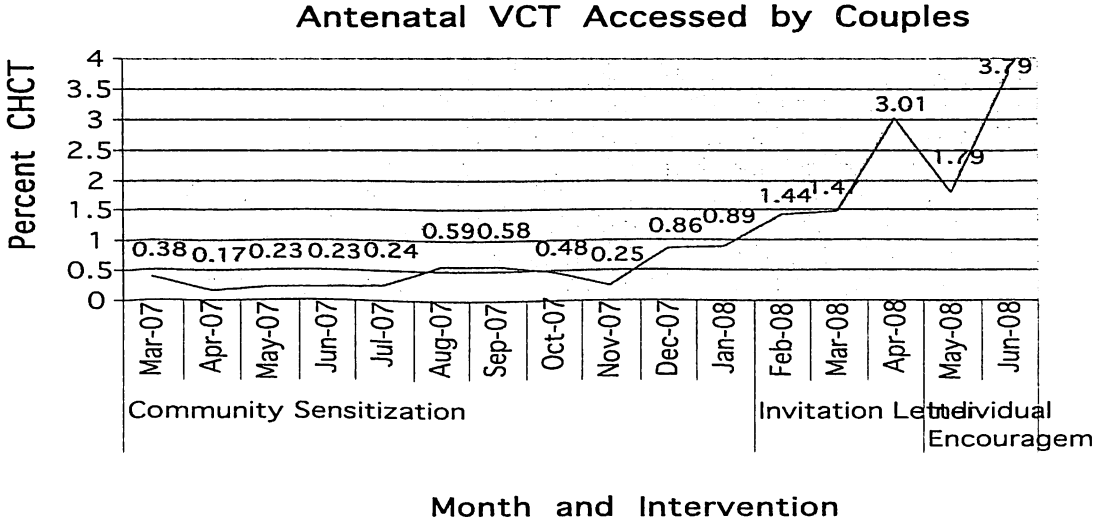

Figure 2. Percentage of VCT accessed by couples at Bwaila, Kawale, Area 18, and Area 25 each month. Community sensitizations for male involvement began in April 2007. Letters of invitation for male partners were given to women attending antenatal clinic beginning in February 2008. Personal encouragement from antenatal clinic nurses was implemented at the end May 2008. All interventions continued through June 2008.

Figure 2. illustrates the increase in male involvement along with a graphical representation of when different intervention methods were introduced. Though the increase appears to coincide somewhat with the initiation of two specific strategies, the invitation letter and individual encouragement, this does not imply a specific causal relationship with either strategy. The potential impact of these and other interventions are explored in subsequent hypotheses. Men who participated in CHCT had an average age of 31, with a range from 15 to 69 years, and an HIV infection rate of 24.8%.

Characteristics of women. Of couples who accessed CHCT, women had a mean age of 25, with a range from 14 to 45 years, and a mean parity of 2. Across the sixteen months that CHCT data was collected, only one single (never married) woman accessed CHCT with a partner at the Area 18 antenatal clinic. The remainder of couples reported a married (monogamous) relationship. Women accessing CHCT tested 84.5% HIV-negative and 15.5% HIV-positive.

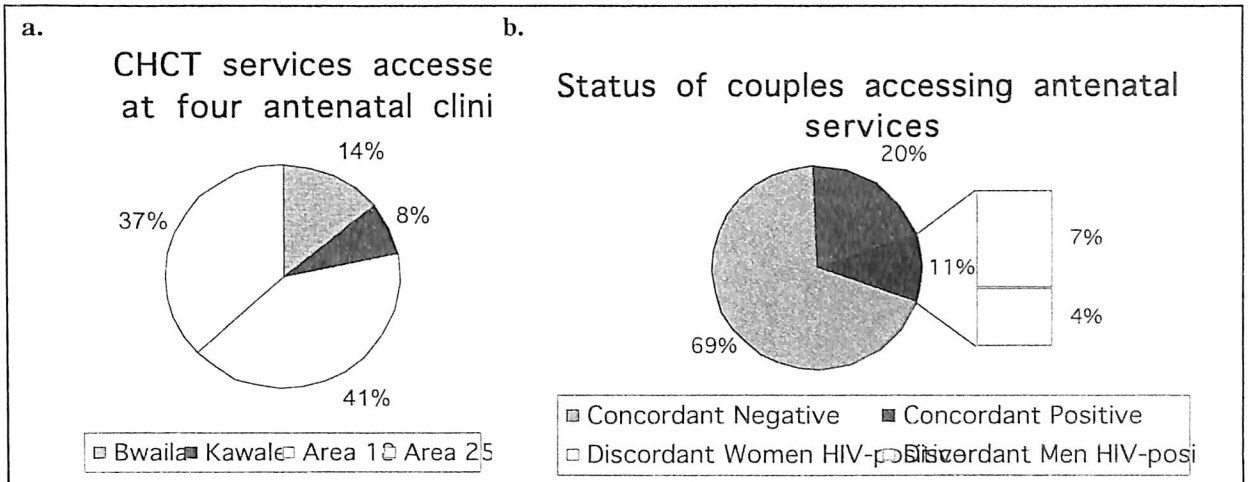

Figure 3. CHCT services accessed. a) CHCT accessed at Bwaila, Kawale, Area 18, and Area 25. b) Distribution of couple status among those accessing CHCT offered by Bwaila, Kawale, Area 18, and Area 25 antenatal clinics.

Point biserial correlation coefficients were computed to assess the relationship between socio-demographic characteristics of women attending antenatal clinic and accessing CHCT. There was a weak positive correlation between age and access of CHCT, r = .074, N = 886, p = .027. An increase in age was correlated with access of CHCT. There was a negative correlation between gestation (in weeks) and access of CHCT, r = -.178, N = 883, p = .000. Women who attended antenatal clinic earlier in their pregnancy were correlated with access of CHCT. Other characteristics tested to be not significantly correlated (see APPENDIX Table A-1). Chi square and t tests were computed to determine significant socio-demographic characteristics of women who accessed CHCT. Age, marital status, and HIV status were found to have no significant variation between women who attended antenatal clinic alone and those who accessed CHCT. The socio-demographic characteristic of gestation was found to differ significantly for women who accessed CHCT, $t\,(881) = 5.361, p = .000$.

Clinic Setting Factors. A point biserial correlation coefficient was computed to assess the relationship between urbanization in antenatal clinics and women who accessed CHCT. A significant negative correlation was found to exist between the two variables, r = -.375, N = 917, p = .000. Less urbanized antenatal clinics were correlated with increases in access of CHCT. The degree of urbanization of the clinic setting was found to be of significant importance in the decision to access CHCT, $\chi^2\,(2, N = 917) = 158.440, p < .01$. A point biserial correlation coefficient was computed to assess the relationship between the extent to which an antenatal clinic's layout was culturally conducive to male patients and access of CHCT. There was a significant positive correlation between the two variables, r = .272, N = 918, p = .000. Antenatal clinics with

a layout more culturally conducive to male patients were correlated with increases in access of CHCT (See Table 3). The extent to which an antenatal clinic's layout was culturally conducive to male patients was also found to be a significant factor in the decision to access CHCT, χ^2 (4, N = 917) = 70.274, p< .05.

Table 3. Setting factors and individual interventions increase male involvement in CHCT.

		Partner came
Clinic layout	non-conducive	17.3%
	semi-conducive	34.9%
	conducive	52.2%
Invitation letter	did not receive	24.7%
	received	42.4%
Specialized male recruitment	not offered	28.0%
	offered	52.8%
Individual encouragement	not offered	21.1%
	offered	88.6%

Interventions. Phi correlation coefficients were computed to assess the relationship between interventions and accessing CHCT. There was a significant positive correlation between receipt of the invitation letter and access of CHCT, r = .184, N = 918, p = .000. There was a significant, stronger positive correlation between specialized male recruitment and access of CHCT, r = .232, N = 918, p = .000. The intervention with the strongest significant positive correlation to access of CHCT was individual encouragement, r = .569, N = 918, p = .000. Interventions found to be significant in couples' choice to access CHCT included the invitation letter, χ^2 (1, N = 918) = 31.878, p< .05, individual encouragement, χ^2 (1, N = 918) = 298.647, p< .05, and specialized male recruitment, χ^2 (1, N = 918) = 47.940, p< .05. Overall, there was a positive

correlation of each intervention to access of CHCT, with the degree of correlation varying.

Phi correlation coefficients were computed to assess the relationship between combinations of interventions and access of CHCT. There was a positive relationship between the invitation letter plus specialized male recruitment intervention combination and access of CHCT, r = .330, N = 918, p = .000. There was a positive relationship between the individual encouragement plus specialized male recruitment intervention combination and access of CHCT, r = .341, N = 918, p = .000. There was a positive relationship between the invitation letter plus individual encouragement intervention combination and access of CHCT, r = .569, N = 918, p = .000. When grouped into combinations of two interventions, giving women a letter of invitation and individual encouragement was the most effective combination, χ^2 (1, N = 918) = 298.647, $p < .05$, followed by individual encouragement and specialized male recruitment, χ^2 (1, N = 918) = 107.714, $p < .05$. The least effective, yet still significant combination of interventions, was found to be receipt of the letter of invitation and specialized male recruitment, χ^2 (1, N = 918) = 95.546, $p < .05$. Overall, exposure to each combination of two interventions had a stronger positive correlation than exposure to a single intervention, with the exception of individual encouragement.

Point biserial correlation coefficients were also computed to assess the relationship between the number of interventions to which women were exposed and access of CHCT. There was a significant positive correlation between the number of interventions received by women attending antenatal clinic and their decision to access CHCT, r = .444, N = 918, p < .001. Increases in the number of interventions to which

antenatal clinic attendees were exposed were correlated with increases in access of CHCT. Women receiving a higher number of total interventions were more likely to access CHCT services, χ^2 (4, N = 918) = 302.576, p < .05.

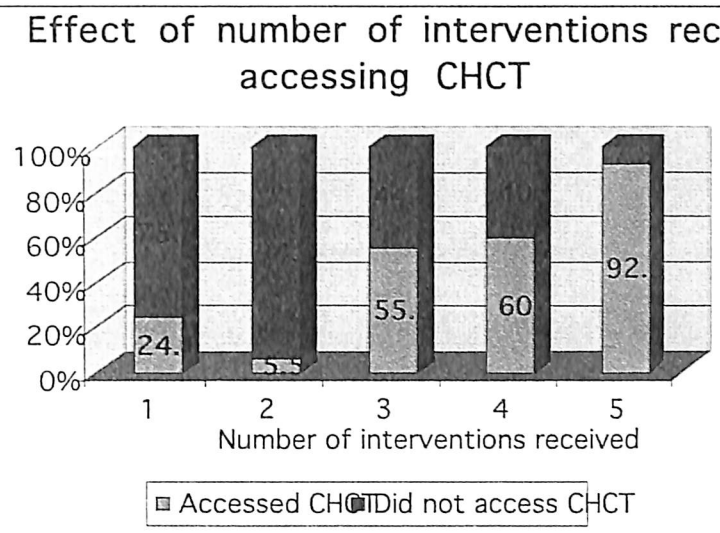

Figure 4. Women receiving a higher number of total interventions are more likely to access CHCT services.

Examining the relative influence of different factors in the overall model.

Logistic regression analysis was employed to predict the probability that couples would access CHCT. The predictor variables were grouped into the following five combinations: age and marital status, parity and gestation, HIV status, degree of clinic urbanization and degree of cultural congruency of a clinic's layout, and individual interventions received including invitation letter, individual encouragement by clinic nurses, and specialized male recruitment. A test of the full model versus a model with intercept only was statistically significant, χ^2(10, N = 871) = 462.424, p < .001. The model was able to correctly classify 61% of those who accessed CHCT and 92% of those who did not, for an overall success rate of 82%.

Introducing age and marital status to the model was found to not significantly improve the model, $\chi^2(2, N = 871) = 4.207, p = .122$. This stage of the model was able to correctly classify 100% of those who did not access CHCT and 0% of those who did, for an overall success rate of 68%. Introducing parity and gestation to the model was found to significantly improve the model, $\chi^2(2, N = 871) = 29.199, p < .001$. Within this model, age and gestation were found to have a significant beta weight. This stage of the model was able to correctly classify 96% of those who did not access CHCT and 6% of those who did, for an overall success rate of 68%. Introducing HIV status to the model was found to not significantly improve the model, $\chi^2(1, N = 871) = 1.568, p = .211$. Within this model, age and gestation were found to have a significant beta weight. This stage of the model was able to correctly classify 96% of those who did not access CHCT and 9% of those who did, for an overall success rate of 69%. Introducing degree of clinic urbanization and degree of cultural congruency of a clinic's layout to the model was found to significantly improve the model, $\chi^2(2, N = 871) = 159.912, p < .001$. Within this model, gestation, HIV status, degree of clinic urbanization, and degree of cultural congruency of a clinic's layout were found to have a significant beta weight. This stage of the model was able to correctly classify 85% of those who did not access CHCT and 52% of those who did, for an overall success rate of 75%.

Introducing the individual interventions of invitation letter, individual encouragement by clinic nurses, and specialized male recruitment to the model was found to significantly improve the model, $\chi^2(3, N = 871) = 267.538, p < .001$. In the overall model, employing a .05 criterion of statistical significance, gestation, HIV status, degree of clinic urbanization, individual encouragement by clinic nurses, and specialized male

recruitment had significant partial effects (See APPENDIX Table A-2). Inverting the odds ratio for gestation reveals that for each week increase on the 38 week gestation range women are 4% more likely to not access CHCT. The odds ratio for woman's HIV status indicates that when holding all other variables constant, a woman who is HIV positive is half as likely to access CHCT as a woman who is HIV negative. Inverting the odds ratio for degree of clinic urbanization reveals that on the three point urbanization-scale, with each one point increase in urbanization women are 5 times more likely to not access CHCT. The odds ratio for individual encouragement intervention reveals that the women who received the encouragement were 67.44 times more likely to access CHCT. Although significant, the effect of the specialized male recruitment intervention was much smaller than that of the individual encouragement intervention, with women receiving the specialized male recruitment being 6.26 times more likely to access CHCT.

Table 4. Logistic regression predicting CHCT access from socio-demographic characteristics, antenatal clinic setting, and individual interventions.

Predictor	***B***	**Wald χ^2**	***p***	**Odds Ratio**
Gestation	-.042	4.922	.027	.958
HIV status	-.686	8.189	.004	.503
Urbanization	-1.575	59.613	< .001	.207
Individual encouragement	4.211	131.753	< .001	67.442
Specialized male recruitment	1.834	9.791	.002	6.258

Discussion

The findings in this study support H1; that is, the number of couples accessing couples' HIV counseling and testing services offered at antenatal clinics will increase over time as programmatic efforts are introduced through the clinics. This is supported by reviewing the number of women who accessed CHCT in March 2007 (0.38%) and in June 2008 (3.79%), as well as the significant positive correlation between intervention month and the number of couples accessing CHCT. Male involvement in CHCT increased over the duration of the study indicating the need to investigate socio-demographic characteristics of women attending CHCT, clinic setting factors, as well as culturally congruent interventions implemented.

Results indicate partial support for H2. A woman's age and gestation in weeks were found to have a significant correlation to the decision to access CHCT. However, upon analysis of a scatter plot and taking into consideration the difference in the range of women's ages of the random sample of women who did not access CHCT (14-40) and the age range of the whole sample of women who attended antenatal clinic (10-56), a chi square test indicated that gestation was a significant factor in the decision to access CHCT. The logistic regression model revealed that gestation and HIV status were the only socio-demographic characteristics that were significant in determining CHCT access. Marital status was not significant in the decision to access CHCT. This is congruent with a recent study conducted by Semrau et al., which found that women attending CHCT in antenatal clinics did not differ from women attending alone in age or parity (Semrau et al., 2005, p.606). The MoHP recommends a woman visit antenatal clinic a minimum of four times during her pregnancy, with the first visit preferably taking

place during the first trimester. The women who accessed CHCT were more likely to do so early in their pregnancy. This can be attributed to the economic barriers encountered by the couple in that the women who first attended antenatal clinic earlier in their pregnancy had more opportunities to later access CHCT.

Results indicate partial support for H3. Correlation and chi square tests indicated that the degree of clinic urbanization and the degree of cultural congruency of a clinic's layout were correlated to and were significant factors in accessing CHCT. However, the logistic regression model reveals that the degree of clinic urbanization carries significant weight, while the degree of cultural congruency of a clinic's layout was not significant in the context of other variables.

Results indicate support for H4 and partial support for H5. Each intervention, with the exception of Bwaila's Saturday clinic, was found to be a significant factor to couples' choice to access CHCT. These interventions included the invitation letter, individual encouragement, and specialized male recruitment, and varied in correlation strength from moderate to strong, respectively. The logistic regression model indicated that individual encouragement and specialized male recruitment were significant, but that the invitation letter was not.

The interventions were introduced to all four clinics and once introduced they were continued for the duration of the study. The interventions began at specific, staggered times throughout the study and therefore were also tested in combinations. These combinations consisted of invitation letter plus specialized male recruitment, individual encouragement plus specialized male recruitment, and invitation letter plus individual encouragement. All three combinations tested to be significant and correlated

to an increase in access of CHCT with invitation letter plus individual encouragement having the strongest positive correlation, followed by individual encouragement plus specialized male recruitment, and lastly invitation letter plus specialized male recruitment.

The number of interventions received was found to be associated with increased rates of male testing through CHCT, providing support for H6. Community sensitizations as relating to male involvement in CHCT have been in place since January 2008. Every clinic attendee received exposure to at least one community sensitization therefore this intervention was not subjected to individual analysis but was included in the sum of interventions tested. The number of interventions received by antenatal clinic attendees had a significant positive correlation to the number of couples accessing CHCT.

The results of a logistic regression model predicting male participation in CHCT provide partial support for H7, which states that, within the model, interventions and the degree to which a clinic's layout is culturally conducive to male patients will account for more variance than socio-demographic characteristics of women and the clinic's degree of urbanization. Specific interventions (specialized male recruitment and individual encouragement) provided for the majority of variance, followed by degree of urbanization of the clinic, and two socio-demographic factors (gestation and HIV status). Although hypothesized to account for a significant variance, the degree to which a clinic's layout is culturally conducive to male patients was not significant in the model.

Communication was a major challenge in implementing these strategies for increasing male involvement in CHCT. The language barrier in communicating with the

clinic nurses was difficult to overcome. Although the nurses speak English, there are situations in which the cultural context becomes important and often the English translation of words and phrases from the indigenous language of Chichewa is not sufficient to accurately convey the appropriate meaning. Convincing and motivating the PMTCT nurses to adopt new and unorthodox methods such as individual interaction with male clients also proved to be a challenge. Various rewards and incentives offered to the clinic nurses were a successful way to overcome this resistance.

The Centers for Disease Control and Prevention (CDC) published a manual in 2007 suggesting methods for recruitment of couples which include community outreach, personalized invitation letters, outreach through antenatal clinics and PMTCT programs. The current study found support for all of these methods when adapted to be culturally congruent and when the methods were implemented simultaneously. Additionally, the study found innovative strategies such as specialized male recruitment and individual encouragement to be significantly effective.

Implications

Male involvement in CHCT increased over the duration of the study indicating that the culturally congruent interventions implemented have potential for long term and expanded use in increasing male involvement in couples' HIV counseling and testing. In 2007, a study conducted in Kigali, Rwanda and Lusaka, Zambia found that predictors for successful CHCT recruitment interventions differed in the two countries. In Zambia, couples were more likely to seek CHCT after receiving an invitation in their home compared to receiving the invitation at a community reference group. As in the current study, success of the interventions was culturally dependent but had similar findings in

that multiple interventions employed simultaneously had higher response rates among couples. For example, in both Rwanda and Zambia there was a higher response rate when invitations were delivered following public endorsement of CHCT (Allen et al., 2007, p.7). The current study found that the number of interventions a woman received increased the likelihood that both she and her partner would access CHCT. Other than the above referenced study, very little data has been made available on recruitment for couples' HIV counseling and testing.

As the findings of this study indicate, the most successful methods for recruiting couples for CHCT are combinations of interventions and the total number of interventions is also significant in increasing male involvement. The most successful methods are specialized male recruitment and individual encouragement. When combined, the invitation letter plus individual encouragement has the strongest correlation on male recruitment, followed by individual encouragement plus specialized male recruitment, and lastly invitation letter plus specialized male recruitment. The most efficient combination of interventions is individual encouragement and specialized male recruitment which may be attributed to the fact that these methods are easily combined and implemented in a society where printed materials are not readily accessible.

Limitations

There was no random assignment of interventions or clinic setting factors. For example, there was a positive correlation found through the computation of a biserial correlation coefficient between the invitation letter intervention and individual encouragement as well as between the invitation letter and specialized male recruitment illustrating that those who received individual encouragement and specialized male

recruitment also received the letter (See APPENDIX Table A-1). Individual encouragement had a strong positive correlation to access of CHCT when tested on its own, but it was always offered with another intervention, never independently, therefore limiting this intervention as an accurate predictor as considered in the logistic progression model.

Random selection was used to create a sample of three hundred women who attended Bwaila, Kawale, Area 18, and Area 25 antenatal clinics from June 2006 to March 2007. Similarly, a second sample was created of three hundred women who attended these antenatal clinics from March 2007 through June 2008 (Mohr, 2004). Using random selection provides a comparable but not entirely accurate representation of the data set. For example, when analyzing age of women from the random sample selection and that of the original data set the mean age of women does not significantly differ. However, the age range of women from the random sample selection is notably tighter than that of the original data set.

Due to extraneous circumstances, the study was limited to a time period of five months. Continuing the study for a longer period of time would provide more insight into the effectiveness of interventions especially those introduced during the last month of the study. The most effective male recruitment intervention, individual encouragement, was not introduced until month four of the five month study. Continuing the study for a greater length of time would also aid in determining the sustainability of each intervention.

Future Directions

Future studies should be conducted to further explore the long term effectiveness and sustainability of interventions in increasing access of CHCT services. Random assignment of interventions to antenatal clinics would aid in determining the individual effectiveness of each intervention. Other interventions suggested for future research include culturally congruent incentives such as a small bag of corn flour given to CHCT attendees, gift certificates awarded to clinic nurses who meet their monthly goals of percentage of clinic attendees to access CHCT services coupled with weekly follow-up visits and reminders from the researcher. Numerous culturally congruent community sensitizations and public endorsements are also suggested.

To counteract the cultural barriers associated with male involvement in antenatal clinic attendance, CHCT could be encouraged at HIV testing facilities such as Malawi's AIDS Counselling [*sic*] and Resource Organization. Interventions similar to those employed in antenatal clinics would be appropriate in this setting as well. Invitation letters, individual encouragement, and community sensitizations are all methods of intervention that could be attempted at HIV testing facilities.

The potential impact of expanding CHCT to a greater percentage of the population cannot be underestimated. Interviews conducted in conjunction with this study in June 2008 in Lilongwe, Malawi with couples who have benefited from CHCT led to the following testimonies:

> So I want to inform all the men who are shy, who thought blood testing is shameful. You will dash the future of your children because you will bear children who are infected with the virus while the opportunity is

there to prepare your future as well as and that of your children as well. (Ronald Phiri)

The advice I can give to other people is that, it's good to test and hear the results together if you aim knowing your status. If you do this individually you may not be honest to one another because it was done individually and your partner might think it's not true. If I had done that, testing individually, I could not accept these discordant results, it could be very difficult for me to accept. I accepted because the results came out whilst we were together. So to other people who want to do that, it's important to do go to the hospital together. On the issue of blood testing, go together, get the results together, and do not act individually [but] as families. (Anonymous)

So it's better to leave together with the father so that when we receive counseling we get it all together and have the counseling together, have blood tests together. If we do that we will have a better Malawi, new health and we will have healthy strong children. (Bertha Makina)

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APPENDIX

Figure A-1. Personalized Male Invitation Letter

a) English prenatal

Dear Sir,

Your partner is one of the pregnant women attending antenatal care at Bwaila, Kawale, Area 18 or Area 25. (Tick where appropriate).
PMTCT services are inviting you to accompany your partner to her next visit to discuss issues related to pregnancy.

MATTERS TO BE DISCUSSED
How to take care of a woman during pregnancy, labour and delivery
Breast feeding
Maternal nutrition and infant and your children nutrition
Sexually transmitted infections
HIV and ARV
Couple counseling

If you are unable to come to the next antenatal visit at the health centre, you are advised to come any day before your partner delivers. You and your partner are also welcome to come to UNC Project, Tidziwe Centre, on the campus of Kamuzu Central Hospital if this location would be more convenient for you. Your participation will be beneficial to you, your partner and your child's health.

Looking forward to meeting you soon.

Yours sincerely,
PMTCT Services

UNC PROJECT
Lilongwe, Malawi

b) English postnatal

Dear Sir,

Your partner receives postnatal care at Bwaila, Kawale, Area 18 or Area 25. (Tick where appropriate).
PMTCT services are inviting you to accompany your partner to her next visit to discuss issues related to infant care and reproductive health.

MATTERS TO BE DISCUSSED
Breast feeding
Maternal, infant and young child nutrition
Sexually transmitted infections
HIV and ARV
Couple counseling

You and your partner are also welcome to come to UNC Project, Tidziwe Centre, on the campus of Kamuzu Central Hospital if this location would be more convenient for you. Your participation will be beneficial to you, your partner and your child's health.

Looking forward to meeting you soon.

Yours sincerely,
PMTCT Services

UNC PROJECT
Lilongwe, Malawi

Figure A-1 (continued)

c) Chichewa prenatal

Zikomo Abambo,
Wokondedwa anu ndi m'modzi mwa amai woyembekezera amene akuyendera sikero ya amai apakati ku chipatala Bwaila, Kawale, Area 18 komanso ku Area 25 (Ku Koleji). (Tick where appropriate).
A ndondomeko akukuitanani kuti mubwere limodzi ndi wokondedwa anu ku ulendo wao ukubwerau kuti tidzakambirane nfundo zokhudzana ndi uchembere.
Mfundo zokambirana:

- Mmene mungasamalirire amai mnthawi yoyembekezera, ya matenda a uchembere ndi ya kubadwitsa mwana
- Kuyamwitsa
- Chakudya choyenera cha mai ndi khanda ndinso ana.
- Matenda wopatsirana pogonana.
- Kachirombo ka HIV ndi ma ARV
- Uphungu wa mabanja.

Ngati simungathe kubwera kuchipatala pa ulendo wa kusikero ukubwerau, mukupemphedwa kubwera tsiku lina liri lonse wokondedwa anu asanachire. Inu ndi wokondedwa anu muli wolandiridwa ku bungwe la UNC Project, Tidziwe Centre, ku chipatala cha Kamuzu Central ngati malowa ndi amene ali woyenera kwa inu. Kutenga nawo mbali kuzakhala kwa phindu pa moyo wanu, wokondedwa wanu ndi mwana wanu.

Tikuyembekezera kukumana nanu posochedwa.
Kuno ku Ndondomeko,
ZIKOMO.

UNC PROJECT
Lilongwe, Malawi

d) Chichewa Postnatal

Zikomo Abambo,
Wokondedwa anu akulandira chisamaliro cha amai wochira kumene (chikuta) ku chipatala cha Bwaila, Kawale, Area 18 komanso ku Area 25(Ku Koleji). (Tick where appropriate). A ndondomeko akukuitanani kuti mubwere limodzi ndi wokondedwa anu ku ulendo wao ukubwerau kuti tidzakambirane nfundo zokhudzana ndi kadyetsedwe ka khanda ndi uchembere.
Mfundo zokambirana:

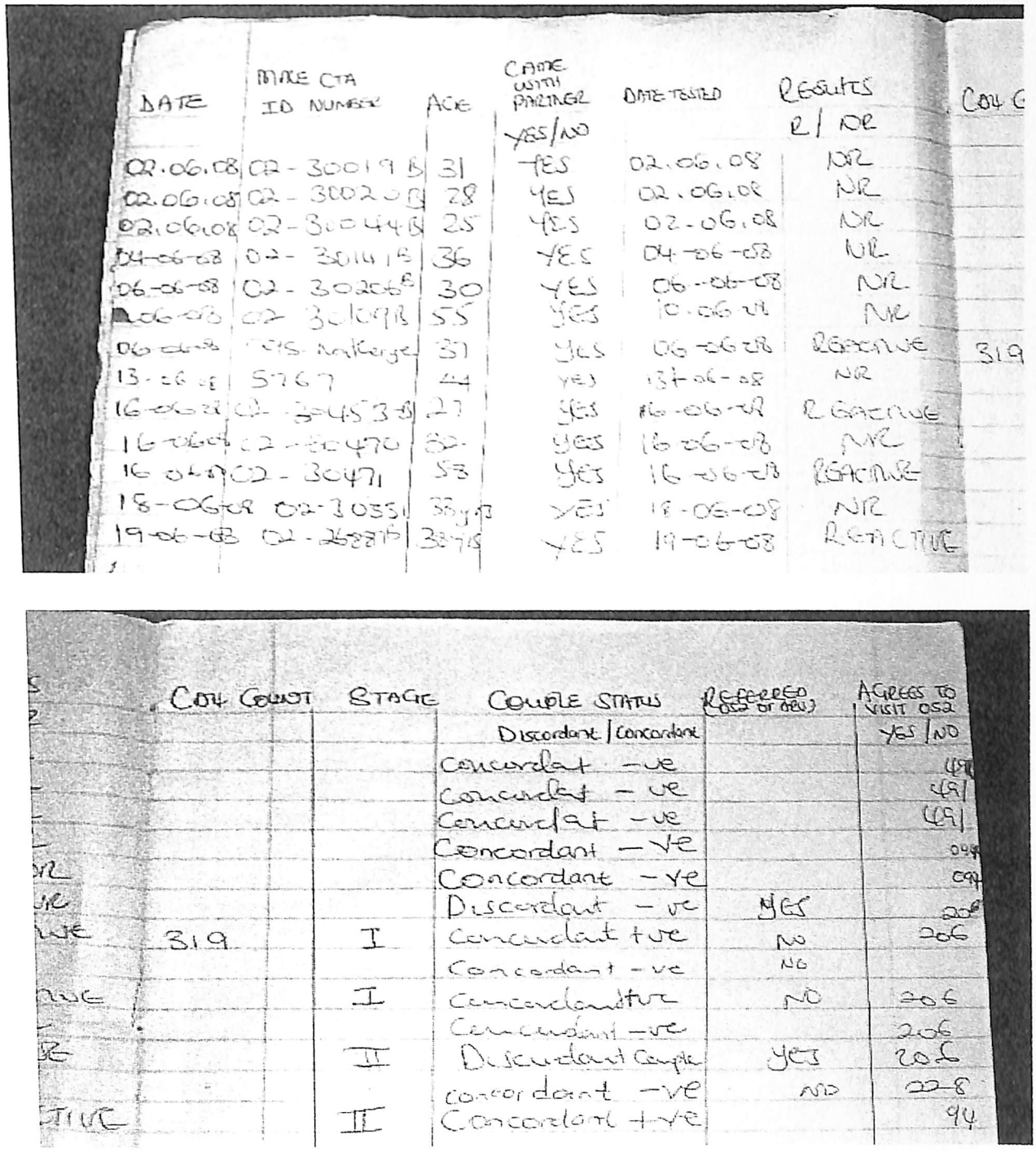
- Kuyamwitsa
- Chakudya choyenera cha mai ndi khanda ndinso ana.
- Matenda wopatsirana pogonana.
- Kachirombo ka HIV ndi ma ARV
- Uphungu wa mabanja.

Inu ndi wokondedwa anu mulinso wolandiridwa ku bungwe la UNC Project, Tidziwe Centre, ku chipatala cha Kamuzu Central ngati malowa ndi amene ali woyenera kwa inu. Kutenga nawo mbali kuzakhala kwa phindu pa moyo wanu, wokondedwa wanu ndi mwana wanu.

Tikuyembekezera kukumana nanu posochedwa.
Kuno ku Ndondomeko,
ZIKOMO.

UNC PROJECT
Lilongwe, Malawi

Figure A-2. Sample Data Collection Log



DATE	MARC CTA ID NUMBER	AGE	CAME WITH PARTNER YES/NO	DATE TESTED	RESULTS R / NR	CD4 C
02.06.08	C2 - 30019 B	31	YES	02.06.08	NR	
02.06.08	C2 - 30020 B	28	YES	02.06.08	NR	
02.06.08	C2 - 30044 B	25	YES	02.06.08	NR	
04-06-08	C2 - 30114 B	36	YES	04-06-08	NR	
06-06-08	C2 - 30206 B	30	YES	06-06-08	NR	
06-06-08	C2 - 30209 B	55	YES	10.06.08	NR	
06-06-08	CTS - No Charge	31	YES	06-06-08	REACTIVE	319
13-06-08	5767	44	YES	13-06-08	NR	
16-06-08	C2 - 30453 B	27	YES	16-06-08	REACTIVE	
16-06-08	C2 - 30470	82	YES	16-06-08	NR	
16-06-08	C2 - 30471	53	YES	16-06-08	REACTIVE	
18-06-08	C2 - 30551	36 yrs	YES	18-06-08	NR	
19-06-08	C2 - 26881 B	38 yrs	YES	19-06-08	REACTIVE	

CD4 COUNT	STAGE	COUPLE STATUS Discordant / Concordant	REFERRED (YES or NO)	AGREES TO VISIT OSC YES / NO
		Concordant -ve		49
		Concordant -ve		49
		Concordant -ve		49
		Concordant -ve		049
		Concordant -ve		094
		Discordant -ve	YES	206
319	I	Concordant +ve	NO	206
		Concordant -ve	NO	
	I	Concordant +ve	NO	206
		Concordant -ve		206
	II	Discordant Couple	YES	206
		Concordant -ve	NO	22-8
	II	Concordant +ve		94

Table A-1. Correlation Coefficients and Significance

		Husband came	age	Marital Status	parity	gestation in weeks	HIV status	letter	encouragement	Grab and Go	Letter + encouragement	letter + grab and go	encouragement + grab and go	Number of interventions received	Clinic Set Up	clinic setting
Husband came		1.000	.074*	-.005	.016	-.178**	-.065	.184**	.569**	.232**	.569**	.330**	.341**	.444**	.272**	-.375**
	Sig. (2-tailed)		.027	.872	.627	.000	.056	.000	.000	.000	.000	.000	.000	.000	.000	.000
age		.074*	1.000	.051	.734**	.098**	-.232**	-.039	.066*	-.014	.001	-.064	-.020	.008	.025	-.172**
	Sig. (2-tailed)	.027		.076	.000	.003	.000	.177	.021	.624	.985	.059	.554	.785	.392	.000
Marital Status		-.005	.051	1.000	.055	.026	-.067*	-.015	.010	-.027	.007	-.033	.004	-.022	-.039	.018
	Sig. (2-tailed)	.872	.076		.101	.442	.019	.605	.738	.351	.843	.330	.907	.453	.178	.532
parity		.016	.734**	.055	1.000	.122**	-.143**	-.077*	-.074*	-.037	-.074*	-.080*	-.072*	-.081*	-.034	-.071*
	Sig. (2-tailed)	.627	.000	.101		.000	.000	.022	.028	.265	.028	.017	.032	.016	.309	.034
gestation		-.178**	.098**	.026	.122**	1.000	.055	-.005	-.108**	-.022	-.108**	-.014	-.061	-.051	-.048	.166**
	Sig. (2-tailed)	.000	.003	.442	.000		.107	.884	.001	.514	.001	.680	.070	.130	.154	.000
HIV status		-.065	-.232**	-.067*	-.143**	.055	1.000	.165**	.034	.081**	.047	.078*	.046	.132**	.086**	.025
	Sig. (2-tailed)	.056	.000	.019	.000	.107		.000	.239	.005	.162	.021	.172	.000	.003	.381
letter		.184**	-.039	-.015	-.077*	-.005	.165**	1.000	.454**	.091**	.439**	.384**	.245**	.619**	-.027	.126**
	Sig. (2-tailed)	.000	.177	.605	.022	.884	.000		.000	.001	.000	.000	.000	.000	.345	.000
encouragement		.569**	.066*	.010	-.074*	-.108**	.034	.454**	1.000	.047	1.000**	.272**	.559**	.586**	.011	.014
	Sig. (2-tailed)	.000	.021	.738	.028	.001	.239	.000		.099	.000	.000	.000	.000	.698	.630
Grab and Go		.232**	-.014	-.027	-.037	-.022	.081**	.091**	.047	1.000	.102**	.720**	.459**	.749**	.840**	-.132**
	Sig. (2-tailed)	.000	.624	.351	.265	.514	.005	.001	.099		.002	.000	.000	.000	.000	.000
Letter + encouragement		.569**	.001	.007	-.074*	-.108**	.047	.439**	1.000**	.102**	1.000	.272**	.559**	.607**	.081*	-.065*
	Sig. (2-tailed)	.000	.985	.843	.028	.001	.162	.000	.000	.002		.000	.000	.000	.014	.049
letter + grab and go		.330**	-.064	-.033	-.080*	-.014	.078*	.384**	.272**	.720**	.272**	1.000	.637**	.752**	.593**	-.139**
	Sig. (2-tailed)	.000	.059	.330	.017	.680	.021	.000	.000	.000	.000		.000	.000	.000	.000
encouragement + grab and go		.341**	-.020	.004	-.072*	-.061	.046	.245**	.559**	.459**	.559**	.637**	1.000	.606**	.378**	-.091**
	Sig. (2-tailed)	.000	.554	.907	.032	.070	.172	.000	.000	.000	.000	.000		.000	.000	.006
Total interventions		.444**	.008	-.022	-.081*	-.051	.132**	.619**	.586**	.749**	.607**	.752**	.606**	1.000	.560**	-.016
	Sig. (2-tailed)	.000	.785	.453	.016	.130	.000	.000	.000	.000	.000	.000	.000		.000	.563
Clinic Set Up		.272**	.025	-.039	-.034	-.048	.086**	-.027	.011	.840**	.081*	.593**	.378**	.560**	1.000	-.579**
	Sig. (2-tailed)	.000	.392	.178	.309	.154	.003	.345	.698	.000	.014	.000	.000	.000		.000
clinic setting		-.375**	-.172**	.018	-.071*	.166**	.025	.126**	.014	-.132**	-.065*	-.139**	-.091**	-.016	-.424**	1.000
	Sig. (2-tailed)	.000	.000	.532	.034	.000	.381	.000	.630	.000	.049	.000	.006	.563	.000	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed)

Table A-2. Logistic Regression Final Model.

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1	age	031	.030	1.131	1	.288	1.032
	MaritalStatus	-.261	.934	.078	1	.780	.770
	parity	-.015	.088	.027	1	.869	.986
	gestation	-.042	.019	4.921	1	.027	.958
	HIV	-.686	.240	8.189	1	.004	.503
	Setup	-.305	.417	.534	1	.465	.737
	class	-1.575	.204	59.613	1	.000	.207
	Letter	-.231	.222	1.080	1	.299	.794
	Encourage	4.211	.367	131.753	1	.000	67.442
	Grabgo	1.834	.586	9.791	1	.002	6.258
	Constant	6.236	3.127	3.977	1	.046	510.823

A-3. PMTCT.

As reported by Malawi's Ministry of Health and Population, 72% of pregnant women who tested HIV-positive at an antenatal clinic received antiretroviral prophylaxis (UNAIDS/World Health Organization, 2007, p.8). Even with PMTCT intervention, 20% of children born to HIV positive mothers will acquire the infection before, during, or just after birth and 50% of these children will not live to their fifth birthday (Zanera & Miteka, 2004, p.185). A study conducted in 2007 in Blantyre, Malawi, found that 18.3% of children aged 12 weeks and under who were born to HIV-positive mothers acquired the virus despite proper dosage of both the mother and newborn with nevirapine

(Pederson, Kamwendo, Blood, Mwapasa, Molyneux, North, Rogerson, Zimmerman, Mashnick, 2007, p.e838).

A-4. The University of North Carolina Project.

The University of North Carolina Project, founded in 1992, is located in Lilongwe, Malawi at the Tidziwe Centre on the campus of Kamuzu Central Hospital. The UNC Project provides free HIV VCT to all as well as healthcare to those enrolled in research studies, currently 2500 patients (Brown, 2005, p.23). UNC Project has a strong relationship with MoHP and the Malawi College of Medicine. As well as providing education opportunities for Malawian medical students and other Malawian health professionals at KCH, UNC Project is responsible for the operation of the KCH sexually transmitted diseases clinic that sees approximately 7,500 patients per year. UNC Project also operates the antenatal clinic at Bwaila Hospital which sees more than 20,000 women per year, as well as District Health Centers in Area 25, Area 18, and Kawale (UNC, 2008). Currently UNC Project oversees eight clinical care programs and is conducting and participating in eighteen research studies. As a clinical care program, UNC Project provides PMTCT services to over 20,000 women per year at four of Lilongwe's antenatal clinics (Bwaila Hospital, District Health Centres in Area 25, Area 18, and Kawale). PMTCT services include multivitamins and iron for patients, tetanus vaccination, malaria treatment and prevention, STD treatment, and counseling on exclusive breastfeeding. The UNC Project's PMTCT program accounts for approximately half of all PMTCT services offered in Malawi. UNC Project's PMTCT program is the largest in sub-

Saharan Africa. Data indicate that 98% of women who attend antenatal clinic accept HIV testing and all HIV-positive women accept nevirapine prophylaxis. This is estimated to prevent HIV transmission to over 2,500 babies each year (UNC 2008).

A-5. IRB Approval Letter.

The University of Mississippi

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December 18, 2008

Ms. Mary Margaret Peterson
7 PR 3057, Unit 8
Oxford, MS 38665

Dr. Laura Johnson
Department of Psychology
University, MS 38677

Dear Ms. Peterson and Dr. Johnson:

This is to inform you that your application to conduct research with human participants, ***An Analysis of Recruitment Strategies to Increase Participation in Malawian Couples' HIV Counseling and Testing Programs*** **(Protocol No. 09-097)** has been approved as Exempt under 45 CFR 46.101(b)(4).

Please remember that all of The University of Mississippi's human participant research activities, regardless of whether the research is subject to federal regulations, must be guided by the ethical principles in *The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research*.

It is especially important for you to keep these points in mind:

- You must protect the rights and welfare of human research participants.
- Any changes to your approved protocol must be reviewed and approved before initiating those changes.
- You must report promptly to the IRB any injuries or other unanticipated problems involving risks to participants or others.

If you have any questions, please feel free to call me at (662) 915-7482.

Sincerely,

Diane W. Lindley

Diane W. Lindley
Coordinator, Institutional Review Board