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Prevalence of HIV sero-discordance and associated behavioural factors among couples aged 18-49 years from Matsapha in Swaziland

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PREVALENCE OF HIV SERO-DISCORDANCE AND ASSOCIATED BEHAVIOURAL FACTORS AMONG COUPLES AGED 18-49 YEARS FROM MATSAPHA IN SWAZILAND

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Date: March 2017

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A research report submitted to the School of Public Health, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the Degree of Master of Public Health.

DECLARATION

I, Nkosingiphile Nkosinathi Ngwenya, declare that this research report is my original work. It is being submitted for the degree of Master of Public Health in the field of Rural Health in the University of the Witwatersrand, Johannesburg. This research report has not been submitted before for any degree or examination to this or any other institute of higher learning.



Date: March 2017

ABSTRACT

Introduction: Sero-discordant couples are a population at risk for new HIV infection in Swaziland due to heterosexual transmission from an HIV-infected partner to the other. Male circumcision and condom use have been key HIV prevention strategies for negative partners. The overall objective of this study was to determine sero-discordance rate and behavioural factors associated with HIV status among couples aged 18-49 years from Matsapha in Swaziland in 2013.

Methods: This is a secondary analysis of the Matsapha voluntary counselling and testing (VCT) couple dataset of 2013 in Swaziland. The aim of the routine VCT couple data collection was to assess HIV prevalence in Swaziland amongst couples, aged 18-49. In the routine VCT data collection, a blood sample for HIV testing was taken and a Swaziland HIV testing and counselling (HTC) client record form was administered to all individuals accessing the service as couples in 2013 in Swaziland. For this study the sample size was 214 couples. The sample was limited to men and women aged 18-49 years documented as couples (in a relationship) where HIV status was known for both partners. Logistic regression analyses were conducted to detect associations between demographic factors, female and male sero-discordant characteristics and risk factors (i.e. condom use, sexual transmitted infections (STIs), number of sexual partners in the past 6 months, male circumcision).

Results: Of 214 couples identified in the Matsapha VCT dataset, couple HIV prevalence in this study was found to be 13.6%. Couple HIV prevalence was as follows: 86.4% were concordant negative, 7.5% were HIV sero-discordant and 6.1% were concordant positive couples. Of the 16 sero-discordant couples, 11 of the HIV positive partners were women. The most significant independent predictor of at least one partner being HIV-infected (versus both partners HIV-uninfected) was the male partner having two or more sexual partners (AOR= 7.6; 95% CI 1.7 to 34.5; P=0.01). In addition there was some evidence that couples who reported only using condoms "sometimes" were at a greater risk of HIV-infection than couples who reported condom use "always" (AOR= 3.2; 95% CI 0.8 to 12.5 ; P=0.09).

Conclusions: Overall, the findings in this study show positive associations between two or more sexual partners and the outcome variable of HIV infection. The study indicated that couple HTC programs should help HIV negative partners in sero-discordant relationships remain uninfected by promoting faithfulness to one sexual partner.

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NOMENCLATURE

Cohabitation: Living together as a couple (de Walque, 2007).

Concordant: Both members of a couple having the same HIV status (Bunnell R. et al, 2006).

Concordant negative: Both members of a couple being HIV-negative (de Walque, 2007).

Concordant positive: Both members of a couple being HIV-positive (de Walque, 2007).

Discordant: Two members of a couple having different HIV status; one is HIV-positive while the other is HIV-negative (Bunnell R. et al, 2006).

Female discordant: A couple in which the woman is HIV-positive and the man is HIV-negative (de Walque, 2007).

Male discordant: A couple in which the man is HIV-positive and the woman is HIV-negative (de Walque, 2007).

Sero-conversion: The development in blood serum of detectable antibodies to a specific infectious agent as the result of infection or immunization; refers in this study to the development of HIV antibodies (Bunnell R. et al, 2006).

1. INTRODUCTION, AIMS AND OBJECTIVES

Chapter 1 provides an overview of the extent of sero-discordance globally and in Swaziland. It describes the characteristics of sero-discordance and factors associated with the couples' HIV status. According to de Walque (2007), high proportions of new HIV infections occur in long-standing heterosexual relationships and HIV sero-discordant couples are at 10% risk of acquiring HIV infection annually. Most HIV prevention approaches focus on condom use, reducing the number of sexual partners, and promoting faithfulness among couples. HIV infected couples form a significant target population for HIV prevention, given the high proportions of heterosexual HIV transmission in couples that lack mutual knowledge of their HIV status. The chapter concludes with a justification and the aims and objectives of this study are provided.

1.1 INTRODUCTION

Heterosexual transmission is accountable for over 90 percent of adult HIV infections in sub-Saharan Africa (de Walque, 2007). The availability and effectiveness of HIV treatment which improves HIV-positive individuals' lives has caused a rise in the prevalence of HIV sero-discordant couples (Wawer et al., 2006). A majority of the HIV new infections are happening in heterosexual relationships with an estimate of 60-94 percent in other sub-Saharan settings (Dunkle et al., 2008). While many HIV prevention approaches focus on individuals, few have targeted married or cohabiting couples who are actually at great risk of HIV infection since many lack knowledge of their own or partner's HIV status.

In Swaziland, the HIV/AIDS pandemic still presents a burden to the nation with the highest HIV prevalence globally of 31 percent adults aged 18-49 years living with HIV/AIDS in 2011 (UNAIDS, 2014). Since HIV was discovered, the government of Swaziland has led and coordinated various multi-sectoral approaches to respond to the pandemic through the National AIDS Council (NAC). The Swaziland country report on monitoring the political declaration on HIV/AIDS 2012 indicated that among married couples aged 15-49 years, 47.3 percent of women and 31.3 percent of men knew their HIV status while in only 40.1 percent of couples had both

spouses received HIV testing (UNAIDS, 2014). In addition, Swazi men and women have an HIV incidence rate of 1.7 percent and 3.1 percent respectively (SHIMS, 2012).

Our understanding of how sero-discordant couples manage their HIV risk is still inadequate. Consequently, couple-oriented HIV prevention interventions are either non-existent or under-promoted. It is therefore urgent for the health sector to understand the HIV sero-discordance prevalence and behavioural factors associated with couple HIV status in order to effectively minimise new HIV infections.

1.2 PROBLEM STATEMENT

Studies have shown that scale-up for voluntary counselling and testing (VCT) of couples in Zambia and Rwanda could decrease heterosexual HIV transmission by 35-80 percent, supposing an incidence of 20 percent annually without an intervention (Dunkle et al., 2008). Another study amongst couples in Rwanda, in which participants received couples' HIV counselling and testing, found that the annual proportion of couples using condoms improved from 4-57 percent because of early access to HIV prevention and condom distribution programs (Hugonnet et al., 2002).

Despite increasing evidence of its prominence, the concept of "sero-discordance" and the incidence and prevalence thereof are poorly understood in most countries (Were, 2008; Kelley, 2011). Often, health workers and policymakers, too, are not acquainted with HIV sero-discordance incidence and importance, resulting in less focus on treatment strategies that can safeguard the uninfected partner and expand the life expectancy of the positive client. The reduction of HIV transmission risk in sero-discordant couples by 92 percent in the HIV positive partner in receipt of antiretroviral therapy comparative to couples with an HIV positive partner not receiving antiretroviral treatment has been validated in studies like the African sub-investigation of partners in prevention herpes simplex virus (HSV) and HIV transmission study (Donnell et al., 2010).

HIV prevention within sero-discordant couples is a reasonably new area of prevention approaches in many developing countries like Swaziland. Barriers and challenges linked with HIV prevention undertakings include difficulty in getting couples to partake in HIV services, sero-discordance

misconceptions and gender inequality. Adverse events (violence or separation) due to couple misunderstandings and fear of stigma associated with sero-discordance may influence the uptake of couples' HIV testing and counselling (HTC) (Bunnell et al., 2006).

With the absence of HIV cure and a vaccine, condom use, treatment of the infected partner and male circumcision are key strategies in the prevention of HIV transmission to HIV negative partners. If unchecked, the HIV pandemic in couples may result in increased morbidity and a strain on national health expenditures and economic productivity, thus increasing poverty.

1.3 JUSTIFICATION

Presently, there is no published data on behavioural factors associated with HIV status among couples accessing VCT services in Swaziland. Reported HIV cases among couples presents an unmet prevention need. A first step in establishing a prevention programme was to conduct this study to increase awareness of HIV sero-discordance. This study could promote programs aimed at strengthening prevention of HIV transmission among HIV sero-discordant couples living together. This study determines HIV sero-discordance prevalence, transmission risk perceptions, and prevention practices adopted among couples and factors that affect them. These findings could provide a basis for formulating strategies to strengthen programs of HIV prevention among couples.

1.4 AIM AND OBJECTIVES

1.4.1. Overall aim

To determine the prevalence of sero-discordance and behavioural factors associated with HIV infection in couples aged 18-49 years from Matsapha in Swaziland.

1.4.2. Specific objectives

1. To determine the prevalence of sero-discordance and the prevalence of HIV positive concordance among couples age 18-49 years presenting at the Matsapha testing centre,

Swaziland.

2. To describe the socio-demographic and behavioural characteristics associated with HIV status (any HIV infection vs. no HIV) of couples presenting at the Matsapha testing centre, Swaziland.
3. To compare the socio-demographic and behavioural factors between sero-discordant and HIV-positive concordant couples aged 18-49 years presenting at the Matsapha testing centre, Swaziland.

2. LITERATURE REVIEW

This conceptual literature review draws on studies that examine sero-discordance prevalence and behavioural factors associated with HIV status among couples. The focus has been narrowed to sub-Saharan Africa and Swaziland where possible. The literature provides evidence for several predisposing and enabling factors such as HIV testing, condom use, STIs, age and gender, number of sexual partners and male circumcision that influence HIV status among couples.

2.1 Socio-demographic Factors

A study in Zambia showed that 87 percent of cases of HIV incidence in the uninfected partner for sero-discordant couples were acquired from the HIV-infected partner (Allen et al., 1991). Another study, piloted at 14 sites in eastern and southern Africa, revealed that 64 percent of sero-conversions may possibly be connected by viral sequencing to the HIV-infected partner in a relationship (Celum et al., 2010).

In most secondary studies of sero-discordant partnerships, data collected is 50 percent males and females but there is substantial variation. Population studies in 2007-2008 in low and middle-income countries discovered that the majority of sero-discordant couples lack mutual knowledge of their partner's status, leaving couples unknowingly vulnerable to HIV infection (Lingappa et al., 2008; Msuya et al., 2008). Numerous studies have revealed that, when HIV discordant partners are not acquainted with each other's status, heterosexual HIV transmission often occurs between the two partners (Farquhar et al. 2004; Hugonnet et al., 2002; Malamba et al., 2005; Kaiser, 2011).

Conversely, sero-discordant couples who are cognizant of their partner's HIV status could be able to access treatment, emotional and adherence support, and acceptance of PMTCT interventions (Lingappa, 2008; Eyawo et al., 2011; UNAIDS, 2014).

The Swaziland country report on monitoring the political declaration on HIV and AIDS 2012 indicated that 62 percent of new infections occur among young women and they occur among those aged 25 years and older, many of whom one would expect to be married or cohabiting with a steady partner (UNAIDS, 2014). Differences in age of principal sexual encounter between

female and male may also be a factor. Numerous studies have shown younger age to be more closely associated with increased couple HIV transmission (Fideli et al., 2001; Hugonnet et al., 2002; Wawer et al., 2006; Gray et al., 2001; Quinn et al., 2000). A study by Gray et al. (2001) concurred with these findings and found 67 percent discordant couples aged 15-19 more likely to acquire HIV infection than those aged 30-59 in Uganda.

2.2 Proportion of HIV sero-discordance

In Swaziland, the percentage of concordant positive couples is higher than those who are discordant (de Walque, 2007). According to the Demographic Health Survey (DHS) 2006/7, Swaziland had a sero-discordant proportion of 16.4 percent out of all couples (CSO, 2008). HIV prevalence amongst women aged 15-24 years was 15 percent in 2011, considerably higher than the 6 percent reported amongst men of the similar age group (UNAIDS 2014).

2.3 Factors associated with any HIV

STIs have been linked with an increased risk of HIV transmission in discordant couples (Gray et al., 2001). Bouhnik et al. (2007) found that female index partners reporting a history of an STI were more likely to have transmitted HIV to their partners than females without STIs (AOR=2.6, 95% CI 1.4-5.1). Study by Quinn et al. (2000) showed that HIV transmission rate among female partners of circumcised men was 5.2 per 100 person-years compared to 13.2 per 100 person-years among the female partners of uncircumcised men in Uganda. A similar result was found in two cross-sectional studies in Kenya and Zambia, where the proportion of uncircumcised men was significantly higher among concordant positive couples than HIV sero-discordant couples (Freeman and Glynn, 2004; Malamba et al., 2005).

It is important for sero-discordant couples to prevent HIV transmission to the uninfected partner by constantly practicing safer sex and by means of male or female condoms (Eyawo et al., 2011). The Swaziland 2011 country report figures showed condom use at last sexual encounter was at 71.4 percent, indicating a change in sexual behaviour (UNAIDS 2014). A study in Zambia and Rwanda revealed that the transmission risk from an HIV-positive partner to an HIV-negative

partner in sero-discordant relationships can be reduced from 20-25 percent to 3-7 percent per year using approaches where condom use is recommended for prevention (Dunkle et al., 2008).

2.4 Summary

The lack of male circumcision, extramarital sex, unawareness of self or partner's HIV status, and STIs have been found to be associated with HIV transmission amongst couples (Carpenter et al., 1999; Gray et al., 2001; Quinn et al., 2000). It has been found that condom provision and couple-specific counselling and testing programs have reduced HIV transmission by 80 percent amongst couples (Allen et al., 1991).

3. METHODOLOGY

3.1 STUDY DESIGN

This is a secondary analysis of the Matsapha VCT couple routine dataset of 2013 in Swaziland. The primary dataset was collected using the Swaziland HIV testing and counselling (HTC) client record which included demographics and behavioural factors: sexual history, self-reported STIs, circumcision, condom use and the number of sexual partners in 2013 (appendix A). The aim of the routine VCT data collection was to assess the HIV prevalence rate in Swaziland amongst couples, aged 18-49.

New categories and variables were created using the study data, and adapted to meet the study objectives for this secondary analysis. The overall study objective aimed to determine sero-discordance rate and behavioural factors associated with HIV status amongst couples aged 18-49 years from Matsapha in Swaziland in 2013.

3.2 STUDY POPULATION AND SAMPLING

The couple VCT routine data collection focused on women and men age 18-49 years presenting at the Matsapha testing centre who were from the four geographic regions of Swaziland namely: Hhohho, Manzini, Lubombo and Shiselweni. Therefore, the secondary analysis focused on this age group from the four regions identified in the VCT 2013 dataset of Matsapha in Swaziland.

The routine VCT data collections recruited 1794 women and 1800 men with 214 couples (428 participants) tested in 2013. As part of routine VCT data collection, couple data was collected using the Swaziland HTC client record administered face-to-face by ten trained VCT counsellors. Each couple HIV Testing and Counselling session was conducted following the Swaziland National HIV Testing and Counselling Guidelines. Men and women age 18-49 years as couples participated in the 2013 routine data collection and provided a blood sample for HIV test. Each VCT counsellor was required to counsel and test ten couples with a target of 20 individuals per day.

For the secondary VCT 2013 dataset analysis, the study sample was limited to women and men aged 18-49 years documented as couples (in a relationship) where HIV status was known for both partners.

3.3 SETTING/CONTEXT

The Matsapha VCT centre known as 'New Start' is a Population Service International (PSI) initiative. PSI is a non-governmental organisation that provides HTC, condom distribution, male circumcision and social behavioural change communication (HIV prevention campaigns) in Swaziland. Matsapha VCT centre is located in the densely populated industrial area of Swaziland. As a result of rural–urban migration within Swaziland, most residents are poor, generally making a living within the informal sector of the economy. Matsapha was specifically selected for this study due to its location in the Manzini region which is the largest industrial site in Swaziland (CSO, 2008). The estimated population of Matsapha was about 90,000 and comprised of 65,000 residents and 25,000 non-residents. (CSO, 2008). Moreover, Matsapha has a well-established VCT that allowed a sufficient number of the study sample.

The secondary analysis was based on the available 2013 couple dataset from the Matsapha VCT centre in Swaziland.

3.4 DATA COLLECTION

No data was collected primarily for this study. In the routine VCT data collection for couples, data was collected using the Swaziland HTC client record administered face-to-face by ten trained VCT counsellors. Each couple HIV Testing and Counselling session was conducted following the Swaziland National HIV Testing and Counselling Guidelines. Men and women age 18-49 years as couples participated in the 'Love and Test" campaign and provided blood samples for the routine HIV test. Each VCT counselor was required to counsel and test ten couples with a target of 20 individuals per day.

In this secondary analysis, data was extracted from the routine Matsapha VCT 2013 couple dataset. Couples in which one or both partners refused an HIV test and were outside of the 18-49 age range were excluded.

3.5 MEASUREMENT AND DATA SOURCES

With the assistance of the consulted biostatistician, an analysis of the baseline data was used to measure HIV prevalence using the Matsapha VCT 2013 couple dataset. The following table shows the variables used to measure the objectives of the study.

Table 1: Illustrating objectives and variables

Objectives	**Actual data collected/analysed (Variables)**
To determine the prevalence of sero-discordance and the prevalence of HIV positive concordance among couples age 18-49 years presenting at the Matsapha testing centre, Swaziland.	couples (concordant negative, concordant positive or sero-discordance) gender (male sero-discordant vs. female sero-discordant)
To describe the socio-demographic and behavioural characteristics associated with HIV status (any HIV infection vs. no HIV) in couples presenting at the Matsapha testing centre, Swaziland.	Age region migration ever tested condom use STIs number of sexual partners in the past 6 months male circumcision
To compare the socio-demographic and behavioural factors between sero-discordant and HIV-positive concordant couples aged 18-49 years presenting at the Matsapha testing centre, Swaziland.	Age region migration ever tested condom use STIs number of sexual partners in the past 6 months male circumcision

3.6 DATA PROCESSING METHODS AND ANALYSIS

For the primary study, data were entered into MS Excel database, checked and cleaned. The secondary study used the de-identified (participant identifiers were removed) and cleaned dataset.

For the secondary study, the primary dataset was checked and additional recoding and cleaning was done using Stata software (version 12.0, STATA Corp., College Station, Texas, USA). The

researcher checked the dataset thoroughly for incongruent values, missing data, and obvious data entry errors. Obvious errors were corrected and the dataset saved under another name. Descriptive statistics were generated to compare socio-demographic characteristics using T-test for continuous variables (age and the number of sexual partners) and Pearson's chi-squared tests were conducted to detect associations between socio-demographic factors and risk factors (i.e. condom use, STIs, the number of sexual partners in the past 6 months, male circumcision). With respect to condom use, a new variable defined as couples who reported the worst use of condoms was generated (worst condom use by couples).

To measure the prevalence of HIV sero-discordance amongst couples, the total number of HIV sero-discordant couples over the total number of couples in 2013 was calculated and reported as a percentage. Separate percentages for male sero-discordance or female sero-discordance and total numbers were calculated for each of the four geographic regions of Swaziland (Hhohho, Manzini, Lubombo and Shiselweni).

In order to address objective 3, Pearson's chi-squared tests were conducted to determine couple variables for inclusion in the univariate analysis. Bivariate logistic regression analyses were carried out to compute odds ratios (OR) and their corresponding 95 percent confidence intervals (95% CI), in order to identify demographic factors associated with HIV sero-discordance and concordance among couples and to control for confounding. The p-values for the significance of associations were calculated using chi-square tests. Furthermore, multivariable logistic regression models were fitted in order to identify independent predictors of any HIV-infection in the couple.

3.7 ETHICS

In the routine couple VCT data, all HTC clients were informed about the privacy and confidentiality of their information. A consent form with the right to refuse was signed by clients prior to HIV testing and routine data collection following the Swaziland National HIV Testing and Counselling Guidelines.

For this secondary analysis permission to utilise the 2013 VCT dataset was granted by the Population Service International (PSI) (Appendix A). Ethical approval to conduct this secondary analysis was obtained from the Human Research Ethics Committee at the University of Witwatersrand (Appendix B) and Swaziland Scientific and Ethics Committee (SEC) Appendix C).

The secondary data analysis was conducted by the researcher with guidance from his supervisor. He used a cleaned and de-identified dataset. The dataset was stored on the researcher's laptop, which is password protected, and the data will be retained for a period of two years following the end of this study. Access to the dataset was limited to the researcher, biostatistician, and supervisor and the data was not shared with any other person.

4. RESULTS

The overall objective of this study was to examine behavioural factors associated with any HIV infection of couples in Swaziland. In this chapter the socio-demographic, couple characteristics as well as couples' HIV concordance and sero-discordance prevalence, gender, region and associations are presented using frequency and percentages.

4.1 HIV PREVALENCE AMONGST COUPLES

A total of 214 couples from the Matsapha VCT dataset were included in the study, with equal numbers of males and females. Couple HIV prevalence was as follows: 86.4% were concordant negative, 7.5% were HIV sero-discordant and 6.1% were concordant positive couples. Of the 16 sero-discordant couples, 11 (68.8%) of the HIV positive partners were women: 11.2% were from Manzini and 2.1% were from Hhohho (Table 2).

Table 2: HIV couple category by explanatory factors

Factor	Level	HIV category		
		Concordant negative (n=185)	**Sero-discordant (n=16)**	**Concordant positive (n=13)**
Age of male	Mean (SD)	31.3 (8.2)	30.7 (7.5)	31 (6.7)
Age difference in couple	Mean (SD)	2.9 (4.7)	2.3 (4.9)	2.2 (6.3)
Region (female)	Hhohho	43 (89.6)	1 (2.1)	4 (8.3)
	Lubombo	23 (92.0)	0 (0.0)	2 (8.0)
	Manzini	112 (83.6)	15 (11.2)	7 (5.2)
	Shiselweni	7 (100.0)	0 (0.0)	0 (0.0)
Migration	No	168 (86.2)	16 (8.2)	11 (5.6)
	Yes	17 (89.5)	0 (0.0)	2 (10.5)
Ever tested (female)	No	53 (84.1)	5 (7.9)	5 (7.9)
	Yes	132 (87.5)	11 (7.3)	8 (5.3)
Ever tested (male)	No	53 (89.8)	3 (5.1)	3 (5.1)
	Yes	132 (85.2)	13 (8.4)	10 (6.5)
STI (female)	No	177 (86.3)	16 (7.8)	12 (5.8)
	Yes	8 (88.9)	0 (0.0)	1 (11.1)
STI (male)	No	180 (87.0)	15 (7.3)	12 (5.8)
	Yes	5 (71.4)	1 (14.3)	1 (14.3)
Medical male circumcision	No	115 (84.6)	13 (9.6)	8 (5.9)
	Yes	70 (89.7)	3 (3.8)	5 (6.4)
Number of sexual partners (female)	0	2 (100.0)	0 (0.0)	0 (0.0)
	1	174 (86.6)	14 (7.0)	13 (6.5)
	2	8 (100.0)	0 (0.0)	0 (0.0)
	3	1 (33.3)	2 (66.1)	0 (0.0)
Number of sexual partners (male)	0	3 (100.0)	0 (0.0)	0 (0.0)
	1	179 (87.8)	13 (6.4)	12 (5.9)
	2	3 (50.0)	2 (33.3)	1 (16.7)
	3	0 (0.0)	1 (100.0)	0 (0.0)
Condom use (female)	Always	47 (90.4)	5 (9.6)	0 (0.0)
	Sometimes	76 (80.9)	6 (6.4)	12 (12.8)
	Never	62 (91.2)	5 (7.4)	1 (1.5)
Condom use (male)	Always	44 (88.0)	6 (12.0)	0 (0.0)
	Sometimes	80 (80.8)	7 (7.1)	12 (12.1)
	Never	61 (93.9)	3 (4.6)	1 (1.5)
Worst condom use by couples	Always	39 (92.9)	3 (7.1)	0 (0.0)
	Sometimes	80 (80.8)	8 (8.1)	11 (11.1)
	Never	66 (90.4)	5 (6.9)	2 (2.7)

4.2 COUPLE CHARACTERISTICS AND HIV STATUS

Couples in which the man had two or more partners were more likely to have at least one member HIV positive compared to couples in which the man had one or no partner (Table 3).

Table 3: Any HIV by explanatory factors

Factor	Level	Any HIV	
		No HIV (n=185)	**Atleast one HIV (n=29)**
Age of Male	Mean (SD)	31.3 (8.2)	30.8 (7.0)
Age difference of couples	Mean (SD)	2.9 (4.7)	2.2 (5.5)
Region (female)	Hhohho	43 (89.6)	5 (10.4)
	Lubombo	23 (92.0)	2 (8.0)
	Manzini	112 (83.6)	22 (16.4)
	Shiselweni	7 (100.0)	0 (0.0)
Migration	No	168 (86.2)	27 (13.9)
	Yes	17 (89.5)	2 (10.5)
Ever tested (female)	No	53 (84.1)	10 (15.9)
	Yes	132 (87.4)	19 (12.6)
Ever tested (male)	No	53 (89.8)	6 (10.2)
	Yes	132 (85.2)	23 (14.8)
STI (female)	No	177 (86.3)	28 (13.7)
	Yes	8 (88.9)	1 (11.1)
STI (male)	No	180 (87.0)	27 (13.0)
	Yes	5 (71.4)	2 (28.6)
Medical male circumcision	No	115 (84.6)	21 (15.4)
	Yes	70 (89.7)	8 (10.3)
Number of sexual partners (female)	0	2 (100.0)	0.(0.0)
	1	174 (86.6)	27 (13.4)
	2	8 (100.0)	0 (0.0)
	3	1 (33.3)	2 (66.7)
Number of sexual partners (male)	0	3 (100.0)	0 (0.0)
	1	179 (87.8)	25 (12.3)
	2	3 (50.0)	3 (50.0)
	3	0 (0.0)	1 (100.0)
Condom use (female)	Always	47 (90.4)	5 (9.6)
	Sometimes	76 (80.9)	18 (19.2)
	Never	62 (91.2)	6 (8.8)
Condom use (male)	Always	44 (88.0)	6 (12.0)
	Sometimes	80 (80.8)	19 (19.2)
	Never	61 (93.9)	4 (6.2)
Worst condom use by couples	Always	39 (92.9)	3 (7.1)
	Sometimes	80 (80.8)	19 (19.2)
	Never	66 (90.4)	7 (9.6)

4.3 COUPLE HIV SERO-CONCORDANCE AND SERO-DISCORDANCE

Overall, 13 couples were found to be HIV sero-concordant positive compared to 16 sero-discordant couples. Most couples with female partners suffering from STIs were HIV concordant positive compared to 50% couples with male partners suffering from STIs. 57.9% couples who sometimes used a condom were concordant positive compared to that of 42.1% couple sero-discordant counterparts (Table 4).

Table 4: Concordance given some HIV

Factor	**Level**	**Concordant positive (n=13)**	**HIV sero-discordant (n=16)**
Age of male	Mean (SD)	31 (6.7)	30.7 (7.5)
Age difference of couples	Mean (SD)	2.2 (6.3)	2.3 (4.9)
Region (female)	Hhohho	4 (80.0)	1 (20.0)
	Lubombo	2 (100.0)	0 (0.0)
	Manzini	7 (31.8)	15 (68.2)
Migration	No	11 (40.7)	16 (59.3)
	Yes	2 (100.0)	0 (0.0)
Ever tested (female)	No	5 (50.0)	5 (50.0)
	Yes	8 (42.1)	11 (57.9)
Ever tested (male)	No	3 (50.0)	3 (50.0)
	Yes	10 (43.5)	13 (56.5)
STI (female)	No	12 (42.9)	16 (57.1)
	Yes	1 (100.0)	0 (0.0)
STI (male)	No	12 (44.4)	15 (55.6)
	Yes	1 (50.0)	1 (50.0)
Medical male circumcision	No	8 (38.1)	13 (61.9)
	Yes	5 (62.5)	3 (37.5)
Number of sexual partners (female)	1	13 (48.2)	14 (51.9)
	3	0 (0.0)	2 (100.0)
Number of sexual partners (male)	1	12 (48.0)	13 (52.0)
	2	1 (33.3)	2 (66.7)
	3	0 (0.0)	1 (100.0)
Condom Use (female)	Always	0 (0.0)	5 (100.0)
	Sometimes	12 (66.7)	6 (33.3)
	Never	1 (16.7)	5 (83.3)
Condom Use (male)	Always	0 (0.0)	6 (100.0)
	Sometimes	12 (63.2)	7 (36.8)
	Never	1 (25.0)	3 (75.0)
Worst condom use by couples	Always	0 (0.0)	3 (100.0)
	Sometimes	11 (57.9)	8 (42.1)
	Never	2 (28.6)	5 (71.4)

4.4 FACTORS ASSOCIATED WITH ANY HIV

To examine the influence of the variables on HIV sero-discordance multivariate logistic regression was conducted. Factors significantly associated with any HIV infection (versus both partners HIV-uninfected) were having two or more sexual partners (AOR = 7.6; 95% CI 1.7 to 34.5). The sometimes use of condoms by couples was marginally significantly associated with any HIV infection (AOR = 3.2; 95% CI 0.8 to 12.5) (Table 5).

Table 5: Results of fitting a model to factors associated with any HIV

Factor	**Level**	**AOR**	**95% confidence interval**	**P-value**
STI (male)	No	1	Baseline	
	Yes	4.2	0.6 - 25.8	0.12
Condom use by couple	Always	1	Baseline	
	Sometimes	3.2	0.8 - 12.5	0.09
	Never	1.5	0.3 - 6.7	0.58
Number of partners (male)	Per one partner increase	7.6	1.7 - 34.5	0.01

5. DISCUSSION

5.1 Socio-demographic Factors

This study documents a considerable heterosexual HIV transmission risk within Swaziland couples because out of 29 couples in which at least one partner was positive and 13 were HIV concordant positive. The study identifies preventable behavioural factors associated with HIV sero-discordant and concordant status. The results of this study demonstrate important areas for HIV prevention programs and policy to consider.

The study findings show that the majority of HIV positive partners were women. Although this difference was not statistically significant, the higher proportion of HIV sero-discordance among females was similar to findings of another study in Ethiopia which reported that the proportions of sero-discordance among men was 29.4 percent as compared to 77.8 percent among females (Tadesse, 2014). In support of this finding, a study done among HIV sero-discordant couples in southwest Nigeria showed that gender is an associated factor of HIV sero-discordance (Afe, 2015). This finding also supports the UNAIDS report which states that HIV disproportionately affects Swazi women; HIV prevalence amongst women aged 15-24 years was 15 percent in 2011, considerably higher than the 6 percent reported amongst men of the similar age group (UNAIDS. 2014). Regardless of the difference being not statistically significant, this finding indicates the need to empower women with knowledge and risk awareness of sero-discordance in HIV prevention programs.

Most of the study participants were from the Manzini (62.6%) and Hhohho (22.4%) regions of Swaziland. The main reason for this regional variation could be explained by the fact that Matsapha VCT is located within the Manzini region and participants were able to access HTC services with ease (CDC, 2007). Manzini and Hhohho regions are located on the central and northern parts of Swaziland with the highest HIV rates in the country while the Lubombo (East) and Shiselweni (South) regions are mostly arid and less populated (CSO, 2008). Similarly, to this findings, a study in Uganda showed that the risk of being HIV positive in an HIV sero-discordant relationship was

associated with area of residence (Kaiser et al., 2011). This finding suggests a need for couple HIV prevention programs to be area-specific in their approach.

This study did not find any associations between any HIV infection and age differences among couples. This finding is in line with the other study carried out in Uganda among couples who presented for VCT (Malamba et al., 2005). However, the finding is inconsistent with a study done in Tanzania which established that female partners married to men who were more than twelve years older than them were more likely to be in any HIV positive union (Guthrie and Farquhar, 2007). Similarly, a number of other studies have shown younger age to be more closely associated with increased couple HIV transmission (Fideli et al., 2001; Hugonnet et al., 2002; Wawer et al., 2006; Gray et al., 2001; Quinn et al., 2000). In support of this finding, the Swaziland country report on monitoring the political declaration on HIV and AIDS 2012 indicated that 62 percent of new infections occur among young women and that 65 percent occur among those aged 25 years and older, many of whom one would expect to be married or cohabiting with a steady partner (UNAIDS, 2014). Regardless of the lack of associations, this finding suggests the need to emphasize HIV transmission risk in the young adults and promote couple VCT and HIV status disclosure.

5.2 Proportion of HIV sero-discordance

Across east Africa, national representative statistics suggested that 40-50 percent of married HIV-positive partners have an HIV-negative partner (Bunnell et al., 2006). The findings of this study revealed a 7.5% prevalence of HIV sero-discordance. This is less compared to the Demographic Health Survey (DHS) 2006/7 which reported 16.4 percent HIV sero-discordance rate amongst Swazi couples (CSO, 2008). It is low compared to other studies from other African countries which revealed that two-thirds of infected couples are HIV sero-discordant in Tanzania, Cameroon, Kenya, Ghana, and Burkina Faso (de Walque, 2007). Nevertheless, HIV-uninfected partners of sero-discordant couples remain vulnerable to become HIV infected (Bunnell et al., 2006). In support of this finding, men with a female sero-discordant partner were 12 times more likely to acquire HIV compared to 100 times women with a male sero-discordant partner (Carpenter et al.,

2002). This finding implies the need to address this risk awareness within sero-discordant relationships.

5.3 Factors associated with any HIV

Having two or more sexual partners was significantly associated with any HIV infection (versus both partners HIV-uninfected) with (AOR = 7.6; 95% CI 1.7 to 34.5). A greater number of sexual partners have been shown to influence HIV transmission in Rwanda and Zambia (Kelley et al., 2011). Similar to the findings reported, a study in Uganda found that two or more sexual partners were associated with HIV transmission (Guthrie and Farquhar, 2007). Men and women in discordant relationship with a greater number of sexual partners are more likely at risk of acquisition and transmission of HIV (Malamba et al., 2005). The impact of having more sexual partners on HIV transmission found in this study may specify the need to address this risk factor in couple HIV prevention programs.

This study did not find that medical male circumcision was associated with any HIV. This result was not consistent with the findings in other studies. The results of several other studies which are not peculiar to couples have shown circumcision to prevent the transmission and acquisition of HIV (Wawer et al., 2005; Gray et al., 2001). A study conducted in Uganda showed that the lack of circumcision is a risk factor for HIV transmission in couples (Malamba et al., 2005; Padian et al., 1997). Regardless of the difference being not statistically significant, male circumcision will be of assistance in reducing man's likelihood of acquiring HIV. Couple VCT should provide referral interventions for uncircumcised men for male circumcision as a means for HIV prevention.

This study showed that the sometimes use of condoms by couples were marginally significantly associated with any HIV infection with (AOR = 3.2; 95% CI 0.8 to 12.5). This result was consistent with a study conducted in South Africa which reported that lack of condom use by sexual partners was associated with HIV transmission in a sero-discordant relationship (Simbayi et al., 2007). Findings in other studies involving couples showed regular condom-use to be a protective factor against transmission within HIV-positive concordance and HIV sero-discordance (Freeman and Glynn, 2004; Malamba et al., 2005). Sero-discordant couples could pose a high risk group

especially if they have unprotected sex which might also increase Swaziland's HIV prevalence. The partial control of condom use on HIV transmission might designate the challenges of long-term condom use amongst sero-discordant couples in Swaziland.

Studies have shown that the presence of STIs in couples enhances HIV transmission (Freeman and Glynn, 2004). Partners in sero-discordant relationships with a greater number of sexual partners are more likely to have STIs which may facilitate the acquisition and transmission of HIV that will eventually lead to concordance (Kaiser et al., 2011). Male partners suffering from STIs showed a trend towards any HIV infection which was not statistically significant. In support of this finding, the Swaziland HIV counselling and testing guidelines highly recommend screening clients for STIs, through syndromic management (SHIMS, 2012).

This study did not find couples who had ever tested for HIV with their partners associated with any HIV infection. This might be due to the small sample size in this study. However, a study carried out in East and Southern Africa revealed that couples who had ever tested adopted behaviours that reduce HIV transmission risk factors within the relationship (Lingappa et al., 2008). Similarly, a trial in Kenya showed that couples assigned to VCT reduced unprotected sex with each other compared with couples allocated to the health information group (Ewayo, 2010). This implies that the HIV infected partner within a sero-discordant relationship might receive appropriate treatment and also refrain from behaviours that put the partner at risk of contracting the virus.

5.4 Limitations of the Study

This study shares some procedural limitations of being cross-sectional in nature. Therefore, the risk factors identified in this study cannot be determined to precede the outcome. Furthermore, the percentage of HIV infections acquired from outside the sero-discordant relationship cannot be calculated. Due to the nature of the study, getting a large number of couples coming for VCT was difficult. Therefore, the small sample size of this study was one of the limitations which affected the precision of the outcomes. This study investigated couples who accessed HIV testing in one VCT centre. The findings therefore did not reflect what was happening in other VCT centres or

the couple HIV risk factors in different settings. Positive HIV transmission factors which include sexual violence, ART, educational and socio-economic characteristics, were not part of the Swaziland HIV testing and counselling (HTC) client record and for this reason were not incorporated in this study.

6. CONCLUSION AND RECOMMENDATIONS

The study findings enlighten HIV prevention programs directed at HIV-negative primary partners; HIV-uninfected partners are predominantly at high risk of acquiring infection because of two or more sexual partners. Hence, reducing sexual partners in Swaziland might reduce transmission of HIV within sero-discordant couples.

6.1. Recommendations

Recommendations are as follows:

- The Swaziland's national HIV prevention strategy should raise the population's HIV sero-discordance awareness among couples. Status disclosure by HIV-positive clients' needs to be promoted through HIV testing and counselling (HTC) before the initiation of sexual relationship and consistently during the course of the relationship should be encouraged as a vital step in detecting and managing HIV status of couples.
- HTC programs should improve mutual knowledge of partner's HIV status through couple HIV testing.
- HTC programs should help HIV negative partners in sero-discordant relationships remain uninfected by promoting faithfulness to one sexual partner.

6.2. Further Research

The issue of circumcision in Swaziland could be investigated further using a larger sample size, by designing specific case-control or intervention studies. Several other risk factors including the economic conditions, religion and viral load had all been found out in studies to be HIV transmission risk factors amongst sero-discordant couples (Gray et al., 2001). There is also need for further studies to investigate the behavioural and attitudinal background that distinguishes urban and rural risk factors with regards to HIV infection amongst sero-discordant couples. This approach may have an influence on partners in sero-discordant relationships to avoid transmission from the HIV-positive to the HIV-negative partner.

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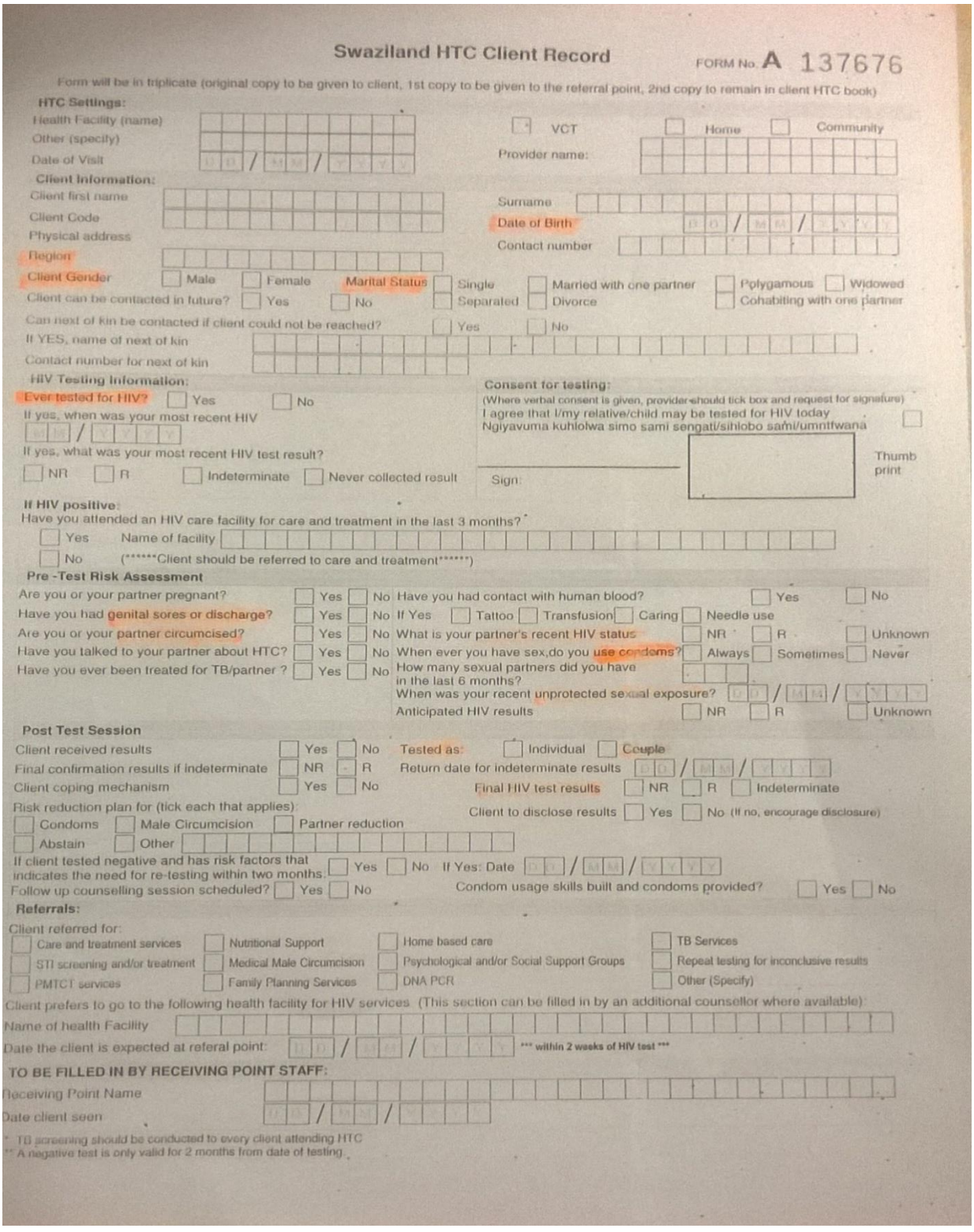
Appendix A: Swaziland HTC Client record



Swaziland HTC Client Record FORM No. A 137676

Form will be in triplicate (original copy to be given to client, 1st copy to be given to the referral point, 2nd copy to remain in client HTC book)

HTC Settings:

Health Facility (name) / Other (specify) / Date of Visit (D D / M M / Y Y Y Y) ☐ VCT ☐ Home ☐ Community

Provider name:

Client Information:

Client first name / Surname

Client Code / Date of Birth (D D / M M / Y Y Y Y)

Physical address / Contact number

Region

Client Gender ☐ Male ☐ Female Marital Status ☐ Single ☐ Married with one partner ☐ Polygamous ☐ Widowed ☐ Separated ☐ Divorce ☐ Cohabiting with one partner

Client can be contacted in future? ☐ Yes ☐ No

Can next of kin be contacted if client could not be reached? ☐ Yes ☐ No

If YES, name of next of kin

Contact number for next of kin

HIV Testing Information:

Ever tested for HIV? ☐ Yes ☐ No

If yes, when was your most recent HIV (M M / Y Y Y Y)

If yes, what was your most recent HIV test result?

☐ NR ☐ R ☐ Indeterminate ☐ Never collected result

Consent for testing:

(Where verbal consent is given, provider should tick box and request for signature)

I agree that I/my relative/child may be tested for HIV today ☐

Ngiyavuma kuhlolwa simo sami sengati/sihlobo sami/umntfwana

Sign: _____ Thumb print

If HIV positive:

Have you attended an HIV care facility for care and treatment in the last 3 months?

☐ Yes Name of facility

☐ No (******Client should be referred to care and treatment******)

Pre -Test Risk Assessment

Are you or your partner pregnant? ☐ Yes ☐ No

Have you had genital sores or discharge? ☐ Yes ☐ No

Are you or your partner circumcised? ☐ Yes ☐ No

Have you talked to your partner about HTC? ☐ Yes ☐ No

Have you ever been treated for TB/partner ? ☐ Yes ☐ No

Have you had contact with human blood? ☐ Yes ☐ No

If Yes ☐ Tattoo ☐ Transfusion ☐ Caring ☐ Needle use

What is your partner's recent HIV status ☐ NR ☐ R ☐ Unknown

When ever you have sex,do you use condoms? ☐ Always ☐ Sometimes ☐ Never

How many sexual partners did you have in the last 6 months?

When was your recent unprotected sexual exposure? (D D / M M / Y Y Y Y)

Anticipated HIV results ☐ NR ☐ R ☐ Unknown

Post Test Session

Client received results ☐ Yes ☐ No Tested as: ☐ Individual ☐ Couple

Final confirmation results if indeterminate ☐ NR ☐ R Return date for indeterminate results (D D / M M / Y Y Y Y)

Client coping mechanism ☐ Yes ☐ No Final HIV test results ☐ NR ☐ R ☐ Indeterminate

Risk reduction plan for (tick each that applies):

☐ Condoms ☐ Male Circumcision ☐ Partner reduction

☐ Abstain ☐ Other

Client to disclose results ☐ Yes ☐ No (If no, encourage disclosure)

If client tested negative and has risk factors that indicates the need for re-testing within two months. ☐ Yes ☐ No If Yes: Date (D D / M M / Y Y Y Y)

Follow up counselling session scheduled? ☐ Yes ☐ No

Condom usage skills built and condoms provided? ☐ Yes ☐ No

Referrals:

Client referred for:

☐ Care and treatment services ☐ Nutritional Support ☐ Home based care ☐ TB Services

☐ STI screening and/or treatment ☐ Medical Male Circumcision ☐ Psychological and/or Social Support Groups ☐ Repeat testing for inconclusive results

☐ PMTCT services ☐ Family Planning Services ☐ DNA PCR ☐ Other (Specify)

Client prefers to go to the following health facility for HIV services (This section can be filled in by an additional counsellor where available):

Name of health Facility

Date the client is expected at referal point: (D D / M M / Y Y Y Y) *** within 2 weeks of HIV test ***

TO BE FILLED IN BY RECEIVING POINT STAFF:

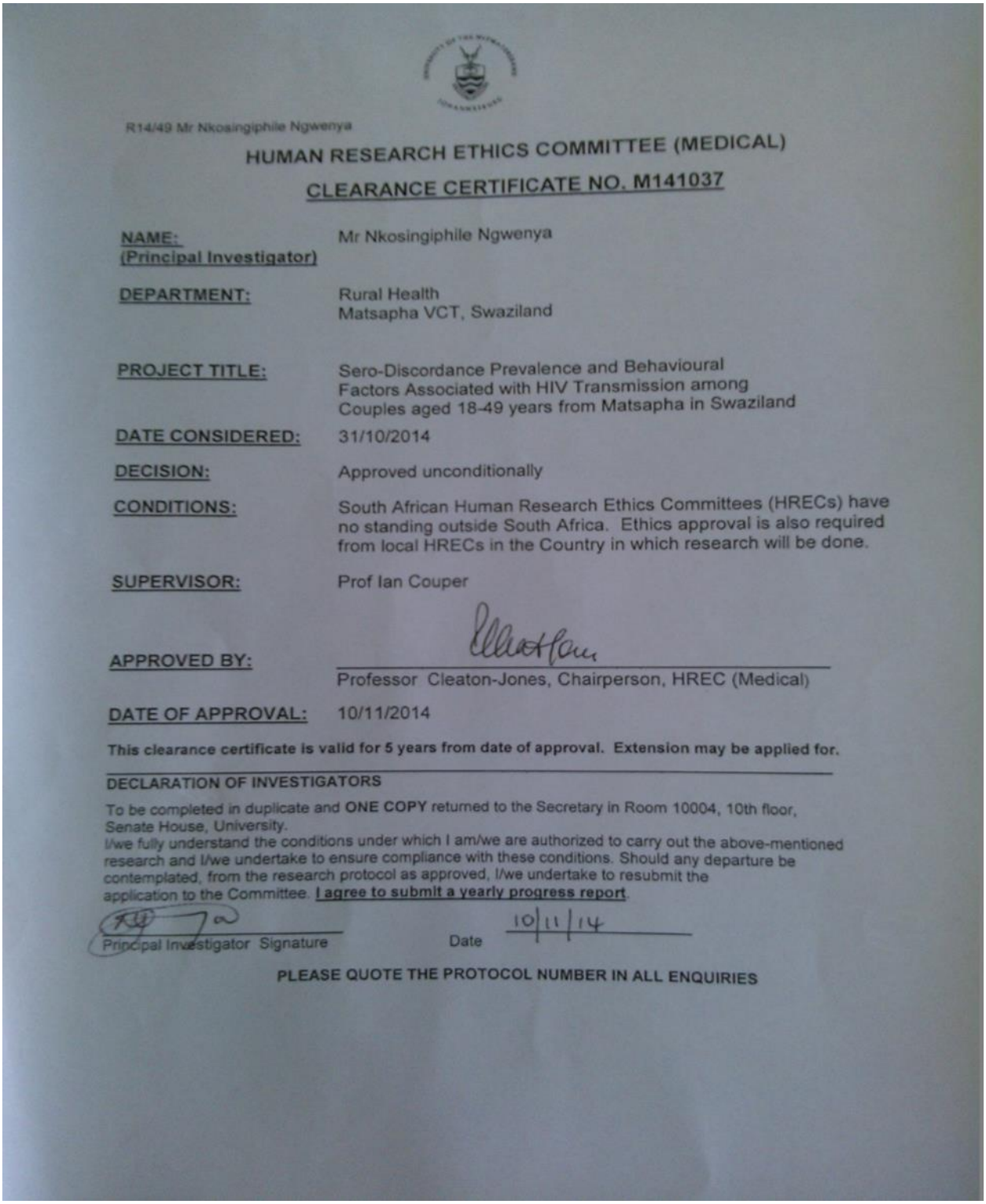
Receiving Point Name

Date client seen (D D / M M / Y Y Y Y)

* TB screening should be conducted to every client attending HTC

** A negative test is only valid for 2 months from date of testing

Appendix B: Ethics Approval HREC (Non-Medical) R14/49



R14/49 Mr Nkosingiphile Ngwenya

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M141037

NAME: (Principal Investigator)	Mr Nkosingiphile Ngwenya
DEPARTMENT:	Rural Health Matsapha VCT, Swaziland
PROJECT TITLE:	Sero-Discordance Prevalence and Behavioural Factors Associated with HIV Transmission among Couples aged 18-49 years from Matsapha in Swaziland
DATE CONSIDERED:	31/10/2014
DECISION:	Approved unconditionally
CONDITIONS:	South African Human Research Ethics Committees (HRECs) have no standing outside South Africa. Ethics approval is also required from local HRECs in the Country in which research will be done.
SUPERVISOR:	Prof Ian Couper
APPROVED BY:	Professor Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	10/11/2014

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature

Date 10/11/14

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix C: Letter of Permission

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email: info@psi.sz | www.psi.org

University of Witwatersrand

School of Public Health

Human Research Ethics Committee

Johannesburg, South Africa

Re: Approval to abstract VCT data and conduct research at PSI Swaziland

Dear Ethics Committee,

I hereby approve that Nkosingiphile Ngwenya a student at your institution abstract data for HTC which will assist him in completing his studies.

The information gathered will be helpful to the organization as it will also inform programming for HTC amongst couples and eventually assist the country in moving towards capturing required Couples HTC data in different settings.

Yours Sincerely,

Pamela Faura

Pamela Faura

Country Representative
PSI Swaziland
First Floor Nkhotfotjeni Building
MBABANE
Office: +268 2404-9117/9718/9847 | Cell: +268 7802 6113 | Fax: +268 2404-9772 |
Email address: pamela@psi.sz
skype name: pfaura2

Appendix D: Ethics Approval MH/599C



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MINISTRY OF HEALTH
P.O. BOX 5
MBABANE
SWAZILAND

THE KINGDOM OF SWAZILAND

January 15, 2015

Mr. Nkosingiphile Ngwenya
Principal Investigator
MBABANE

REF: MH/599C

Dear Mr. Ngwenya

RE: Sero-discordance prevalence and behavioural factors associated with HIV transmission among couples aged 18 – 49 years from Matsapha in Swaziland.

The committee thanks you for your submission to the Swaziland Scientific and Ethics Committee, an expedited review was conducted.

In view of the importance of the study and the fact that the study is in accordance with ethical and scientific standards, the committee grants you authority to conduct the study. You are requested to adhere to the specific topic and inform the committee through the chairperson of any changes that might occur in the duration of the study which are not in this present arrangement.

The committee requests that you ensure that you submit the findings of this study (**Electronic and hard copy**) **and the data set** to the Secretariat of the SEC committee.
The committee further requests that you add the SEC Secretariat as a point of contact if there are any questions about the study on 24047712/24045469.

Yours Sincerely,

19 JAN 2015
P.O. Box 5
Mbabane H100

RUDOLPH T.D. MAZIYA
CHAIRMAN, SEC

cc: SEC members