

**UNWANTED FERTILITY EXPERIENCE, HIV STATUS AND POST-PARTUM
CONTRACEPTIVE USE IN A PMTCT POPULATION IN DURBAN, SOUTH
AFRICA**

Heather M. Marlow

A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in
partial fulfillment of the requirements for the degree of Doctor of Philosophy in the
Department of Maternal and Child Health.

Chapel Hill
2012

Approved by:

Dr. Siân Curtis

Dr. Suzanne Maman

Dr. Lisa Pearce

Dr. Bert Peterson

Dr. Heidi Reynolds

Abstract

HEATHER M. MARLOW: Unwanted Fertility Experience, HIV Status and Post-partum Contraceptive Use in a PMTCT Population in Durban, South Africa
(Under the direction of Dr. Siân Curtis)

The HIV prevalence in South Africa is 17.1% and a majority of HIV infected adults are women. One of the government's strategies to avert new HIV infections is the prevention of unwanted pregnancies in HIV positive women through contraceptive use. Therefore, understanding how unwanted fertility and HIV status affect contraceptive use is important to meeting this goal. The purpose of this mixed methods dissertation is to understand how unwanted fertility experience, HIV status and health facility factors affect women's contraceptive use in the post-partum period. The specific aims are: *Aim 1*: To examine whether knowledge of HIV status affects women's modern contraceptive use post-partum, *Aim 2*: To determine whether unwanted fertility and HIV status affect post-partum modern contraceptive use and intent and *Aim 3*: To explore health facility factors including client-provider interactions around contraception, counselor's knowledge about contraceptive methods, client waiting times and other health facility factors affecting modern contraceptive use post-partum. Quantitative methods were used for Aims 1 and 2 using a sample of sexually active post-partum women from an urban township outside of Durban, South Africa. Several multivariate logistic regression models were used to examine intent to use contraceptives at baseline and unwanted fertility experience, HIV status and post-partum contraceptive use at 14 weeks. Qualitative methods were used for Aim 3. In-depth interviews

were conducted with clients and providers to identify health facility factors influencing in post-partum contraceptive use. Results from the quantitative paper demonstrate that intent did not predict post-partum contraceptive use, HIV status had a direct, but not moderating, effect on post-partum contraceptive use and that women experiencing unwanted fertility were less likely to use contraceptives post-partum. The measure of unwanted fertility likely underestimated unwanted fertility experience in this population. Findings from the qualitative paper indicate areas where clinic contraceptive programs can improve post-partum contraceptive use. Educating nurses about contraceptive initiation and more permanent methods, such as sterilization, could improve post-partum contraceptive use and reduce costs and patient overload. Creating opportunities for nurses and clients to have more in-depth discussions about contraceptive methods, side effects, condoms and STIs would improve post-partum contraceptive use.

Table of Contents

List of Tables	v
List of Figures	vi
Chapter	
I. Introduction	1
II. Background.....	3
III. Analytic Framework and Mixed Methods Approach	23
IV. Quantitative Methods and Results	31
V. Qualitative Methods and Results	52
VI. Conclusion	79
References.....	85

List of Tables

1. Key Independent and Dependent Variables for SAHAPS Participants who Tested for HIV(N=846).....	48
2. Control Variables for SAHAPS Participants who Tested for HIV.....	49
3. Results from Logistic Regression Models.....	50

List of Figures

1. Analytic Framework: Unwanted Fertility Experience, HIV Status and Post-partum Contraceptive Use in a PMTCT Population in Durban, South Africa.....	26
2. Analytic Sample.....	47

Chapter 1: Introduction

The adult (ages 15-49) HIV prevalence in South Africa is 17.1% and a majority of HIV infected adults are women of childbearing age (1). Strategies to prevent new HIV infections are needed to slow the spread of the disease. One strategy endorsed by the World Health Organization (WHO) and implemented as part of South Africa's Prevention of Mother to Child Transmission (PMTCT) program is the prevention of unwanted pregnancies in HIV positive women through the use of modern contraceptive methods (2). Despite its potential to avert unwanted fertility and new infant HIV infections, there is little existing research examining how HIV status and unwanted fertility affect women's adoption of modern contraceptive methods. There is even less research examining contraceptive use post-partum to avoid future unwanted pregnancies and whether it varies depending on a woman's HIV status.

Research Questions: How does knowledge of HIV status affect women's modern contraceptive use post-partum? How do knowledge of HIV status and unwanted fertility affect post-partum contraceptive use? What are health facility factors that affect women's post-partum contraceptive use?

Specific Aim 1: To examine whether knowledge of HIV status affects women's modern contraceptive use post-partum. *Hypothesis 1:* Women who intend to use modern contraceptives post-partum and test HIV positive are more likely to use contraceptives post-partum than women who intend to use contraception post-partum and test HIV negative. *Hypothesis 2:* Women who test HIV positive are more likely to self-report condom use and

dual protection (use of a barrier method and hormonal method) post-partum compared to women who test HIV negative.

Specific Aim 2: To determine whether unwanted fertility and HIV status affect post-partum modern contraceptive use and intent. *Hypothesis 3:* Women who have experienced unwanted fertility are more likely to report intent to use contraceptives in the future than women who have not experienced unwanted fertility. *Hypothesis 4:* Women who have experienced unwanted fertility and test HIV positive are more likely to self-report current modern contraceptive use than women who have experienced unwanted fertility and who test HIV negative.

Specific Aim 3: To explore health facility factors, including but not limited to: client-provider interactions around contraception, the points during antenatal care when women discuss contraception with providers, contraceptive counselor's level of knowledge about contraceptive methods, the contraceptive method mix available in the clinic, client waiting times and other health facility factors influencing women's use of modern contraception post-partum.

Chapter 2: Background

HIV/AIDS in South Africa

The HIV/AIDS epidemic is devastating South Africa and there is an urgent need to identify new strategies to slow the spread of the disease and prevent new HIV infections. The epidemic in South Africa is one of the fastest growing in the world (3). The adult (ages 15-49) HIV prevalence of 17.1% is one of the highest in the world, and South Africa is home to the largest population of HIV infected persons worldwide (5.6 million) (1). AIDS is the leading cause of death in South Africa and HIV/AIDS accounts for 31% of disability adjusted life years (4, 5). Without effective interventions to slow the spread of HIV and treat AIDS infected South Africans, the demographic effect on the population will be catastrophic.

Women in their childbearing years are most affected by the HIV epidemic in South Africa. Fifty nine percent of HIV infected adults over the age of 15 are women in their childbearing years and most women are infected with HIV before the age of 25 (6, 7). Further, HIV infections in pregnant women have increased from 1% in 1990 to 30% in 2005 (8). Effective interventions to prevent HIV infections in women of childbearing age and pregnant women are critically needed in South Africa. The benefits of preventing HIV infections or treating HIV positive women of reproductive age are multiple: reductions in adult-to-adult HIV transmission, lowering maternal and infant morbidity and mortality, and preventing mother-to-child transmission of HIV (9-12).

The Prevention of Mother to Child Transmission

The South African Prevention of Mother to Child Transmission (PMTCT) program started in 2001 aims to avert HIV infections in women and children. The PMTCT program includes interventions to improve HIV testing, place HIV positive women on treatment, prevent HIV infections in children, and avoid future HIV positive births through modern contraceptive use. Over 95% of pregnant women test for HIV during antenatal care (ANC) (1), however, every year in South Africa, 300,000 HIV positive mothers give birth, and many of their infants are born HIV positive due to non-use of PMTCT interventions (13). It is important that HIV positive women eligible for ART start treatment. An HIV positive woman on treatment is less likely to transmit HIV to her child if both the mother and infant are treated per South African protocols. Many HIV positive births in South Africa are the result of unwanted pregnancies that could have been avoided through modern contraceptive use (25% of recent first births were unwanted, according to the most recent Demographic and Health Survey-DHS) (14). Modern contraceptive use is defined as the use of highly effective hormonal or barrier methods, and includes the following in South Africa: injectables, pills, intra-uterine device (IUD), sterilization, male or female condoms, diaphragm. Dual protection is the use of a hormonal method and a barrier method at the same time.

As a component of South Africa's PMTCT program, avoiding unwanted pregnancies in HIV positive women through modern contraceptive use is an excellent intervention because of its benefits for maternal and child health. Current modern contraceptive use averts 120,256 HIV positive births in South Africa yearly according to estimates, and has the potential to avert even more (10). A recent study estimated the unmet need for contraception in South Africa at 15%, and that were this need met, over U.S. 3.3 million dollars would be

saved annually (15). Second, reductions in unwanted births may contribute to lowering the number of maternal and infant deaths, particularly for HIV positive women and children (12). The leading cause of excess maternal and infant death in South Africa is HIV/AIDS, and the maternal mortality rate for HIV positive women (340 deaths per 100,000 live births) is ten times higher than for HIV negative women (13). Third, reducing morbidity and mortality due to HIV/AIDS in women and children through modern contraceptive use is a cost-effective intervention (10, 12). For example, small decreases in unwanted pregnancies in HIV positive women are equivalent to approximately the same number of infant infections averted through anti-retroviral drugs (ART), yet modern contraceptives are much less expensive than ART drugs, and are therefore more cost effective (11).

The History of Modern Contraceptive Use in South Africa

Modern contraceptives were first available in the 1950's and 1960's in South Africa during Apartheid, a government system of racial segregation and repression that lasted from 1948-1994 (16). Under Apartheid, South Africans were racially classified as white, Indian/Asian, colored (mixed race), or black African. Because health and family planning services were delivered based on race, with preferential treatment given to white South Africans, early adopters of modern contraceptive methods were wealthy and well educated white and Indian women (4, 16). In this system, black Africans had poor access to health services and essentially no access to family planning, due to racial discrimination. Starting in the 1970's, the Apartheid government changed their policy and started promoting family planning methods to black South Africans. The Apartheid government feared the growing size of the black population, which at the time was the largest racial group in the country, and therefore wanted to reduce the size of the black population by promoting contraception (4,

16, 17). To decrease population growth among black South Africans, injectable contraceptives were widely promoted to black women. By 1974, the National Family Planning program integrated family planning services into health services for all South Africans, including blacks.

Historically, there is little information regarding family planning use during the Apartheid period because demographic information collected by the government was kept secret (17). According to one estimate, contraceptive prevalence in 1976 was between 37-50% (18). However, there are data from the late Apartheid period. Conducted in 1987-1988, the South Africa Demographic and Health Survey (SADHS) is a probabilistic sample of women of reproductive age (12-49 years), and are the only data from the Apartheid period that include all racial groups and all geographic areas of South Africa. The original sample was 22,000 women in union or living with someone, or had given birth or were pregnant. Data presented below are from an analytic sample of 19,756 non-pregnant 15-49 year old women. Data were restricted to make them comparable to SADHS surveys conducted in 1998 and 2003.

Modern contraceptive use in 1987 differed by racial category and several other demographic factors. Black African women were least likely to use contraceptives (49%) compared to white (71%), colored (65%), or Indian/Asian women (66%) (16). For all racial groups, contraceptive use was higher in rural than in urban areas, except for black women. Fifty-eight percent of urban black women used contraceptives compared to 41% of rural black women (16). Modern contraceptive use for black African women by marital status was also different from other racial groups. Never-married black women were more likely to use contraception than ever-married black women (65% vs. 41%); yet the opposite was true for

other racial groups. Younger black, colored and Indian/Asian women (ages 15-24 and 25-34) were more likely to use contraceptives than women over 35, however, white contraceptive users were likely to be older. Modern contraceptive use increased with parity for colored, Indian/Asian and white women, but for black women, use increased after the birth of one child and then remained steady with additional children.

Over half (54%) of black women used an injectable, compared to 40% of colored women, 7% of Indian/Asian women and 4% of white women (16). The predominance of injectable contraceptive use among black South African women is thought to be the legacy of Apartheid family planning policies, where the injectable was promoted as the only family planning option (16, 19). This dominance of the injectable method among black South African women persists today.

In summary, black South African women were less likely to use contraception in the late Apartheid period compared to all other racial groups, and black women who did use contraception were different demographically from other women. Black women who used modern contraception were likely to be younger, live in an urban area, not be married, to initiate use after the birth of one child, and to use an injectable method.

Modern Contraceptive Use in Post-Apartheid South Africa

Subsequent SADHS surveys in 1998 and 2003 suggest that modern contraceptive use continued to increase for South African women post-Apartheid. The greatest gains in contraceptive use were for black, rural South African women compared to all other racial groups. However, modern contraceptive use among black South African women still lagged behind women of other racial groups in 2003: 62% of sexually active black women used a

modern method compared to 70% for colored women, 75% for Indian/Asian women and 80% for white women (14).

In 2003, the Contraceptive Prevalence Rate (CPR) for sexually active women of all age groups was 65%, and was slightly higher for women not in union (68%), than for women in union (65%) (14). Between the 1998 and 2003 surveys, the proportion of sexually active women not in union increased. This likely contributed to the slightly higher CPR among women not in union compared to women in union, although the differences are small.

Increases in current contraceptive use between the 1998 and 2003 surveys were evident in all age groups, except 20-24 year olds, where use remained stable. Current contraceptive use among sexually active women was dominated by the injectable (32%), followed by the pill (12%), female sterilization (10%), male or female condom (8%), IUD (0.5%), and male sterilization (0.5%) (14). Injectable contraceptive use declined in the younger age groups between 1998 and 2003 and was replaced with the use of male condoms. Additionally, IUD use among sexually active women, which was already low, dropped even further (from 1.9% to 0.8%), as did female sterilization among women in union (from 16% to 14%) (14).

Differences in contraceptive use between rural and urban populations narrowed over time. To achieve this between 1998 and 2003, current use of any modern method by sexually active women increased in rural areas (from 54% to 62%), and remained steady for urban areas (from 67% to 66%) (14). The same gains in narrowing the education gap in contraceptive use were not achieved. Contraceptive use was still highest in 2003 among the most educated South African women, and the higher the educational attainment, the higher the contraceptive prevalence.

In summary, between the late Apartheid period and 2003, contraceptive prevalence increased for all South African women of reproductive age, but most notably for rural black women. Differences in contraceptive use between rural and urban populations narrowed, contraceptive prevalence remained higher for more educated women compared to less educated women, and contraceptive use shifted from women in union to women not in union. Injectable methods of contraception remained most popular, and the use of male condoms increased for younger women.

It is important to note that Apartheid affected partnership formation for black South Africans, which in turn affected contraceptive use by black South African women. South African family formation was disrupted when the imposed migrant labor system under Apartheid forced the separation of families (4). Men were forced to migrate to urban areas to work and women and children were relocated to rural Bantustans. Since the 1950's, labor migration made traditional payments needed to marry (lobola) unaffordable and co-habitation without marriage became common (4). Today, 40% of black households are headed by females who typically live with their children and without a co-habiting or marital partner (14).

The greatest increases in contraceptive prevalence between the 1998 and 2003 SADHS surveys were evident in the province of KwaZulu-Natal (KZN). KZN had the highest contraceptive prevalence of modern method use among sexually active women (76%) of all nine South African provinces in 2003 (14). This was an increase of 19 percentage points from 1998. Despite high contraceptive prevalence in KZN, 23% of women used no contraceptive method at last sex and there remains an unmet need for family planning of 6.8% (14). Although the unmet need for contraception in KZN is lower than South Africa

overall (6.8% versus 15%), the unmet need may differ by race, and is potentially higher for black South African women, given their lower levels of contraceptive use compared to other racial groups. Condom use and dual protection are low in KZN, even though overall modern contraceptive use is high (20). This has important implications for a province with the highest HIV prevalence in the world, as it leaves women vulnerable to HIV infection.

HIV Status and Contraceptive Use

Studies from sub-Saharan Africa demonstrate that the effect of learning one's HIV status is a short-term increase in contraceptive use for HIV positive women compared to HIV negative women; however, this increase in modern contraceptive use is temporary, usually lasting a few months. A prospective cohort study of women in Lilongwe, Malawi assessed the effects of learning one's HIV status on contraceptive use up to one year after diagnosis. Contraceptive use initially increased among HIV positive women, but decreased over time (21). Similar results were found in Kigali, Rwanda, where HIV positive women had initial higher contraceptive use compared to HIV negative women, but use in both groups declined after one and two years, primarily due to contraceptive discontinuation (22). Another study of HIV sero-discordant couples in Lusaka, Zambia showed initial increases in contraceptive use, but no impact on pregnancy incidence, and high levels of user failure and discontinuation (23). Several other studies in Uganda and Rwanda also found higher contraceptive use in HIV positive compared to HIV negative women of reproductive age, however, the study methods were cross sectional and bi-variate (Uganda) and the model misspecified (Rwanda) (24, 25). A study in Mwanza, Tanzania of PMTCT clients showed higher odds of ever family planning use and family planning use since giving birth for HIV positive women compared to HIV negative women, however, it wasn't clear whether women knew

their HIV status, therefore the findings do not assess the effect of knowledge of HIV status on family planning use (26). Finally, in a multi-country population based analysis of DHS data from Zambia, Swaziland, Zimbabwe and Lesotho, Johnson et. al. found that women aware of their HIV positive status were more likely than HIV negative women or HIV positive women not aware of their status to use contraception (27).

The findings from these studies all show a temporary effect of knowledge of HIV status on modern contraceptive use, but after one or two years, modern contraceptive use declines, and HIV status appears to have little effect on sustained contraceptive use. Instead, user failure and contraceptive discontinuation, or other changing factors such as fertility desire and socioeconomic circumstances, appear to become more important than HIV status alone, in the decision to use modern contraceptives. The Johnson multi-country study also highlights the importance of actually knowing one's HIV status in order to understand the relationship between HIV status and contraceptive use. Prior studies, such as the one in Tanzania, are limited because women aren't aware of their HIV status; therefore associations drawn between the effects of positive or negative HIV status and contraceptive use are not meaningful. In South Africa, a majority of women do not know their HIV status, and therefore are unaware that they might infect not only their partner, but also future children if they were to become pregnant. The implications of these findings are that immediately following HIV diagnosis, HIV positive women are motivated to use contraceptives. Therefore, PMTCT programs should capitalize on their motivation during this period to educate women about how to overcome issues of user failure and discontinuation.

In South Africa, knowledge of HIV status on contraceptive use is not fully understood. South Africa is completely different from other sub-Saharan African countries in

terms of contraceptive prevalence and fertility desires because contraceptive use is much higher and fertility desires much lower. In fact, South Africa's fertility patterns and contraceptive use patterns more closely resemble a developed country. Therefore, the relationship between modern contraceptive use and HIV may be entirely different from other sub-Saharan African countries.

Two studies in South Africa examine knowledge of HIV status and contraceptive use, but each has limitations, for different reasons. The first study in a PMTCT population in KwaZulu-Natal examined the odds of condom use one and two years post-partum for HIV negative and HIV positive Zulu women (28). The authors found that the odds of condom use were higher for HIV positive compared to HIV negative women. This study shows a short-term increase in the odds of condom use for HIV positive women compared to HIV negative women, like in other countries, however, in this population, the effect persisted up to two years, unlike other countries. A limitation of the study was that the authors only reported the odds of condom use, not any modern method use or dual protection. The second study examined any modern contraceptive use in the post-partum period in a PMTCT population in Eastern Cape, and the authors found no differences in contraceptive use between HIV negative and positive women (29). This study does not support a short-term effect of HIV status on modern contraceptive use; however, the methods were weak because they did not control for demographic variation among the women. Additional research in South Africa will help to determine whether knowledge of HIV status affects contraceptive use, and if so, whether the effect is short or long term. These findings will help PMTCT program managers to improve contraceptive initiation and sustained use among women who want to space or limit childbearing. The key to sustaining contraceptive use among PMTCT attendees may be

intervening during the shorter-term period, or the post-partum period, when women are in contact with the healthcare system and motivated to use contraception after learning their HIV status.

Contraceptive Use in the Post-partum Period

Prior research indicates that women are amenable to contraceptive adoption in the post-partum period and that it may be an ideal time to counsel women about modern contraceptive use (30). A recent study of contraceptive adoption by HIV positive women in Russia showed that post-partum women were more likely to choose a highly effective contraceptive method compared to non post-partum women (31). This study suggests that not only is the post-partum period an ideal time to counsel women about modern contraceptive method use, but it also provides evidence that the post-partum period may be an great time for HIV positive women to consider contraception. In South Africa, I am aware of only one study that examines the post-partum adoption of contraceptive methods by HIV status (the PMTCT study of Zulu women in KZN described above) (28). In KZN, median post-partum amenorrhea is 2.4 months (~8 weeks) and median post-partum abstinence is 2.3 months (~8 weeks)(14). However, younger women report shorter periods of post-partum amenorrhea, and post-partum amenorrhea due to breastfeeding is only 0.7 months in urban areas (14). A different study in Cape Town, South Africa examined whether advice about contraceptive use given antenatally increased contraceptive uptake one year later found no increased uptake (32). Additional research is needed in South Africa examining patterns of post-partum contraceptive use by HIV status.

Studies from elsewhere in Africa show that post-partum initiation of contraception and intent to use contraception are associated with higher contraceptive continuation. Using

DHS data from Zimbabwe, Samibisa and Curtis found that contraceptive continuation rates were higher among women who initiated use early in the post-partum period compared to women who initiated use later (33). Another study from Morocco using DHS data demonstrated that there is a strong relationship between intent to use contraceptives and subsequent use, and that women who intended to use contraceptives but didn't were more likely to have an unmet need for contraception (34). In a different study in Morocco, modern method adoption after birth was associated with the presence of a nearby public health center and lower method failure rates (35).

Fertility

Trends

Fertility rates in South Africa slowly declined as women of reproductive age adopted modern contraceptives from the late Apartheid period to the present. These declines in fertility reflect South African women's childbearing desires, which are unique in the sub-Saharan Africa region because they are lower than other countries. Most South African women want two children on average, whereas in other sub-Saharan African countries, women want three or four children on average (14). Fertility rates declined in South Africa in the last 40 years, primarily due to increased contraceptive use since the 1970's, which lengthened birth intervals (36-40). The total fertility rate in South Africa fell from 5.0 to 2.1 children per woman of reproductive age from 1970 to 2003 (14, 41, 42). In the province of KwaZulu-Natal, fertility declined from 3.7 in 1996 to 2.8 in 2005 (39).

Despite overall declines in fertility, there is evidence of a stall in the rate of fertility decline in South Africa, and it isn't yet clear why the rate of decline slowed (39). In KwaZulu-Natal, the rate of fertility decline of 3.3% per year in the 1990's slowed to 1.1%

per year from 2000-2005 (39). Evidence from other African countries experiencing a similar stall suggested a leveling in the demand for contraception and an increase in the wanted fertility rate as possible explanations for the slow in fertility decline (43-45). Moultrie et. al. argue that these are unlikely explanations for South Africa's stall because women continued to adopt highly effective methods of contraception and fertility patterns did not conform to conventional conceptualizations of the fertility transition (39).

In South Africa, over one third of young women experience an extramarital first birth before the age of 20; and 43% percent of first births are mistimed according to the most recent DHS (4, 14, 46). First births are generally wanted, however, they are not wanted at the time of the pregnancy for many South African women younger than age 20. The mistiming of these births can be partially explained by several factors. First, there is intense social pressure, particularly for black South African women, to prove their fertility with a first birth in order to enhance their marriage prospects (47). Because of this, pre-marital and adolescent childbearing are common for black South African women, particularly in KwaZulu-Natal (4). Second, adolescents generally do not access health services for contraceptives until after they experience a first birth, although the most recent DHS shows younger women are increasingly using contraceptives before a first birth, particularly condoms (14, 48).

According to the 2003 DHS, 60% of women, whether in union or not, wanted no more children (14). The desire to cease childbearing varied by age, education and province. Thirty five percent of all 20-25 year olds wanted no more children and the desire to end childbearing increased with age (14). As a woman's education level increased, so did her desire to end childbearing. Although KwaZulu-Natal had a lower proportion of women wanting no more children in 2003 compared to other provinces, two-thirds of women wanted

to cease childbearing when reaching a parity of two (14). In KwaZulu-Natal, modern contraception appears to be used for spacing between first and second births and limiting following second births.

Unwanted Fertility

Unwanted fertility is measured in the DHS by a series of questions about pregnancy intention. First, a woman is asked if her pregnancy was intended. If the pregnancy was unintended, then a woman is asked whether the pregnancy was wanted later (mistimed) or not wanted at all (unwanted) (14). Levels of unwanted fertility using this method are surprisingly high in South Africa given the elevated levels of highly effective contraceptive use and the overall declining fertility rate. Using this method of measurement, twenty five percent of recent first births were unwanted and 23% of all births to South African women in the 5 years preceding the DHS survey were unwanted (14). Unwanted fertility also varied by age. Thirty four percent of unwanted births were to women under the age of 20. Among women of other age groups, unwanted births varied between 15-34% (14). Eliminating unwanted fertility, using DHS figures, would reduce the total fertility rate from 2.1 to 1.6, a rate similar to countries with low fertility and below replacement fertility level (14).

A different way to measure unwanted fertility, also used by the DHS, but developed by Lightbourne, is to calculate whether actual family size exceeds a stated ideal family size at the time of conception (49-51). This measure of unwanted fertility suffers from two potential types of bias. First, when stating an ideal family size, it is not uncommon in developing countries for participants to give a non-numeric response, such as “It is God’s will” (49, 50). However, in the case of the data used to measure this concept for this study, there are no non-numeric responses, so this should not bias the findings. Another limitation is

“rationalization,” which is stating an ideal number of children close to the actual number of children. This happens because women are reluctant to report having “unwanted” children, and will bias estimates of unwanted fertility down (49, 50).

Unwanted fertility is an important measure to understand in PMTCT populations in South Africa because one of the objectives of PMTCT family planning programs is to reduce unwanted fertility, particularly among HIV positive women. Using the second measure of unwanted fertility in a population of rural women of childbearing age from India, the authors of one study found that the desire to stop childbearing was significantly higher for women who had experienced unwanted fertility compared to women who had not (50). Because these women were more motivated to end childbearing, they were likely more in need of contraception, and with the right counseling, more likely to adopt contraception. The authors conclude that women experiencing unwanted fertility may require more counseling and monitoring to ensure contraceptive use to avoid additional unwanted fertility. Given the high rates of unwanted fertility in South Africa, understanding unwanted fertility in PMTCT populations will aid health workers in identifying women who may need additional contraceptive counseling to avoid additional unwanted fertility, especially for HIV positive women.

HIV/AIDS and Fertility Desires

There is a growing body of evidence about whether HIV/AIDS status affects women’s fertility desires, and the evidence is mixed. Studies from sub-Saharan African countries fall into three broad categories: 1. An HIV positive diagnosis is associated with lower fertility desire, 2. HIV status has no bearing on future fertility decisions, and 3. An HIV positive diagnosis increases women’s fertility desire.

Several studies showed that women who know they are HIV positive do not want more children. Using DHS data from Zambia, Swaziland, Zimbabwe and Lesotho Johnson et. al. found that women with an HIV positive test result received in the prior year were less likely to want a/another child compared to HIV negative women or women who hadn't received their test result, and the desire to limit births was higher for recently tested HIV positive women compared to recently tested HIV negative women (27). Upon receiving an HIV diagnosis, HIV positive women in Rwanda and Zimbabwe were more likely to report that they did not want any more children compared to HIV negative women (22, 52, 53). Measures of fertility intent asked immediately after HIV diagnosis are likely to suffer from social desirability bias. Women may be more likely to report that they no longer want children if they are HIV positive because societal attitudes and healthcare provider's attitudes about HIV positive women bearing children are often negative (54-57).

Despite negative societal attitudes, a number of studies found that positive HIV status actually increases women's fertility desire, particularly for women on anti-retroviral treatment (ART) or for women who do not have children. Evidence from South Africa, Kenya and Uganda showed that HIV positive women on ART are more likely to want more children than women not on treatment (8, 58, 59). Women on ART treatment are likely to be healthier, more hopeful about the future and more likely to be sexually active than women not on treatment; therefore they are optimistic about a pregnancy. HIV positive women who have no children are still likely to want at least one child because of social expectations that women should bear children (8, 60). In South Africa, HIV positive women from a study conducted in Cape Town still wanted children because children were a sign of hope and normality (8).

Several studies in sub-Saharan Africa show that HIV status has no effect on fertility desire. Research from Zambia, Zimbabwe, Cote d'Ivoire, Kenya, Rwanda, South Africa and Tanzania showed HIV status did not have a depressing effect on fertility desire because social, cultural and health factors outweighed HIV status on decisions about childbearing (61-63). Fertility desire may remain unchanged in societies where childbearing is highly valued and confers social status (8, 60).

A majority of studies to date in sub-Saharan Africa examine fertility *intentions* and whether they change after learning one's HIV status, however, they do not examine *actual* fertility experiences and how they might interact with HIV status to affect contraceptive use. This study examines a measure of actual fertility experience (unwanted fertility) and its interaction with HIV status and how this affects post-partum contraceptive use. The findings from this study will inform PMTCT program managers about whether targeting post-partum contraceptive counseling to women who have experienced unwanted fertility, and are HIV positive, is important.

Health Facility Factors Influencing Contraceptive Use

The HIV/AIDS and family planning literature predominately examines individual level factors influencing fertility preferences, pregnancy planning and contraceptive use, yet contextual factors such as community beliefs, presence and quality of health services, transportation routes and other economic factors may influence contraceptive use (64). In sub-Saharan Africa, recent studies suggest several health systems factors that may influence women's contraceptive adoption and merit additional investigation. These factors include: the contraceptive method mix offered at government health facilities, contraceptive counselor's level of knowledge about contraceptive methods, waiting times at public health

facilities and service integration (Voluntary Counseling and Testing-VCT, Family Planning-FP, Maternal and Child Health-MCH).

Contraceptive use in South Africa is dominated by injectable methods (Depo-Provera and Nuristerate), which account for approximately one third of all contraceptive method use, and 83% of women receive contraceptives from the public sector, where they are free (14). Therefore, there is a clear preference for injectable contraceptive use in government facilities in South Africa. The advantages of injectable methods are that women only need an injection every 2-3 months and therefore they only need to visit a health facility a few times a year, the method is not visible so women can utilize it even if their partner is opposed, and injectables are cost effective (65). The disadvantages are that injectables do not protect against sexually transmitted diseases, they are painful for some women, and women using injectable methods often experience side effects such as bleeding, headache or weight gain (66). Discontinuation rates are higher for injectable methods compared to other methods such as the pill and IUD (66). In South Africa, the method mix may play an important role in contraceptive continuation. If women on injectables experience side effects, they may discontinue the method and not be aware of other methods or have access to them. Studies from elsewhere show that when women are given a choice of contraceptive methods, continuation rates are higher (67, 68). Given high rates of unwanted pregnancy despite high levels of contraceptive use in South Africa, discontinuation may be of concern, and changing the method mix may be important for overcoming issues of discontinuation.

In public health facilities in sub-Saharan Africa, efforts to integrate HIV and family planning services show limited success in increasing contraceptive uptake, but elucidate several areas where government facilities can improve in order to more effectively promote

contraceptives to their clients (69-73). In an integration study of family planning into VCT services in government facilities in Ethiopia, the authors found that the counselor's perception of available contraceptive methods (perception of the method mix and stock), influenced client's contraceptive uptake and intent to use condoms (69). Additionally, the counselor's level of knowledge about contraceptive side effects was also associated with whether the client adopted a contraceptive method or not (69). Long waiting times at government facilities deter clients and have been shown to be associated with client dissatisfaction (74, 75). In South Africa, high patient volume and limited resources result in long waiting times, potentially deterring clients seeking HIV and family planning services (76). Two studies from Eastern Cape, South Africa examined government health facility factors influencing individual contraceptive use and choice (42, 77). The first study included the following health facility factors: distance to the facility, staffing levels, staff training in family planning, availability of family planning services and presence of family planning methods (42). Only distance to the health facility was significant in the model and women who lived farther from the facility were more likely to use contraception than women who lived closer to the facility (42). The second study examined the following health facility factors and their associations with contraceptive method choice: number of doctors, number of community health workers, number of nurses trained in HIV/AIDS, number of expired contraceptive methods in stock and health facility asset score (77). The authors found that the presence of more doctors was associated with increased use of the pill and permanent contraceptive methods, and women living in communities where health facilities had more assets (e.g. contraceptive methods in stock, number of staff) were more likely to use an IUD or be sterilized rather than an injectable method (77).

Several other studies in South Africa show a need for further research about health systems factors influencing contraceptive use among government facility clients. A study of two types of integration: 1. VCT at family planning services, and 2. Referral to VCT from family planning services, showed increased HIV testing in both models compared to standard practice, that providers and clients discussed family planning more in the referral model compared to the other models, but contraceptive use in the two models did not increase compared to the standard (78). Another study examining the integration of HIV/FP/MCH services in rural and urban settings in KZN showed that 14% of MCH clients needed family planning advice but were not receiving it and 30% of family planning and MCH clients were at high to medium high risk for HIV infection, but received no information about HIV (79). A qualitative study of family planning and maternal and child health clients at government facilities in Cato Manor, just outside of Durban, demonstrated that women are rarely counseled on a range of family planning methods, they have little opportunity to ask questions about family planning, and they do not understand the purpose of antenatal care (80). For a majority of South African women, antenatal care is their first point of contact with the healthcare system, and is therefore an ideal place to counsel women about modern contraception (79). Further research is needed in South Africa to identify government facility factors influencing contraceptive adoption among PMTCT clients in order to develop more effective interventions.

Chapter 3: Analytic Framework and Mixed Methods Approach

Analytic Framework

The analytic framework (Figure 1) guides the theoretical and analytical approach. The constructs in the framework are based on individual level social cognitive theories of behavior and frameworks for HIV/AIDS research. The framework draws from the component of the Theory of Reasoned Action (TRA) that focuses on behavioral intent and performance (81). Fishbein and Ajzen's Theory of Reasoned Action posits that individual intentions directly influence future behaviors (82, 83). Behavioral intent has been shown to be a medium to strong predictor of behavioral performance, including modern contraceptive use, and is measured using self-report (84-90). Specifically, the relationship between intent to use contraceptives (Measured at Time 1 or Baseline) is examined in relation to actual contraceptive use (future behavioral performance; Measured at Time 3 (14 weeks post-partum) at the individual level. There is evidence that past behavioral performance (in this study, ever contraceptive use) directly influences intent (84), therefore ever contraceptive use is an important control variable in the conceptual model. Another important control variable identified in South Africa is the influence of female family members (or "referents" in the Theory of Planned Behavior (TPB), which expands upon the TRA), on contraceptive use (86, 91). The presence of other female household members is included as a control variable in the model. HIV status is examined as a potential moderating factor between the intent to use contraceptives and actual use, as well as a direct influence on contraceptive use (92). Both

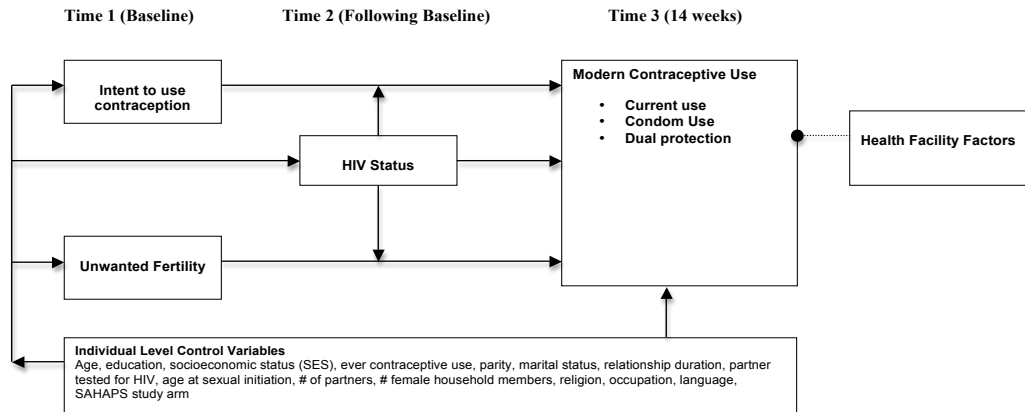
relationships are explored because prior research has not yet elucidated whether HIV status is a direct or moderating influence on contraceptive use (21-23, 93).

Protection Motivation Theory (PMT) is used to examine HIV status and unwanted fertility in the analytical model. PMT posits that threatening health information (in this study, knowledge of HIV positive status and experience of unwanted fertility) affects attitudes toward a health behavior as well as behavior change (94). According to PMT, *information about a health threat* initiates a *cognitive mediating process*, during which individuals undergo parallel processes of *threat appraisal* and *coping appraisal*, which result in either a *maladaptive response* (e.g. non-contraceptive use) or an *adaptive response* (e.g. contraceptive use) (94, 95). PMT is often used to measure a behavioral intent outcome, however, several studies also use PMT to measure actual behavior as an outcome (95, 96). The level of protection motivation in this study is measured using actual behavior as an outcome (contraceptive use). Using PMT, I hypothesize that the threat of HIV positive status will prompt women to adopt an *adaptive response* (e.g. increase the probability of contraceptive use post-partum) compared to HIV negative women. I also hypothesize that women who experienced unwanted fertility will adopt an *adaptive response* compared to women who did not experience unwanted fertility, and that the threat of HIV positive status *and* unwanted fertility will make women even more likely to adopt an *adaptive response* and will have an even higher probability of contraceptive use.

Previous concepts described in the analytic framework are measured at the individual level; however, several HIV/AIDS researchers assert that conceptual models and frameworks must also include other underlying, proximal and distal determinants of health behaviors, particularly in sub-Saharan Africa (85, 97). One HIV/AIDS framework supports the

inclusion of three levels: 1. Personal attributes (cognition and feelings about sexual behavior and HIV/AIDS; thoughts about self), 2. Proximal context (interpersonal relationships; physical and organizational environment) and 3. Distal context (culture, e.g. societal norms, social discourse, shared beliefs and values; structural factors e.g. legal, political, economic) (85). Another HIV/AIDS framework examines three levels of determinants of health and demographic outcomes: 1. Underlying determinants (context and intervention programs), 2. Proximate determinants (individual level behaviors), 3. Biological determinants (individual level biology) (97). There is no one social cognitive behavioral model or HIV/AIDS framework that incorporates both individual level and underlying determinants of contraceptive use and HIV/AIDS infection, despite the fact that both are outcomes determined by sexual behavior. In this study, I examine individual level behaviors, but also acknowledge the importance of more distal and underlying factors influencing individual behaviors. Specifically, I explore health facility factors related to modern contraceptive use. These factors are included in the analytical framework as a potentially important construct influencing individual level modern contraceptive use.

Figure 1: Analytic Framework: Unwanted Fertility Experience, HIV Status and Post-partum Contraceptive Use in a PMTCT Population in Durban, South Africa



Mixed Methods Approach

This study uses a mixed methods approach, utilizing both qualitative and quantitative research techniques, to examine individual level factors (specifically HIV status and unwanted fertility) influencing post-partum contraceptive use and dual protection, as well as health facility level factors influencing the same outcomes.

Individual level data are drawn from an HIV counseling and testing intervention study, the South Africa HIV Antenatal Post-test Support Study (SAHAPS), implemented at an antenatal clinic located in an urban township outside of Durban, South Africa. Facility level data were collected from clinic staff and clients.

A mixed methods approach is utilized for this study for several reasons. To determine the effect of learning one's HIV status and unwanted fertility on post-partum contraceptive use (Specific Aims 1 and 2), data are needed from a sample of HIV positive and negative women who have just given birth. Quantitative data from women attending an antenatal clinic are most appropriate to determine the effect of HIV positive status relative to HIV negative status on contraceptive use. Contraceptive use is measured using quantitative assessments that allow for control of potential confounding factors that might obfuscate the relationship between HIV status and/or unwanted fertility and contraceptive use. Many individual level factors associated with contraceptive use (e.g. education level, parity, marital status, age) have already been identified in the literature (including studies from South Africa) and can be utilized in quantitative models to strengthen findings about the relationships of interest in this study.

Qualitative methods are used for Specific Aim 3 in order to describe the health facility context that influences individual level behaviors measured in Specific Aims 1

and 2. Several studies from sub-Saharan Africa suggest that facility level factors, such as the client-provider interaction, the contraceptive method mix available, contraceptive counselor's level of knowledge about contraceptive methods and client waiting times may also influence individual level contraceptive use. Several health facility factors in South Africa have been identified as important influences on individual contraceptive use. These health facility factors include: waiting times, distance to the health facility for the client, the number of doctors at the health facility, the number of health facility assets (e.g. contraceptive methods in stock, counselors available), counselor's knowledge and explanation of a range of contraceptive methods and counselor's allowing clients the opportunity to ask questions about contraceptives (42, 64, 76, 80). Quantitative data about these specific health facility factors were not collected as part of SAHAPS study; therefore, these factors cannot be included in quantitative models. In this study, I focus specifically on the client-provider interaction when contraceptive methods are discussed and recommended. Qualitative methods are used to understand and explore this relationship, as well as other health facility factors relevant to the clinic.

Study Setting

The study setting is an urban township outside the city of Durban in the province of KwaZulu-Natal (KZN). KZN is an ideal place to study the effects of HIV status and unwanted fertility on post-partum contraceptive use. The HIV prevalence in KZN is 16.5%, and as high as 40% among pregnant women testing in antenatal care (6, 98). Contraceptive use among sexually active women in KwaZulu-Natal is high at 76%, however, 23% of women used no method at all at last sex (14). Some of these women may desire pregnancy, but for others, non-use of a contraceptive method at last sex leaves

them vulnerable to both HIV infection and unintended pregnancy. Fifty-four percent of currently married women in KZN want no more children, and this percentage increases with parity (14). Reaching these women in antenatal care with contraceptive options potentially can reduce the unmet need for family planning, which in KZN is 6.8%, and assist women to better plan the timing, spacing and limiting of their pregnancies (14). Further, post-partum contraceptive adoption also contributes to meeting South Africa's PMTCT program goals.

Study Site

The study site is a government public health clinic in an urban township. The clinic is staffed by one physician and 15 nurses and offers services 24 hours a day, seven days a week. The township was established during Apartheid as a settlement where black migrant laborers resided after working in the city during the day. It is the biggest township in KwaZulu-Natal (99) and the second biggest in the country (100). The population estimate for the township varies considerably depending on whether the enumerators included informal settlers or not in their estimation; the lower bounded estimate suggests that 300,000 people reside there (101) while the upper bounded estimate suggests the population is nearly 2,000,000 (100). The community has one hospital that serves the 17 clinics in the surrounding area.

Ethical Approval

All study methods and procedures were approved by the Biomedical Research Ethics Committee at the University of KwaZulu-Natal located in Durban, South Africa and the University of North Carolina at Chapel Hill, Chapel Hill, USA, as well as the

Regional South African Department of Health office and the head supervisor at the research site.

Chapter 4: Quantitative Methods and Results

Methods

The South Africa HIV Antenatal Post-test Support Study

Data are from the South Africa HIV Antenatal Post-test Support Study (SAHAPS), a randomized controlled trial examining the efficacy of an integrated model of HIV post-test support for women attending antenatal care in Durban, South Africa. One thousand five hundred pregnant women attending antenatal care at a government clinic in an urban township were enrolled in the study between 2007-2010. At baseline, all women completed a questionnaire including: demographics, HIV testing and disclosure, social support, sexual risk behaviors, power and violence, PMTCT, infant feeding, family planning, legal needs and emotional distress. Women were randomized at baseline to standard World Health Organization (WHO)/Centers for Disease Control and Prevention (CDC) HIV counseling and testing or an enhanced counseling and testing intervention. Women randomized to the intervention arm also received: 1. A health education video before HIV counseling and testing, 2. Enhanced counseling before and after HIV testing, including additional discussions of risk reduction, disclosure and PMTCT decisions, 3. Counseling about legal education at 6 weeks post-partum, 4. Counseling about family planning at 10 weeks post-partum. Following the baseline questionnaire and randomization, women were counseled and tested for HIV. Women were then followed longitudinally at 6 weeks post-partum, 10 weeks post-partum, 14 weeks post-partum and 9 months post-partum. Data are from questionnaires

administered at baseline and 14 weeks post-partum. I did not use data from the 6 and 10 week visits because very few women did a 6 or 10 week visit and few women had resumed sexual activity by then, therefore there was little data on important variables.

Eligibility

Women eligible to participate in the SAHAPS study were age 18 or older, were pregnant at enrollment, had an intimate partner for six or more months, planned to reside in Durban for a year following enrollment, and gave informed consent. Women were eligible to participate if they had never tested for HIV before or if they had tested HIV negative previously. Women were not eligible if they had tested HIV positive previously. SAHAPS is a collaborative study between the University of KwaZulu-Natal (UKZN) located in Durban and the University of North Carolina at Chapel Hill (UNC-CH), and has been approved by institutional review boards at both institutions.

Interview Procedures

Women were recruited from the ANC clinic at the study site. Women who met eligibility criteria and gave informed consent were interviewed in Zulu by a trained interviewer who captured the data on a computer. Women were reminded about follow-up appointments with an appointment reminder card, and if missed, were then traced by a driver and tracer (a staff member who followed-up with participants about missed appointments). HIV testing was conducted by a study nurse at the first antenatal visit and a separate consent process was used for HIV testing. Women were interviewed again in Zulu by a trained interviewer who captured the data on a computer at 14 weeks. Interviews lasted one to one and a half hours and participants were remunerated with 50 Rand (~U.S. \$6) at each visit for transportation.

Analytic Sample

One thousand fifteen hundred women completed the baseline questionnaire, however, 20 women refused to test for HIV during the study and were excluded (See Figure 2). Of the 1,480 women who completed a questionnaire at baseline and tested for HIV, 1,154 (78%) also completed a 14-week visit. Two hundred seventy six women were not sexually active (N=275) or pregnant (N=1) at 14 weeks and were excluded. Further, 32 women were missing data on modern contraceptive use at 14 weeks and were excluded. Therefore the final analytic sample of 846 included women who completed a baseline questionnaire, tested for HIV, were sexually active at 14 weeks and had data on modern contraceptive use at 14 weeks. The sample sizes for each of the final models varied due to missing values on baseline, independent and dependent variables (see Figure 2).

Of the 326 women lost to follow-up, they were demographically similar on variables included in the analyses, except for HIV status. Women lost to follow-up were more likely to be HIV positive (N=142/326 or 43% compared to 38% N=565/1480).

Analysis

I used several logistic regression models with robust standard errors to examine the relationships of interest (see Table 3 for results). I used the same control variables for all models (see Table 2). Analyses were conducted using Stata 11 (102).

Model 1

I examined whether intent to use contraceptives at baseline and knowledge of HIV status affect women's modern contraceptive use post-partum. The first hypothesis was: women who intend to use modern contraceptives post-partum and test HIV positive

are more likely to use contraceptives post-partum than women who intend to use contraception post-partum and test HIV negative.

The independent variable of interest in Model 1 is a woman's intent to use modern contraception. The variable was measured at baseline using a computer-assisted questionnaire. Women were asked: *Would you like to have more children immediately after this pregnancy?* Sixty six percent of women did not want more children. Women were then asked: *If you would not like to have children after the child you are expecting, are you planning to use something to protect yourself after this pregnancy?* The intent variable was dichotomized as yes for women who plan to use something to protect themselves and no for women who do not intend to use something to protect themselves or do not know. I included women who wanted another child (N=117) in the No/Don't know category. Seventy four percent of HIV positive women and 70.5% of HIV negative women at baseline intended to use contraceptives (see Table 1).

The main dependent variable is modern contraceptive use post-partum at 14 weeks. Data were derived from the following question: *Are you currently using any of the contraceptive methods to prevent future pregnancy?* Women currently using a modern method were coded as yes and those not using a modern method no. Modern method use was defined as: pill, injectable, intra-uterine device (IUD), male condom, female condom, sterilization, and dual protection (use of a hormonal method and a condom). At 14 weeks, 86% of HIV positive and 84% of HIV negative women reported modern contraceptive (see Table 1). I included the control variables listed in Table 2 in the model.

HIV status is hypothesized to be a moderating variable in this model. HIV status data were recorded in a baseline medical file. HIV status was dichotomous and coded as HIV positive or HIV negative.

Model 2

I examined whether knowledge of HIV status affects women's modern contraceptive use post-partum. The second hypothesis was: women who test HIV positive are more likely to self-report condom use and dual protection (use of a condom and a hormonal method) post-partum compared to women who test HIV negative.

The dependent variables for Model 2 are measures of condom use and dual protection. The first dependent variable is a measure of condom use at 14 weeks. Data were derived from the following question: *Are you currently using any of the following contraceptive methods to prevent future pregnancy?* Women currently using condoms were coded as yes and those not using condoms were coded no. A second dichotomous dependent variable, dual protection, was created utilizing data from the same question mentioned above, except that women who used both a condom *and* another hormonal contraceptive method were coded as yes and those utilizing no method or only one modern method were coded no. At 14 weeks post-partum, 14% of HIV positive women and 28% of HIV negative women reported condom use (see Table 1). Twenty two percent of HIV positive women and 12% of HIV negative women reported dual protection (see Table 1). I included the control variables listed in Table 2 in the model.

The main independent variable of interest in Model 2 is HIV status. HIV status was recorded at baseline in a medical file. The variable is dichotomous: HIV positive or HIV negative status.

Model 3

I examined whether unwanted fertility experience affects post-partum modern contraceptive intent. The third hypothesis was: women who have experienced unwanted fertility are more likely to report intent to use contraceptives in the future than women who have not experienced unwanted fertility.

The independent variable of interest in Model 3 is whether or not a woman has experienced unwanted fertility. This variable is a dichotomous variable (yes or no) measured at baseline. Unwanted fertility is defined as having more children than a stated ideal number at baseline. This variable was calculated by subtracting a woman's actual number of children at baseline (including her current pregnancy) from a woman's ideal number of children at baseline. If the result is less 0, then she has experienced unwanted fertility. If the result is greater than or equal to 0, then she has not experienced unwanted fertility. Eight percent of HIV positive women experienced unwanted fertility and 5% of HIV negative women experienced unwanted fertility (see Table 1).

The main dependent variable is intent to use modern contraceptives in the next 12 months, measured at 14 weeks. The data are from the following question: *Do you intend to use a method to delay or avoid pregnancy within the next 12 months?* The variable is dichotomous with responses of yes or no. Ninety percent of HIV positive women and 89% of HIV negative women reported that they intended to use contraception in the next 12 months (see Table 1). HIV status is hypothesized to be a moderating variable in this model. HIV status data were recorded in a baseline medical file. I included the control variables listed in Table 2 in the model.

Model 4

I examined whether unwanted fertility and HIV status affect post-partum modern contraceptive use. The fourth hypothesis was: women who have experienced unwanted fertility and test HIV positive are more likely to self-report current modern contraceptive use than women who have experienced unwanted fertility and who test HIV negative. The independent variable of interest in Model 4 is whether or not a woman has experienced unwanted fertility. This variable is a dichotomous variable (yes or no) measured at baseline. Unwanted fertility is defined as described above. The main dependent variable is modern contraceptive use at 14 weeks post-partum. At 14 weeks, 86% of HIV positive and 84% of HIV negative women reported modern contraceptive (see Table 1). I included the control variables listed in Table 2 in the model. HIV status is hypothesized to be a moderating variable in this model. HIV status data were recorded in a baseline medical file. HIV status is dichotomous and was coded as HIV positive or HIV negative.

Results

Demographics

Of the 846 women included in the analytic sample, 159 HIV positive women and 279 HIV negative women were in the intervention arm and 141 HIV positive women and 267 HIV negative women were in the control arm. Sixty four point five percent of participants in the analytic sample were HIV negative (N=546) and 35.5% (N=300) were HIV positive. The average age for HIV positive women was 26 and 25 for HIV negative women. Most HIV positive women had completed grades 8 to 11 (49%) and most HIV negative women had completed high school (Matric-52%). A majority of HIV positive

and negative women were Zulu speaking and Christian. HIV positive women were employed (46%) and HIV negative women were housewives (44%). See Table 2 for more demographic details.

Very few women were married and most were partnered but not living together. HIV positive and HIV negative women had been in a relationship for an average of 4 and 5 years, respectively. A majority of women did not know if their partner had tested for HIV. The average age at first sex reported by women was 18 years old (range: 9-34) and this did not differ by HIV status. Women reported an average of 2.5 lifetime sexual partners (range: 1-28) and the average was higher for HIV positive women (2.9 partners) compared to HIV negative women (2.3 partners). Sixty three percent of HIV positive and 65% of HIV negative women had ever used a contraceptive method. Most HIV positive women had experienced two births and most HIV negative women had experienced one birth. See Table 2 for more details.

Model 1 Results

I used a logistic regression model to analyze the relationship between contraceptive intent at baseline and modern contraceptive use at 14 weeks, with HIV status as a moderating variable. Intention to use contraceptives at baseline is associated with a 13% reduction in the odds of contraceptive use at 14 weeks (OR: 0.87, 95% CI: 0.51-1.50); however, this finding was not statistically significant ($p=0.62$) (see Table 3). The ratio of odds ratios for contraceptive use for women who intended to use modern contraceptives post-partum and tested HIV positive compared to women who intended to use contraception post-partum and tested HIV negative was 0.82 (95% CI: 0.31-2.16) (see Table 3). The confidence interval for the ratio of odds ratios includes the value of 1,

and this suggests that the interaction between intent to use contraceptives at baseline and HIV status was not significant in the model (103). Therefore I cannot reject the null hypothesis: there is no effect of intent to use contraceptives and HIV status on post-partum contraceptive use.

Model 2 Results

I used two logistic regression models to examine the relationship between HIV status and condom use at 14 weeks post-partum, and HIV status and dual protection at 14 weeks post-partum. In the first model where I examined the relationship between HIV status and condom use, the odds of condom use for HIV positive women were 2.26 times (95% CI: 1.61-3.18) the odds of condom use for HIV negative women and the finding was statistically significant at $p=0.00$ (see Table 3). The odds of condom use for women who had completed primary school or less or grades 8 to 11 were lower compared to women who completed Matric (the high school equivalent in South Africa), OR: 0.40 (95% CI: 0.18-0.86) $p=0.02$; OR: 0.75 (95% CI: 0.53-1.06) $p=0.10$ respectively. The odds of condom use at 14 weeks for women who had ever used contraceptives were 1.88 times the odds of contraceptive use for women who had never used contraceptives (95% CI: 1.34-2.64, $p=0.00$). In the second model examining the relationship between HIV status and dual protection, the odds of dual protection for HIV positive women were 2.27 times (95% CI: 1.44-3.56) the odds of dual protection for HIV negative women and the finding was statistically significant at $p=0.00$ (see Table 3). The odds of dual protection for women who had ever used contraceptives were 2.78 times (95% CI: 1.72-4.50 $p=0.00$) the odds of dual protection for women who had never used contraceptives. The hypothesis that women who test HIV positive are more likely to self-report condom use

and dual protection (use of a condom and a hormonal method) post-partum compared to women who test HIV negative is supported by the findings in the two models.

Model 3 Results

I used a logistic regression model to analyze the relationship between unwanted fertility at baseline and intent to use modern contraceptives in the next 12 months, with HIV status as a moderating variable. Unwanted fertility experience at baseline is associated with a 35% reduction in the odds of intent to use contraception at 14 weeks (OR: 0.65, 95% CI: 0.18-2.27), but the finding was not statistically significant ($p=0.50$) (see Table 3). The ratio of odds ratios for intent to use contraceptives for women who experienced unwanted fertility and tested HIV positive compared to women who experienced unwanted fertility and tested HIV negative was 2.82 (95% CI: 0.24-33.58) (see Table 3). The confidence interval for the ratio of odds ratios includes the value of 1, and this suggests that the interaction between unwanted fertility experience and HIV status was not significant in the model (103). Therefore I cannot reject the null hypothesis: there is no effect of unwanted fertility and HIV status on intent to use contraceptives in the future.

Model 4 Results

I used a logistic regression model to analyze the relationship between unwanted fertility at baseline and modern contraceptive use at 14 weeks post-partum, with HIV status as a moderating variable. Unwanted fertility experience at baseline is associated with an 67% reduction in the odds of contraceptive use at 14 weeks (OR: 0.33, 95% CI: 0.11-1.00), and was statistically significant at $p=0.05$ (see Table 3). The odds of modern contraceptive use at 14 weeks for women who had ever used contraceptives were 1.48

times (95% CI: 0.99-2.24) the odds of contraceptive use for women who had never used contraceptives ($p=0.06$). The odds of modern contraceptive use for women who had experienced three or more births were 2.12 times the odds of contraceptive use for women who had experienced two births (95% CI: 1.00-4.44; $p=0.05$). The ratio of odds ratios for contraceptive use for women who experienced unwanted fertility and tested HIV positive compared to women who experienced unwanted fertility and tested HIV negative was 2.07 (95% CI: 0.39-10.88). The confidence interval for the ratio of odds ratios includes the value of 1, and this suggests that the interaction between unwanted fertility experience and HIV status was not significant in the model (103). Therefore I cannot reject the null hypothesis: there is no effect of unwanted fertility and HIV status on contraceptive use post-partum.

Discussion

In the multivariate analysis in Model 1, intent to use contraceptives at baseline did not predict post-partum contraceptive use. Women who intended to use contraceptives at baseline were less likely to use them post-partum than women who did not intend to use them at baseline; however, the finding was not statistically significant. Further, HIV status in Model 1 did not have a moderating effect in predicting post-partum contraceptive use. Of the 1,060 women who intended at baseline to use contraception post-partum, 607 did a 14 week-visit, were sexually active and had data on post-partum contraceptive use. Eighty five percent of women who intended to use contraceptives at baseline and also did a 14-week visit (518/607) actually used contraceptives post-partum. Interestingly, 201 women who did not intend to use contraception at baseline reported post-partum contraceptive use. Therefore 85% of women who did not intend to use contraceptives post-partum ended up using contraceptives post-partum (201/238). Eighty-

five percent of HIV negative women who intended to use contraceptives at baseline and did a 14-week visit (327/385) actually used contraceptives post-partum. One hundred thirty three HIV negative women did not intend to use contraceptives at baseline but reported contraceptive use post-partum. Therefore 83% of HIV negative women who did not intend to use contraception post-partum did use contraception post-partum (133/160). Similarly, 191/222 (86%) HIV positive women who intended to use contraceptives and did a 14-week visit reported post-partum contraceptive use. For HIV positive women, a large number of women who did not intend to use contraceptives at baseline reported post-partum contraceptive use (68/78; 87%). These analyses also suggest that intentions do not predict post-partum contraceptive use very well in this population.

Other researchers found intention to use contraceptives post-partum did not predict contraceptive use. Authors of a study in Madhya Pradesh, India of women of reproductive age found that over half of women intending to use contraception did not use contraceptives later (104). The author of a qualitative study in peri-urban Maputo, Mozambique found disjunctions between intentions to use contraceptives and actual use, and that contraceptive intent and use was influenced by gender divisions, informal social interactions and societal views about fertility (105). I examined a component of Fishbein and Ajzen's Theory of Reasoned Action that posits that individual intentions directly influence future behaviors (82, 83). However, I found in Model 1 that intent did not predict behavior. This result may be due to women's changing fertility and reproductive health desires over time. Indeed, women's ambivalent reproductive intentions make prediction of contraceptive use difficult (50, 106).

When I examined the direct (not moderating) relationship between HIV status and post-partum contraceptive use without intentions, I found that HIV status does predict post-partum contraceptive use in Models 2A and 2B. I found that the odds of condom use at 14 weeks post-partum were greater for HIV positive women compared to HIV negative women, and the finding was statistically significant. Further, HIV positive women had greater odds of dual protection compared to HIV negative women, and this finding was statistically significant. Authors of a prior study of PMTCT attendees in KwaZulu-Natal also found that the odds of condom use were higher for HIV positive compared to HIV negative women (28). The findings from Model 2 and the previous study suggest that HIV status is an important predictor of contraceptive use post-partum in PMTCT populations. Using Protection Motivation theory, I hypothesized that the threat of HIV positive status would prompt women to adopt an *adaptive response* (e.g. increase the odds of contraceptive use post-partum) compared to HIV negative women. My results suggest that women in this population did adopt an adaptive response (contraceptive use) when they received threatening health information (HIV positive status) (94, 95). My findings also indicate that PMTCT interventions to prevent unintended pregnancies in HIV positive women are working in this population. However, it is important to note that contraceptive use, and particularly condom use and dual protection, are as important for HIV negative women of reproductive age as for HIV positive women of reproductive age because the risk of HIV infection for women of this age group is very high (98, 107).

The measure of unwanted fertility in this study did not predict intent to use contraceptives in the future. In fact, women who experienced unwanted fertility were less likely to report intent to use contraceptives in the future than women who had not

experienced unwanted fertility; however, this finding was not statistically significant. Further, unwanted fertility experience was associated with reduced odds of contraceptive use at 14-weeks, and this was statistically significant. One possible explanation is women who experienced unwanted fertility are poor contraceptive users; having already had more children than a stated ideal. Therefore these women may be less likely to intend or to use contraceptives. HIV status did not appear to moderate the relationship between unwanted fertility and intent or actual contraceptive use. These findings do not support Protection Motivation Theory that the threatening health information of unwanted fertility and HIV positive status resulted in an adaptive response (94, 95).

The measurement of unwanted fertility in this population was likely not a very good one. To measure unwanted fertility I used a method developed by Lightbourne to calculate whether actual family size exceeds a stated ideal family size at the time of conception (49-51). A limitation of this method is “rationalization,” or stating an ideal number of children close to the actual number of children. This happens because women are reluctant to report having “unwanted” children, and will bias estimates of unwanted fertility down (49, 50). Rationalization is a possible explanation of the skewed distribution and the reduced odds of contraceptive intent and use. Researchers in India used the Lightbourne method to measure unwanted fertility in a population of rural women of childbearing age and found that the desire to stop childbearing was significantly higher for women who had experienced unwanted fertility compared to women who had not (50). Up to a quarter of pregnancies in South African women are unwanted, therefore the measure of unwanted fertility in this population likely underestimated unwanted fertility (14).

Limitations

Three hundred twenty six participants did not return at 14 weeks and 20 participants refused to test for HIV during the study. On demographic characteristics included in the models, participants lost to follow-up were similar to participants who completed a 14-week visit, except for HIV status. Women lost to follow-up were more likely to be HIV positive. HIV status appears to affect post-partum contraceptive use in this study and others; therefore the loss of 326 participants may potentially bias the models. The measure of unwanted fertility may not accurately capture women's experience with unwanted fertility due to rationalization. I wanted to include measures of ART use and exclusive breastfeeding. Due to missing values on ART use, I did not include it in the models. The measurement of breastfeeding was not exclusive breastfeeding, so I did not include in the models.

Conclusion

I sought to understand how intent to use contraceptives, unwanted fertility experience and HIV status affect women's intent to use contraceptives and actual post-partum contraceptive use in an urban clinic in Durban, South Africa. In this setting where HIV is highly prevalent it is ever more important that women control the timing and limiting of births so as to preserve the health of the mother and child. As a PMTCT strategy, the South African government promotes the use of modern contraceptives to women in antenatal care. I found that women's intent to use contraceptives did not predict post-partum contraceptive use and that HIV status did not have a moderating effect on this relationship. I did find that HIV status had a direct effect on post-partum condom use and dual protection. HIV positive women were more likely to use condoms

and dual protection post-partum compared to HIV negative women. This indicates that PMTCT strategies are working in this particular setting, but also points to the importance of promoting these messages to HIV negative women as well. I also examined unwanted fertility experience and intent to use contraceptives and actual post-partum contraceptive use with HIV status as a moderating variable. Women experiencing unwanted fertility may have already been poor contraceptive users and still less likely to use contraceptives post-partum. Therefore, more research with this group of women is merited to understand whether they are in need of additional contraceptive counseling and advice. The measure of unwanted fertility likely underestimated unwanted fertility experience in this population given the high number of pregnancies reported as unplanned. Further research is needed to understand unwanted versus mistimed pregnancies in this population and its interaction with HIV status to further determine whether these women require more attention and counseling about post-partum contraceptive use.

Figure 2: Analytic Sample

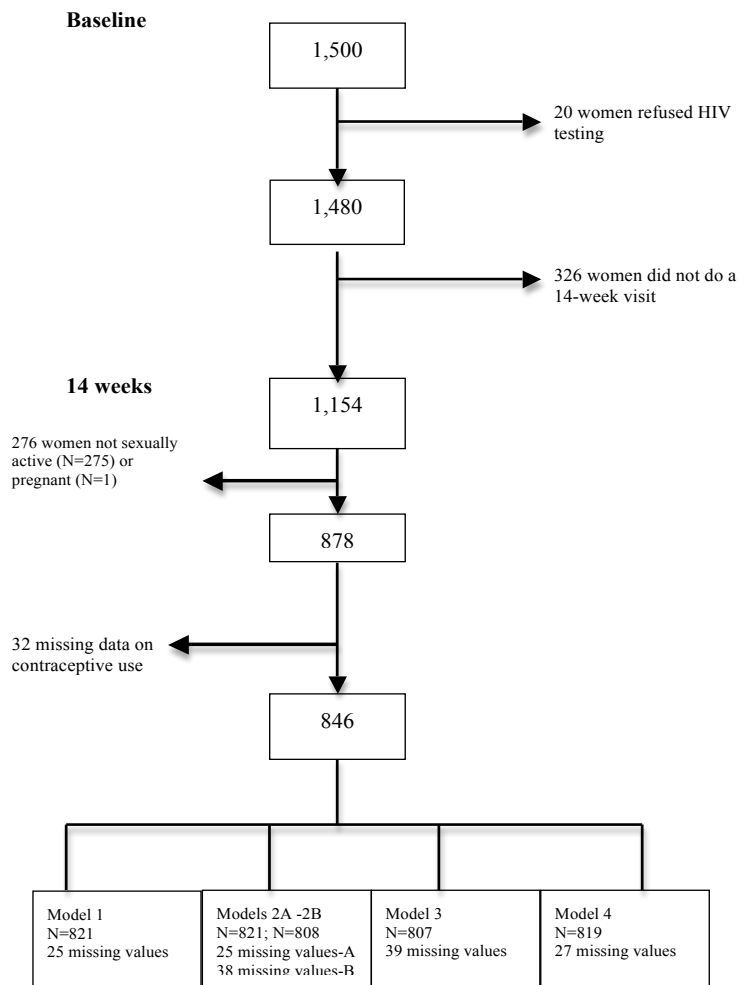


Table 1: Key Independent and Dependent Variables for SAHAPS Participants who Tested for HIV (N=846)

Variable	HIV Positive (N=300) (35.5%)	HIV Negative (N=546) (64.5%)
Key Independent Variables		
Intends to use modern contraception post-partum (baseline measure)	Yes-222 (74%)	Yes-385 (70.5%)
	No-78 (26%)	No-161 (29.5%)
Unwanted fertility (baseline measure)	Yes-23 (8%)	Yes-30 (5%)
	No-276 (92%)	No-514 (94%)
	Missing-1	Missing-2*
Key Dependent Variables		
Modern contraceptive use at 14 weeks post-partum (14 week measure) (Modern methods: injectables, pills, intra-uterine device, sterilization, male or female condoms, diaphragm)	Yes-259 (86%)	Yes-461 (84%)
	No-41 (14%)	No-85 (16%)
Condom use at 14 weeks post-partum (14 week measure) (Condom use is male or female condom use)	Yes-133 (44%)	Yes-153 (28%)
	No-167 (56%)	No-393 (72%)
Dual protection at 14 weeks post-partum (14 week measure) (Use of a male or female condom plus injectable, pill, intra-uterine device or sterilization)	Yes-66 (22%)	Yes-66 (12%)
	No-235 (78%)	No-480 (88%)
Intent to use contraception in the next 12 months at 14 weeks post-partum (14 week measure)	Yes-271 (90%)	Yes-487 (89%)
	No-33 (10%)	No-55 (11%)

Table 2: Control Variables for SAHAPS Participants who Tested for HIV

Variable	HIV Positive-N=300 (% of HIV positive women)	HIV Negative-N=546 (% of HIV negative women)
Age	26 years (range: 18-44) Missing-2	25 years (range: 18-45)
Education Level	Primary or less-23 (8%) Grades 8 to 11-146-(49%) Matric-117 (39%) Beyond matric-13 (4%) Missing-1	Primary or less-30 (5%) Grades 8 to 11-204 (37%) Matric-285 (52%) Beyond matric-27 (5%)
Primary language	Zulu-267 (89%) Xhosa-27 (5%) English/Other-6 (2%)	Zulu-496 (91%) Xhosa-42 (8%) English/Other-8 (1%)
Religion	Christian-299 (76%) Traditional/African-55 (18%) Other-16 (5%)	Christian-444 (82%) Traditional/African-71 (13%) Other-28 (5%) Missing/Refused-2
Marital status	Married-12 (4%) Partner-living together-83 (28%) Partner-not living together-205 (68%)	Married-49 (9%) Partner-living together-108 (20%) Partner-not living together-389 (71%)
Relationship duration	4 years (range: 0.5-3.5)	5 years (range: 0.5-26) Missing-1
Employment status	Housewife-132 (44%) Employed-139 (46%) Student-22 (7%) Unemployed-7 (2%)	Housewife-238 (44%) Employed-210 (38%) Student-85 (16%) Unemployed-13 (2%)
Partner has tested for HIV	Yes-80 (27%) No/Don't know-220 (73%)	Yes-208 (38%) No/Don't know-338 (62%)
Age at first sex	18 years old (range: 12-26)	18 years old (range: 11-34)
Number of sex partners	2.9 (range: 1-10) Missing-1	2.3 (range: 1-28) Missing-1
Other female household members	Yes-195 (66%) No-100 (34%) Missing-5	Yes-392 (73%) No-147 (27%) Missing-7
Socio-economic status-Number of household assets	5.0 (range: 0-9) Missing-1	5.3 (range: 0-9) Missing-52
Ever contraceptive use	Yes-190 (63%) No-110 (37%)	Yes-352 (65%) No-193 (35%) Missing-1
Parity	One birth-100 (33%) Two births-130 (43%) Three or more births-70 (23%)	One birth-219 (40%) Two births-193 (35%) Three or more births-134 (25%)
SAHAPS Intervention Arm	Intervention-159 (53%) Control-141 (47%)	Intervention-279 (51%) Control-267 (49%)

*Does not equal 100% due to rounding

Table 3: Results from Logistic Regression Models

	Model 1 (N=821) Modern contraceptive use at 14 weeks	Model 2A (N=821) Condom use at 14 weeks	Model 2B (N=808) Dual protection at 14 weeks	Model 3 (N=807) Intent to use modern contracept ives	Model 4 (N=819) Modern contracepti ve use at 14 weeks
	Odds Ratio (Robust Standard Error)				
Intends to use modern contraceptio n	0.87 (0.24)	-	-	-	-
Unwanted fertility	-	-	-	0.65 (0.41)	0.33* (0.19)
HIV status	1.23 (0.52)	2.26* (0.39)	2.27* (0.52)	1.00 (0.26)	1.05 (0.25)
HIV status x Intent to use contraceptive s	0.82 (0.40) (Ratio of odds ratios)	-	-	-	-
HIV status x Unwanted fertility	-	-	-	2.82 (3.57) (Ratio of odds ratios)	2.07 (1.75) (Ratio of odds ratios)
Age	1.02 (0.03)	1.00 (0.02)	1.00 (0.03)	0.97 (0.03)	1.01 (0.03)
Primary education or less	0.77 (0.37)	0.40* (0.15)	0.62 (0.31)	1.53 (1.00)	0.78 (0.37)
Grades 8 to 11	1.20 (0.27)	0.75** (0.13)	0.84 (0.20)	0.94 (0.24)	1.19 (0.27)
Matriculatio n	Referent	Referent	Referent	Referent	Referent
Higher than matriculatio n	1.21 (0.59)	1.57 (0.55)	1.12 (0.48)	3.74 (3.98)	1.24 (0.61)
Zulu	Referent	Referent	Referent	Referent	Referent
Xhosa	1.27 (0.51)	1.49 (0.42)	1.14 (0.41)	0.94 (0.42)	1.30 (0.53)
English/Othe r	0.32 (0.19)	0.13* (0.13)	Omitted (N=13)	0.73 (0.57)	0.31* (0.18)
Christian	Referent	Referent	Referent	Referent	Referent
Traditional/ African	0.87 (0.26)	0.90 (0.21)	1.11 (0.34)	0.75 (0.22)	0.86 (0.26)
Other Religion	0.65 (0.28)	0.77 (0.28)	0.84 (0.38)	0.96 (0.53)	0.63 (0.27)
Partnered- living together	1.13 (0.35)	1.27 (0.30)	1.22 (0.35)	1.01 (0.42)	1.16 (0.36)
Partnered- not living together	Referent	Referent	Referent	Referent	Referent
Married	0.94 (0.45)	0.68 (0.25)	0.56 (0.27)	0.61 (0.33)	0.91 (0.45)
Relationship duration	0.99 (0.03)	1.01 (0.025)	1.03 (0.03)	0.98 (0.04)	0.99 (0.04)

	Model 1 (N=821) Modern contraceptive use at 14 weeks	Model 2A (N=821) Condom use at 14 weeks	Model 2B (N=808) Dual protection at 14 weeks	Model 3 (N=807) Intent to use modern contracept ives	Model 4 (N=819) Modern contracepti ve use at 14 weeks
Housewife	Referent	Referent	Referent	Referent	Referent
Employed	0.59* (0.13)	1.02 (0.18)	1.02 (0.24)	0.90 (0.24)	0.60* (0.14)
Student	0.51* (0.16)	1.18 (0.31)	0.79 (0.27)	0.88 (0.33)	0.51* (0.16)
Unemployed	0.77 (0.47)	0.76 (0.41)	1.17 (0.72)	1.07 (1.18)	0.78 (0.44)
Partner has tested for HIV	0.79 (0.17)	0.90 (0.15)	0.88 (0.19)	1.09 (0.29)	0.82 (0.18)
Age at first sex	0.94 (0.04)	0.98 (0.04)	1.06 (0.05)	1.10 (0.07)	0.94 (0.04)
Number of sex partners	0.98 (0.04)	1.04 (0.05)	0.94 (0.06)	0.97 (0.05)	0.97 (0.04)
Other female household members	0.98 (0.26)	0.76 (0.17)	0.75 (0.21)	1.21 (0.45)	1.02 (0.28)
Socioeconom ic status	1.02 (0.06)	1.11* (0.05)	1.13* (0.07)	1.01 (0.07)	1.03 (0.06)
Ever contraceptive use	1.49* (0.31)	1.88* (0.32)	2.78* (0.68)	1.09 (0.28)	1.48* (0.31)
One birth	0.98 (0.25)	1.22 (0.24)	1.31 (0.34)	Referent	0.98 (0.25)
Two births	Referent	Referent	Referent	1.40 (0.45)	Referent
Three or more births	1.67 (0.59)	1.14 (0.27)	0.93 (0.29)	1.10 (0.52)	2.11* (0.80)
SAHAPS Intervention	0.88 (0.18)	0.95 (0.15)	0.81 (0.17)	0.74 (0.18)	0.89 (1.75)

*Statistically significant p=0.05 **Statistically significant at p=0.10

Chapter 5: Qualitative Methods and Results

Methods

Interview Procedures

Interviewers purposively recruited fourteen family planning clients by HIV status (8 HIV negative; 6 HIV positive). All women were legal adults (18 years or older), had experience with family planning at the clinic and gave informed consent. I developed a semi-structured in-depth interview guide in Zulu with the help of local staff. All interviews were conducted in Zulu by a trained interviewer and tape-recorded. Interviews lasted from 30-60 minutes. Tape recordings were transcribed and translated into English from Zulu.

Five nurses were purposively recruited to participate in the study with the help of the local study staff and all were 18 years old or older and gave informed consent. Nurses interviewed promoted family planning post-partum. I developed a semi-structured in-depth interview guide in English for nurses with the help of local staff. I conducted the interviews in English and they lasted 30-75 minutes. The in-depth interviews were tape-recorded the interviews transcribed.

Analysis

I read all of the client and nurse transcripts together for initial theme identification. Then, I created a preliminary codebook drawn directly from the interview guides and emergent from the data. I hand-coded the transcripts using deductive coding primarily from the interview guide questions, although I also used some inductive coding

as well, representing themes that emerged from the interview data (108). The unit of analysis was the individual. Analyses of client interviews included exploring differences between HIV negative and HIV positive women's experiences at the clinic.

Results

Demographics

Clients

The average age of participants in in-depth interviews was 29 (range: 18-36 years) and HIV positive women were older than HIV negative women on average (31 versus 27). Women were highly educated, as all completed 10 to 12 years of schooling and 64% completed Matric, the high school equivalent in South Africa. Most women had one or two children (range: 1-3) and HIV positive women had more children on average (2.3 compared to 1.6 for HIV negative women). One woman was married, one woman was single and the remaining 12 women were in relationships, but not married. Although women were not married, they were in relationships for an average of 4.8 years (range: 1-17), and HIV positive women had been in a relationship for an average of 4 years and HIV negative women for 7 years.

All but one woman (93%) reported current contraceptive use, and all 13 women were using an injectable contraceptive method. Four women specified that they were using the 3-month injectable (Depo-Provera) and one specified that she was using the 2-month injectable (Nuristerate) and the other women did not specify the injectable type. Eleven of 14 (79%) women reported past contraceptive use. Five women used an injectable contraceptive method, two used contraceptive pills, three used condoms and one used contraceptive pills and condoms. All six HIV positive women used

contraceptives in the past (3 injectable contraceptives, 2 condoms and 1 injectable contraceptive and condoms). Five of eight (63%) HIV negative women used contraceptives in the past (2 injectable contraceptives, 2 contraceptive pills and 1 condoms).

Nurses

The nurses were an average 49 years old (range: 37-55) and four of the five nurses had been working as nurses for over 20 years (average for all five: 23 years, range 6-31). Two nurses had worked at the clinic for over 20 years, and the others between 4 months and two years.

The Process of Family Planning Promotion and Provision

Women arriving for family planning at the clinic register at the main clinic and then wait in the reception area of the main clinic until they are called in groups of 10-15 to come to a separate building where they, along with other women there to immunize their babies, are seen by nurses who immunize babies and distribute family planning. All women coming for post-partum family planning wait with clients also seeking immunization and see the same nurses. Women coming for family planning for the first time receive education from a nurse in a group about the available contraceptive methods and then have an individual conversation with a second nurse. Women returning for family planning only meet with one nurse in a private room. All of the women interviewed were at the clinic for post-partum family planning. Women are encouraged to come for post-partum family planning during antenatal care and at delivery. The post-partum visit coincides with the immunization schedule of the baby and is a time when family planning is promoted as well. The family planning methods offered are two

injectable contraceptive methods, Depo-Provera and Nursisterate, as well as hormonal contraceptive pills and condoms. All contraceptive methods are free of charge. When I asked nurses and clients whether other methods should be offered, they didn't think any other methods were necessary. I also asked whether stock-outs of available contraceptive methods were a problem and nurses and clients said it was never a problem. Women are given a family planning card where nurses write the contraceptive method of their choice and their return appointment dates.

Factors Important to Client Satisfaction with Family Planning Services: Waiting Times and Nurses Treatment of Clients

The amount of time women waited for family planning services affected their reported satisfaction with services. When women waited for short periods of time, 10-15 minutes, they were satisfied. When they waited for long periods of time (hours) they were not as happy with the family planning services. Women reported that if you arrive early in the morning (7am) the family planning nurses attend to patients quickly. The nurses begin to see clients around 8am, and at that time, clients move quickly from the main clinic to family planning and are often seen in 10-15 minutes. One woman described this:

[The nurses] treated me very well. When you come to the clinic, you don't wait for a long time. They are very fast to help you. When they start working you don't wait more than ten minutes. They have good care. They are very hospitable.
(Client #2, 20 years old, HIV negative, 1 child, 12 years of education)

However, two women reported long waits when they were unable to get to the clinic first thing in the morning. One woman explained:

Sometimes, if you are not here early, they don't attend to you. They forget that we are not the same. I live [in another part of the township] and sometimes...I come here after 10 [am]. They ask: 'Why were you sleeping?' We once came after 10am, and we waited until 3:30pm, it was so slow.

(Client #9, 32 years old, HIV positive, 3 children, 11 years of education)

A different woman was frustrated because at her last family planning visit, the nurses were rushing in the afternoon and were not giving the patients optimal care because they had arrived at the clinic later in the day:

The nurses asked me why I came in the afternoon. I told them that I forgot that it was the 16th and that was why I didn't wake up early in the morning to come to the clinic. When I checked my card in the afternoon and saw that it was my date, I rushed and came late. [Because it was so late] the nurses didn't have any time. I don't want to lie to you; they didn't have any time. Instead of asking us questions about how the injections were treating us, because they normally ask, they didn't ask any of us, but they wrote down 'she is happy', where as I never said that at all. *(Client #10, 27 years old, HIV positive, 1 child, 12 years of education)*

The nurses realized that sometimes patients wait a very long time in the clinic, but the nurses said that they were understaffed and overloaded with patients. One nurse described this situation:

Clients want things to happen [immediately] but [sometimes] we are not fully staffed. So sometimes we'll let the client know we are busy with someone else. But some people [lose patience]. Nurse #1

A different nurse also acknowledged the long wait times and said that sometimes patients go to private doctors because it is quicker. She described this:

Clients wait for a long time here at the clinic. Sometimes they go to private doctors and pay 20 Rand because it's faster. Nurse #2

Some women compared their experiences at the clinic to other clinics in the township and preferred the services of the study clinic because of their hospitable treatment of patients:

When you go to other clinics for contraception, the nurses treat you badly. They shout at you and say all sorts of things. But here, even if you missed [the date for the injection], they don't ask you a lot of things; they do what they are supposed to do. I think they treat patients well here, I have never seen any abuse [of patients]. *(Client #3, 34 years old, HIV positive, 3 children, 11 years of education)*

She also described how she was very comfortable with the nurses, and that if the service was poor, she would go elsewhere:

I am satisfied with the care I receive here. If I was not satisfied, I would have changed clinics, because there are a lot of them. [Here I feel] at home. If I'm with a nurse here, it's the same feeling as being with my mother or my sister. I can tell [the nurse] all my problems.
(Client #3, 34 years old, HIV positive, 3 children, 11 years of education)

When women reported that they were treated poorly or did not feel comfortable with the nurses, they were more likely to also report dissatisfaction with the family planning services. One woman said it was because there were certain nurses with whom she did not feel comfortable:

There are those [staff] for whom you feel like going to the back of the queue [in order to] see the staff who don't [cause] problems. Sometimes you [wish] you knew who was on shift, otherwise, you can't relax. You should be able to relax with the nurse and tell her when you have a problem. [The way it is now] you are scared to tell the nurse your problem if you have one.
(Client #9, 32 years old, HIV positive, 3 children, 11 years of education)

A different woman said that nurses shout at the patients and are impatient with clients, to the point that she was considering going to a different clinic:

I got what I came for, but my feelings were hurt. I did not feel good. Sometimes when it is your date to attend the clinic, you think, I can't talk to the nurses because they are always busy shouting [at the patients]. Sometimes I think [about] changing to another clinic. It is not my first time here, but it is my first time for family planning. When I'm here, I'm always [attended to by] the same people who don't have time and who don't know how to talk [to patients]. I think that a person who works with the public should have patience, no matter [what]. For example, if [the nurse] is tired and has been working the entire day, she must [still treat] people as humans who have brains. She must not treat people as if they have no brain, you see. [She must not treat you like] she is better than you, [or act like she is better than you, or shout at you].

(Client #8, 23 years old, HIV negative, 1 child, 12 years of education)

Variability in Length and Content of Nurse-Client Conversations Affects Clients' Understanding of Family Planning Methods

I asked women about their most recent conversation with a family planning nurse. Five of the 14 women said that the nurse spent time with them and explained how the injection works in the body, possible side effects, risk of pregnancy if they miss a dose, the importance of condom use for protection from sexually transmitted infections and that they should return to the clinic if they experience problems with their chosen method.

One woman described her most recent conversation:

The nurse told me that the injection does not [always] agree with [you], and [sometimes] you must come back and change the injection. The nurse said when you take an injection [some clients] get fat and [some] don't develop anything [and some] bleed when using the injection. We spoke about the risk of pregnancy if you don't wait [to have sex] for 7 days. You must wait 7 days for the injection to settle. After that, you can sleep with a man. After the injection has settled, it protects you from pregnancy.

(Client #5, 27 years old, HIV negative, 2 children, 10 years of education)

Nine of 14 women described very short conversations (2 to 5 minutes) with the nurses during which time the nurse usually only asked them what method they were using and then the nurse gave it to them. Women often didn't know the name of the contraceptive method they were using, but described it as the 2 or 3-month injection or the pills. One woman described her conversation with the nurse:

[The nurse] asked if I chose pills or the injection, I said the injection for 3-months and she wrote it down, and I got the injection. They don't explain a lot of things; you just say the injection that you want or the pills that you want, that's all. *(Client #9, 32 years old, HIV positive, 3 children, 11 years of education)*

When asked whether nurses inquired whether clients experienced side effects, described the risk of pregnancy if they miss a dose, or discussed other family planning methods, five of the 14 women said no. Two women described their last conversations with the nurses:

We did not talk about different family planning methods. She said I would get used to the injection. We did not get enough time to talk. There was little that we spoke about, [she asked] me how the injection was treating me. Maybe it was 2 minutes. *(Client #2, 20 years old, HIV negative, 1 child, 12 years of education)*

It's just that here at the clinic they don't explain. You end up choosing an injection [but you have] no information about it. Even when things happen in your body, it takes time [for you] to realize that it's a side effect from the injection, because you were never given an explanation [about] the good and the bad of [the injection]. *(Client #8, 23 years old, HIV negative, 1 child, 12 years of education)*

Some women were afraid to ask the nurses questions about family planning because there was a sense that they would take up too much time and the nurses were busy. One woman explained:

[I wanted to ask] What is the difference between the 2-month and the 3-month injection? Because I've never heard about it in the clinic, but I always hear about it elsewhere. I was scared [to ask because the clinic] was full and there were people [waiting]. *(Client #14, 18 years old, HIV negative, 1 child, 11 years of education)*

I asked the nurses how many patients they see in a day and how much time they spend with each patient. The nurses said that they see between 20-30 patients per day and spend 2-5 minutes with each of them. They also said that depending on the patient's problem, they sometimes spend more time with the patient, but that they feel pressured to see patients quickly. One nurse explained:

It is difficult. The number of patients is increasing due to the squatter camps. Sometimes when you see them you don't do a proper examination because of overload. In a day, we see 80 [patients]. And yet we are four nurses. It's supposed to be 30-40 minutes per patient. Sometimes [we don't have time] to do the proper thing. We have to push [in order to see everyone]. Nurse #2

Nurses described their conversations with the clients about family planning. The nurses treated the younger and older clients differently as well as the first time acceptors of family planning and the repeat users. One nurse explained how they separate the younger and older women:

To make family planning effective, you must separate the young women from the older women, so that the women feel comfortable. Your health education and explanation will be different for the different groups of women. Nurse #5

For the younger clients, the nurses promote Nuristerate and for older women Depo-Provera. This is because Depo-Provera causes amenorrhea and it can take longer for fertility to return after stopping the method.

Normally, the Nuristerate is good for the young ones who have never conceived. The other one [Depo-Provera or Petrogen], sometimes when you want to fall pregnant, it takes [a long time]. We normally start new acceptors and those who have never conceived on Nuristerate. Nurse #2

However, the nurses emphasized that it is the patient's right to choose the method and that they advise them about all of the different methods, and the patient ultimately decides for herself. The nurses also reported that they spend more time with the first time users because they must guide the patient in the process of choosing a method for the first time, and this requires more in-depth discussions. One nurse described this:

When you are dealing with a patient who is coming for the first time, you have to spend more time with that patient because we have to tell the patient about the methods that we have, we look at the age of the patient, whether the patient is breastfeeding or not, whether the patient is HIV positive or not, so with those patients, we have to spend more time, especially when they are coming for the first [family planning] visit. Nurse #3

Menstruation: An Unnecessary Barrier to Family Planning Initiation

Six clients mentioned that a woman must be menstruating in order to initiate a contraceptive method at the clinic. These women said that if a woman is not menstruating the nurses send them home and tell them to come back when they are menstruating. One woman described this:

The nurses don't let you take birth control before they can see that you are on your period. *(Client #6, 32 years old, HIV positive, 2 children, 11 years of education)*

You have to go [to the clinic] when you are still on your period. You [can't] just go there [any time]. [The nurses] want [clients] who are menstruating to [confirm] that they are not pregnant [before they start them on a contraceptive method]. *(Client #8, 23 years old, HIV negative, 1 child, 12 years of education)*

Three of the five nurses interviewed said that clients must be menstruating in order to initiate a family planning method at the clinic. One of the nurses described this:

If it is her first time using family planning, she must wait for her period and then come to do family planning. Nurse #3

However, another nurse mentioned that nurses should not do this and that they should not turn away the clients because they are not menstruating:

You must not dispatch the patients without a contraceptive method. Nurses have got it [in their minds] that the clients must be on their periods to start a contraceptive method. Then the patient will leave, have sex with her boyfriend and get pregnant. Bleeding or not, give the patient a contraceptive method [at that moment]. Even if you give the patient an injection when the patient is pregnant, that injection is not going to harm anything. Nurse #5

The Importance of Discussing and Understanding the Side Effects of Family Planning Methods

Ten of fourteen women interviewed reported 1-3 side effects when they used an injectable contraceptive method. Seven women described bleeding ranging from spotting to heavy bleeding for up to a month. Five of the seven women who experienced bleeding discussed it with a nurse, and one switched methods, another took pills to stop the

excessive bleeding, for one woman the bleeding resolved on its own, and for two women they were waiting to see if the bleeding normalized. One woman was not informed that bleeding was a possible side effect of Depo-Provera:

The first time I used Depo. With my ignorance, I bled for a month. When I came back to the clinic, I explained that the injection induced bleeding. [The nurses] asked me why I hadn't come back to tell them that I had a problem with bleeding. It was clear that I had not been well informed.

(Client #3, 34 years old, HIV positive, 3 children, 11 years of education)

Another woman was aware of the possible side effect of bleeding and was able to resolve the issue when she told the nurse:

I bled a lot when I first started using contraceptives. I bled for a long time, about two weeks, but after that, it stopped. [The nurses] explained to me that I might bleed a lot, but that it's not a problem. If I bleed a lot [the nurses explained] I should come to them so that they can give me the pills to stop the bleeding.

(Client #10, 27 years old, HIV positive, 1 child, 12 years of education)

The other two women who experienced bleeding did not say anything to the nurses, and one of them was in need of advice:

If [there was] something that would [return] my period back to being normal. But I'm not sure if that is possible.

(Client #14, 18 years old, HIV negative, 1 child, 11 years of education)

Three women experienced weight gain and stopped getting their period, and one woman also experienced excessive bloating. One of the three women who gained weight told her sister, but not the nurse. She remained on the method. Another woman whose period stopped and she gained weight and had excessive bloating just stopped using contraception:

I am the one who... what can I say? I wasn't having my period and I was gaining weight, so I thought I should stop for a while. [The injectable] makes you hungry, you gain a lot of weight and your body gets full of water.

(Client #13, 25 years old, HIV positive, 2 children, 12 years of education)

All of the nurses said they counsel their clients about the side effects of family planning. In particular, they said that they emphasize the side effect of bleeding and educate the women about what to do if they experience this side effect. One nurse explained:

When they first come, we tell them the pill or the injection might cause them to have severe menses. We tell them that if they menstruate for more than 7 days, they must come back. But if you see [the menses] coming and going, or spotting, that is a normal thing, or stopping. But they know. It doesn't scare them, because they know that it is the side effect from the injectable or pills. Nurse #1

Nurses also said that they educate about the side effects of headache and weight gain.

One nurse thought it was important to discourage changing methods if clients experience side effects:

The most common side effect is the headache, the weight gain. Educate. Don't say 'Change the method', educate. Stay on the method. Unless there are severe, severe side effects. Nurse #3

Whereas another nurse cautioned against not switching the client's method because the client might stop taking contraception and then get pregnant:

Tell them contraindications. Don't just say this [contraceptive method] is fine. Tell them about the side effects. When patients experience side effects, you counsel them. And then [depending on the patient] you change the method. If [the method] causes her to bleed, you cannot say: 'Continue! Continue!' Because you don't want [her to stop the method and get pregnant]. Nurse #5

Another nurse also pointed out that if patients experience side effects, they don't always return to the clinic and just discontinue their contraceptive method. She described this:

The patients don't always come back when they have side effects. They just stop taking the method. Nurse #4

The Importance of Discussing HIV Status and Family Planning

Of the six HIV positive women interviewed, the nurses discussed with four women their HIV status as part of their last family planning counseling session. The

nurses who discussed women's HIV positive status supported their use of family planning, but also emphasized the importance of condom use and ART prophylaxis to them. Two of the women who discussed their HIV positive status described their experience:

The nurse said that if I know my status I must look after myself and use a condom. And because I am on contraception [I must not] stop using a condom. She said we must use condoms because we know our [HIV positive] status.
(Client #6, 32 years old, HIV positive, 2 children, 11 years of education)

She said that the [contraceptive] injection is not as important [as the condom] because I know my situation (that she is HIV positive). I should not [stop using] the condom. I am all right (she is on treatment) and I must stay on treatment so that my CD4 count does not go down.
(Client #3, 34 years old, HIV positive, 3 children, 11 years of education)

The two HIV positive women who did not discuss their HIV status with the nurses at the clinic wanted more information about how HIV and contraception affect their bodies.

One woman explained:

(Interviewer: Did the nurse say anything about your HIV status when you discussed contraception?) She never asked me about my [HIV] status. [The nurses] must [give us the] proper information. Like those of us who are HIV positive, they must explain to us, because there are those of us without [the right] information. If they could explain about family planning, what they are going to do, why they are doing it, how is it going to protect you and what is it going to do in your body. *(Client #11, 36 years old, HIV positive, 3 children, 12 years of education)*

For the eight HIV negative women, four did not discuss their HIV status with a nurse as part of the family planning counseling, three did, and there was no information for one woman. One woman who did not discuss her HIV status with a nurse did discuss the importance of condom use in addition to the injection:

[The nurse] said even if you are on contraception it is important to use condoms because the injection does not prevent HIV, it prevents pregnancy.
(Client #5, 27 years old, HIV negative, 2 children, 10 years of education)

Although one of the women told the nurse her HIV negative status, the nurse simply noted it, but did not discuss it with her:

(Interviewer: Is there anything that the nurse said about your HIV status when you were talking about family planning?) She asked if I checked my HIV status, and I said yes. She asked: ‘What were the results?’ So I said they told me I was negative. Then she wrote other things, and then I went to be injected.
(Client #8, 23 years old, HIV negative, 1 child, 12 years of education)

Another nurse emphasized that even though the patient knows that she is HIV negative, she must still use condoms:

(Interviewer: Did the nurse say anything about your HIV status when you discussed family planning methods?) Yes. My status was negative. [The nurse] told me I must not stop [using] condoms because a man goes all over. If I stop using condoms because I think I trust my partner, I [still] don’t know what he is up to. I’ll have sex with him, trusting him and knowing that I’m HIV negative; then I [might] get infected. Therefore, I must not stop using condoms.
(Client #7, 26 years old, HIV negative, 1 child, 12 years of education)

Two nurses reported that they promote contraceptives the same way to HIV positive and to HIV negative patients. One of these nurses explained:

We promote contraceptives the same way to HIV negative and HIV positive patients. If they are HIV negative they can still be exposed to HIV. And those who are HIV positive, they are supposed to use contraceptives, especially condoms, because they prevent STIs and pregnancy. Everyone must use contraceptives, condoms. If you don’t use condoms and you use [hormonal] contraceptives, you can get HIV. Use both [hormonal contraceptives and condoms]. Nurse #4

Two other nurses described differences in how they promote family planning to HIV positive and HIV negative clients. One nurse explained how family planning is promoted to HIV positive patients:

Those who are HIV positive we don’t give the 2-months [injection], the short acting one, rather we give the 3-months or long acting one. Because of contraindication of the [ART] treatment, you cannot give a patient who is HIV positive the Tri-phasal, the Nordette, because the effect of the [contraceptive] tablets is reduced if the patient [is taking ART treatment]. Nurse #3

Tri-phasal and Nordette are contraceptive pills that do interact with ART drugs to lower contraceptive effectiveness. Another nurse described the importance of condom use for HIV positive patients, but also the difficulty of convincing HIV positive patients to use condoms. She explained:

The HIV positive patients, we advise them to use condoms. They say [condoms] are uncomfortable, I'm going to die anyway, so [I'd rather have] 'flesh on flesh' [sex]. We discourage 'flesh on flesh' and still encourage them to use condoms. They say they don't enjoy sex with a condom. There are people who say 'I'd rather die than use a condom'. Nurse #2

Condoms Should be Discussed with All Clients

I asked women whether nurses discussed condoms during their last family planning counseling session. A majority of women discussed condom use with a nurse (11/14; ~79%), whether they were HIV positive (5/6; 83%) or HIV negative (6/8; 75%). Nurses emphasized with women in the counseling sessions that injectable contraceptives do not protect them from HIV or other STIs. One woman described her session, including a condom demonstration:

(Interviewer: Did the nurse talk about condom use?) [The nurse] showed us how a condom is used. The condom protects you from falling pregnant and protects you from sexually transmitted diseases. The nurse showed us how it works and how to throw it away. (*Client #7, 26 years old, HIV negative, 1 child, 12 years of education*)

For HIV positive patients, nurses emphasized the importance of condom use at all times with their partners. One woman explained:

(Interviewer: Did the nurse say anything about the use of condoms?) Yes, she did. She said that if you know your [HIV] status is positive, you must [have sex using] a condom at all times. She said that whenever you [have sex] with your partner, you must always use a condom. (*Client #13, 25 years old, HIV positive, 2 children, 12 years of education*)

Nurses also emphasized condom use with HIV negative women, particularly if they have multiple partners. An HIV negative woman described her session:

(Interviewer: Did the nurse talk about condom use?) Yes. She said you should condomize. If you have multiple partners you must condomize, because you don't know where your partners have been.

(Client #1, 35 years old, HIV negative, 3 children, 12 years of education)

All of the nurses said that they promote condoms to all clients, whether they are HIV positive or HIV negative. Nurses give out condoms free to all clients and demonstrate their proper use. Two nurses described this:

Every client, we tell them about condoms and give them condoms, whether they ask for them or not. Nurse #2

To promote condoms, we put them everywhere. The condoms are free for them to take. I demonstrate how to use a condom. Nurse #4

All of the nurses also explained that they promote condoms as a method to prevent sexually transmitted diseases, including HIV, but not as a family planning method. The nurses acknowledged that condoms are indeed a family planning method, but as a health education strategy, they promoted hormonal contraceptives for family planning and condoms for STI prevention as a means to encourage the use of both. Two nurses explained this strategy:

Normally the condom is not for preventing them from getting pregnant; that is what we emphasize. Because what if it bursts? Because they tell us 'Oh [the condom] burst'. We say to them if you were taking tablets or injections you wouldn't be pregnant. The condom is for STIs only, not for preventing you from getting pregnant. Nurse #1

So I cannot say condoms are one of the methods of contraception, because when you say a condom is a method of contraception, the client will say nurse, I don't want to take Petrogen, I don't want to take Nuristerate; I'll use a condom. When you know very well that there will be that day when the patient will not use the condom. So never ever mention the condom as a contraceptive. Mention the condom as prevention for HIV/AIDS and STIs. Nurse #3

Although the nurses encouraged clients to use condoms and educated them about their proper use, they understood the challenges clients face when using condoms because their male partners are often opposed to condom use and because women are often submissive to men and unable to request condom use. Two nurses described this:

There are challenges with condom use. The clients say their husbands, their boyfriends; they don't want to use a condom. That is why there are so many people who are HIV positive. Nurse #2

[Women] tend to be submissive. Because they think that if the man doesn't want a condom, and they insist, he will leave them for another woman. So they tend to allow everything, even if it's harmful to them. Nurse #1

Another nurse described the importance of educating men about condom use:

It is not enough to educate women [about condom use] because they are inferior [to men]. Those [men] who are superior, they won't allow women to use a condom during sex. It is very important to educate young men. Even the older men. Nurse #4

Missed Opportunities and Misinformation about Sterilization as Another Family Planning Method

I asked women whether the nurses at the clinic ever discussed sterilization with them. Sterilization is not offered at the clinic, but women are referred to a nearby hospital for the procedure. Half of the women were interested in sterilization, yet none of them spoke with a nurse at the clinic about it. One woman explained:

I first heard [about sterilization] at [the hospital]. The doctor was talking to someone next to me. [Their conversation] made me realize that sterilization is important. It's something that I always imagined as painful. I'm scared of anything that involves the uterus. I never heard [about sterilization] here [at the clinic]. *(Client #9, 32 years old, HIV positive, 3 children, 11 years of education)*

Five women were afraid of sterilization for different reasons. Two women were afraid that it wouldn't work. One woman explained:

At the hospital I told the doctor to sterilize me because I did not wish to have another baby. I was talking to another lady and she said ‘I sterilized but here is the baby’. She had two children and decided not to have another, so she sterilized. So then I also wanted to be sterilized, but I was scared. Now I’m worried because [if I do sterilize] I have no way to check to see if I was really closed. *(Client #3, 34 years old, HIV positive, 3 children, 11 years of education)*

The other women were afraid that sterilization would make them sick and were not clear how the procedure was done. One woman described her fears:

I am afraid. I heard from ladies that are sterilized that it makes you sick. When you get the operation, [they] close the uterus inside and it makes you sick in the blood; that is what scares me.
(Client #5, 27 years old, HIV negative, 2 children, 10 years of education)

Three women believed that you could not sterilize until you have three or four children. One woman also thought that her husband had to agree for her to be sterilized:

If you are going to sterilize, your husband should also agree. Once I asked a nurse, before I had this baby, if you are allowed to [sterilize], if you had a C-section and you are pregnant with a fourth child. She said yes, if you agree with your husband. You are able to [sterilize], but the law says [after] three [children] and sometimes four [children].
(Client #1, 35 years old, HIV negative, 3 children, 12 years of education)

Despite women’s fears about sterilization, half of the women interviewed wanted more information about the procedure. One woman expressed multiple fears, but was still interested in sterilization and wanted more information from a medical professional:

I have thought about [sterilization], but I was frightened because people say it’s scary. I don’t know how it’s done...some operation on the side of the body? I thought after having this baby, I would get sterilized. But I didn’t do it. I was scared. And there’s a girl who told me that she was sterilized, but she was always bleeding every month, and not just a little, but a lot. I would like to hear more about sterilization from a doctor or a nurse.
(Client #10, 27 years old, HIV positive, 1 child, 12 years of education)

Several nurses said that female sterilization is rare because of lack of knowledge on the part of the providers and the clients and lack of uptake. Two nurses explained the lack of knowledge about the procedure:

It's very rare [sterilization]. It's a lack of knowledge on the part of the clients and the providers. The procedure is available. I would refer the patient to the hospital. I would first advise her. You want to give them time to think about it, because it's not an easy procedure, because then she won't be able to have a child for the rest of her life. Nurse #2

It's not common [for patients to ask for sterilization] because they don't know [about it]. Nurse #5

Another nurse perceived that patients weren't interested in sterilization:

Even if we talk to patients about tubal ligation, they don't want to do it. Nurse #3

The nurses promote sterilization to older women with high parity or women who already had several C-sections. One nurse explained that sterilization is for higher parity women:

Tubal ligation is a family planning method for those who have more babies. Let's say you've had four babies or three babies. The mother will say nurse, 'I don't want any more babies. I'm tired of [taking] family planning'. You tell the patient, because you have so many babies, three is enough for you, I recommend that you do a tubal ligation. Nurse #3

Patients are told they must use hormonal contraceptives before they are considered for sterilization, because they must be referred by a nurse to the hospital. The length of time nurses told patients that they must first use family planning varied. Two nurses described this:

We refer patients to the hospital for sterilization. Sometimes they ask what can I do if I don't want to have any more babies. We advise them to do family planning first, for one year. Then we refer them to the hospital. Nurse #4

When the patient asks for tubal ligation, we have to do so many things. First, the patient has to do family planning, for 6 or 7 months? I'm not sure [how long]. But the patient has to do family planning. She has to have a PAP smear. Once she does those things, we refer the patient to the hospital. Nurse #3

Nurses were very reluctant to discuss sterilization with younger women because it is permanent, and they would rather the younger women use a reversible family planning

method until they are older or are higher parity. Nurses said they considered the patient's age and marital status as part of discussing sterilization with a patient. One nurse explained the process:

The process of sterilization...you check the [patient's] age, you check the marital status also. You check the HIV status [of the patient] and you also check the mentality of the patient. And then you must explain when you sterilize someone they must sign a consent form [that they understand fully]. If you don't tell the patient everything about sterilization, you as a nurse are going to be in trouble. Before, in the 1980's, they used to tie the tubes. Now, because of [advances] in research, they cut the tubes. And it's not easy to reconnect the tubes. Nurse #5

Suggestions to Improve Family Planning Services

I asked women if they had any suggestions about how to improve the family planning services at the clinic. Most of the women said that they were satisfied with the services and did not have any suggestions, however, eight women gave suggestions about how to make the family planning services at the clinic better. Five of the eight women who made suggestions said that the women attending the clinic for family planning should be separated from the women attending the clinic to immunize their babies.

I wish that they would separate [the patients] coming for contraception from the mothers with babies, because sometimes you are in a rush [to get your contraception].
(Client #11, 36 years old, HIV positive, 3 children, 12 years of education)

One woman suggested that one nurse be dedicated to family planning only.

They should separate the nurses. There should be one nurse for family planning and one nurse for immunization.
(Client #6, 32 years old, HIV positive, 2 children, 11 years of education)

The women who suggested these changes wanted the separation for expediency and for privacy.

The other three women suggested that the clinic staff needed to improve. One woman said she thought that the staff needed to learn to respect the clients more. She described this:

(Interviewer: Are there any changes you think should be made to improve the clinic?) Educating the employees about respect...respecting other people. Maybe other things [would] automatically [improve]...because it all starts from respect.
(Client #8, 23 years old, HIV negative, 1 child, 12 years of education)

In a similar vein, another woman suggested that the staff not shout at the clients:

They should limit their shouting...the way they shout at you and go crazy. They must limit shouting [at patients] and speak to us in a pleasant manner.
(Client #13, 25 years old, HIV positive, 2 children, 12 years of education)

Finally, one woman thought that the clinic needed more staff, and staff that are dedicated to their work and to the clients. She explained:

They must find permanent staff that will work with passion, not casual staff. I wish they would increase [the number of] staff. What is more important, is that clients should be looked after, and [with] no delays.
(Client #9, 32 years old, HIV positive, 3 children, 11 years of education)

I asked the nurses how the clinic could improve to make their jobs promoting family planning easier. Four of the five nurses said that the clinic should have one nurse dedicated to family planning only, rather than several nurses who work on family planning and immunization. The nurses said that this would help with privacy and allow the nurse to have enough time with the family planning clients. One nurse explained:

We don't have a place where we have a family planning nurse [attending to family planning clients only]. It's time consuming because someone will come with a card for family planning and bring a baby for immunization, so you have to do immunization and family planning and there is no privacy. If there was a room just for family planning, that would be better. Nurse #1

Another nurse thought that they also needed more staff because they are too busy and don't have enough time to adequately promote family planning. She explained:

We need to have more staff. Because you'll find that sometimes we fail to promote contraception because we are rushing the queue. That's the most important thing, the shortage of staff and the number of clients. I think for us to promote family planning we need to have more staff. We need to have a nurse who is responsible for family planning only. That is how we can effectively promote family planning. Nurse #3

One of the nurses discussed the importance of privacy, dignity and allowing the patients to ask questions. Dignity included not judging patients. She explained:

Here at the clinic, we are caregivers, we are not mothers. We are not the priest. We are caregivers. When you see a young girl come to the clinic in a school uniform, [nurses berate them], but we are not their mothers. We are not the social worker. We are caregivers. Don't just shout [at her] and scold [her], she is not going to come back. Don't treat her as if she is your own child. Do you think someone is going to ask for contraceptives if you just shouted at her? That is why our clients are running away. Then the clients tell other people not to go to the clinic. Nurse #5

She also stressed the importance of letting the patients talk and ask questions:

You must let the patient ask [questions]. You can't just talk and talk and talk. You must give them a chance to ask [questions]. Sometimes, if you just give them the method without telling them everything, for three or four days they are not safe [but they don't know]. They will think they are protected [when they aren't]. Nurse #5

Finally, she emphasized that nurses must not shout at the patients because that is why patients do not come back:

You must not shout. That is our problem. That is why our patients run away. Our attitudes as nurses. We must listen to the community and change our attitudes. If we don't, we will continue to do the wrong things, and things will get worse [at the clinic]. Nurse #5

Discussion

Clients and nurses reported variations in client waiting times and the amount of time they spent together during a family planning visit at the clinic. The volume of patients at times affected the client-provider interaction time, and as a result, the quality of care. Patients were unable to ask questions or perceived that nurses were too busy to

answer them, and nurses reported that they felt rushed and didn't always have sufficient time to address patient's concerns. Other studies also find that where staff are overworked and clients wait for a long time, patient satisfaction and quality of care are decreased (74, 76, 79). The South African government's national contraceptive policy guidelines include that all government clinics ensure reasonable waiting times for clients (109). In this study, I found that although the clinic was open 24 hours, clients who did not arrive early in the morning often had to wait for very long periods of time, whereas those who arrived early were seen quickly and reported greater satisfaction with the family planning services.

Nurses promoted different contraceptives to younger and older clients. Nurses encouraged younger women to use Nuristerate and older women to use Depo-Provera. From the nurse's perspective, Nuristerate was better for younger women because their return to fertility was quicker compared to Depo-Provera. In a society where fertility is highly valued, this makes sense (47). Depo-Provera also causes amenorrhea, which may be unacceptable to some younger women. Authors of other studies conducted in South Africa found that menstruation was important to women because it was a way for "dirty blood" to exit the body, and lack of menstruation was a reason for method discontinuation (65, 110). Use of Nuristerate has increased in South Africa, likely due to its promotion to younger women (65, 111). However, according to WHO guidelines, there is no reason based on age or parity alone why one injection should be preferred over the other, and the South African national contraceptive policy guidelines state that young women should not be prevented from using either injectable method because of their age (109, 112). I also found that clients were required to initiate contraceptive use during

their menstrual period to confirm that they were not pregnant. The South African national contraceptive policy guidelines clearly state that contraceptive use should not be restricted to menstruation because this creates an unnecessary barrier to access (109).

A majority of women in the study experienced side effects from injectable contraceptive methods. Most women discussed the possibility of side effects with a nurse when they initiated the method and returned to the clinic and were able to resolve their problems. However, several clients reported that the nurses never discussed side effects with them. Side effects are common with injectable contraceptive methods and can lead to discontinuation (66). Authors of studies in South Africa and other African countries also found that women who experienced side effects discontinued their contraceptive method (110, 113, 114). Effective counseling as defined in the South African national contraceptive policy guidelines includes providing complete information about the chosen method, including side effects and how to deal with them, and warning signs of complications and what to do if they occur (109).

Nurses were more likely to discuss HIV status with HIV positive women as part of their contraceptive counseling, however, nurses did not discuss HIV status at all with many clients interviewed. Some of the nurses said that they promoted family planning the same way to clients whether they were HIV positive or negative and some said that they promoted different methods to HIV positive women. Authors of a study in Ethiopia with voluntary HIV counseling and testing clients found that counselors were more likely to discuss reproductive health with HIV positive women (115). South Africa's contraceptive policy guidelines state that providers should conduct an HIV/STI risk assessment with

clients as part of family planning counseling and promote dual protection, as necessary (109).

Even where nurses did not explicitly discuss the client's HIV status, they did promote condom use. A majority of clients discussed condom use with nurses and nurses promoted condoms to clients regardless of their HIV status. In a population of women where the HIV prevalence exceeds 30% (116), condom promotion to every client is extremely important. Nurses promoted condoms as STI prevention, not as a family planning method, in order to promote dual protection with clients. Both nurses and clients mentioned the difficulties of condom use with male partners. The difficulty of getting men to use condoms has been well documented in South Africa and elsewhere (114, 117-119).

Many women in our study were interested in female sterilization but expressed numerous fears and misconceptions about the procedure. None of the women interested in sterilization discussed it with a nurse. The nurses said that there was lack of information on the part of the clients and the nurses and perceived that clients weren't interested in the procedure. Patients are referred to a local hospital for the procedure, however, nurses were confused about whether the patient had to use contraception for a specified period of time before she could be sterilized and nurses were reluctant to promote sterilization to younger women. The South African Sterilization Act of 1998 guarantees the right to sterilization for any consenting adult over the age of 18 (109).

A majority of women interviewed were satisfied with the family planning services they received at the clinic. Women liked the fast service, hospitable nature of nurses they interacted with and they were happy with their contraceptive methods. For clients who

were not satisfied with the services, they felt that the nurses were rushing and that nurses were impatient or demeaning to them.

When asked how family planning services at the clinic could be improved, clients and nurses thought that there was a need for more privacy for family planning clients and that a nurse (or nurses) should be dedicated specifically to family planning. The national contraceptive policy guidelines state that effective family planning counseling should be in a private, comfortable environment where client confidentiality is ensured (109).

Nurses wanted more staff because they felt rushed and overworked and felt this would ensure better quality care. Nurses and clients thought that the staff needed to work harder to respect clients and not yell at them or demean them. As part of the national contraceptive policy guidelines, nurses should be trained in values clarification, anti-bias and the development of client rights, and provide services to all people in a respectful, understanding and nonjudgmental manner (109).

This study is limited by its size and the findings should not be generalized beyond the study site. The findings are based on nurses' and client's self reported behaviors and may suffer from social desirability bias. I tried to minimize this by interviewing clients in Zulu by trained interviewers who built rapport with interviewees and nurses in English by an interviewer with no influence in their professional development. Despite these limitations, the findings from this study are useful for understanding the family planning experience from the client and the provider perspectives.

Conclusion

I sought to understand family planning promotion from both the client and provider perspectives in a government clinic in an urban township in Durban, South

Africa. Overall, most clients were satisfied with the services they received at the clinic, particularly when they were expedient and hospitable. I did uncover areas where services could be improved. Women should be able to initiate a contraceptive method whether they are menstruating or not. Requiring clients to return to the clinic when they are menstruating creates an unnecessary barrier to family planning initiation. In a setting where HIV prevalence and unintended pregnancy rates are very high, it is imperative that nurses discuss with *all* clients their HIV status, contraceptive use and condoms for dual protection, not just some clients. Nurses and clients reported that lack of time and volume of patients impeded the ability of clients and providers to have needed conversations about family planning, including side effects. Clients and nurses suggested that increased privacy and a nurse dedicated to family planning might contribute to more time and better quality of care. Clients were interested in sterilization, but never discussed it with nurses. Nurses admitted that there was lack of knowledge about the procedure on their and the client's parts. More efforts to educate both clients and nurses about sterilization and about the client's right to undergo the procedure are merited. Finally, nurses and clients discussed the need for additional training of nurses in the respectful treatment of patients so that they feel comfortable at the clinic.

Chapter 6: Conclusion

Utilizing mixed research methods in this dissertation I sought to: *Aim 1*: Examine whether knowledge of HIV status affects women's modern contraceptive use post-partum, *Aim 2*: Determine whether unwanted fertility and HIV status affect post-partum modern contraceptive use and intent and *Aim 3*: Explore health facility factors such as client-provider interactions around contraception, counselor's knowledge about contraceptive methods, client waiting times and other health facility factors affecting modern contraceptive use post-partum.

Qualitative and quantitative findings from my dissertation suggest that knowledge of HIV status influences post-partum contraceptive use. The results from quantitative, multivariate Models 1 and 2 show that HIV status has a direct, but not moderating effect on post-partum contraceptive use. HIV positive women were more likely than HIV negative women to use condoms and dual protection post-partum. This finding has important implications for PMTCT programs in South Africa. Women who test HIV positive during antenatal care are more likely to use contraceptives post-partum to prevent future pregnancies compared to HIV negative women. Many South African women do not know their HIV status until they test during pregnancy. The findings from my dissertation support the importance of HIV testing during pregnancy as a motivating factor for HIV positive women to use contraceptives post-partum. Further, many HIV negative women who did not intend to use contraceptives at baseline ended up using

them post-partum. Prior research with this population suggests that HIV negative status is also a motivating factor to use modern contraceptives and remain HIV negative (91).

HIV positive women may be more likely to adopt contraception post-partum because nurses are more likely to discuss the importance of condoms and dual protection with them. Qualitative findings from in-depth interviews revealed that nurses were more likely to discuss HIV status with HIV positive women as part of their post-partum contraceptive counseling, however, nurses did not discuss HIV status with many clients as required by the South Africa contraceptive policy guidelines. Even when nurses did not discuss HIV status with clients, they did discuss the importance of using condoms, although both clients and nurses acknowledged that condom use is difficult for many women because it involves male partners. In-depth interviews with nurses revealed that nurses promote condoms for STI prevention and hormonal methods as family planning as a strategy to encourage dual protection. In a setting where HIV prevalence and unintended pregnancy rates are high, it is imperative that nurses discuss with *all* clients their HIV status, contraceptive use and condoms for dual protection, not just some clients.

Unwanted fertility experience did not predict intent to use contraceptives in the future and unwanted fertility experience *and* HIV status did not affect post-partum modern contraceptive use. Women who experienced unwanted fertility were less likely to report intent to use contraceptives in the future than women who had not experienced unwanted fertility; however, the finding was not statistically significant. HIV status did not moderate the relationship between unwanted fertility and intent or actual contraceptive use. Unwanted fertility experience *was* associated with reduced odds of

contraceptive use at 14-weeks. One possible explanation is women who experienced unwanted fertility are poor contraceptive users; having already had more children than a stated ideal. Therefore these women may be less likely to intend use contraceptives. However, the quantitative measure of unwanted fertility likely underestimated unwanted fertility experience in this population. In the most recent DHS, up to 25% of pregnancies in South African women of reproductive age were unwanted (14). Eighty percent of women in this study reported their pregnancy as unplanned, however, this is a different concept than unwanted, and an unplanned pregnancy may be wanted but mistimed. I was unable to distinguish between mistimed and unwanted pregnancies in this population, and perhaps mistiming of pregnancies is more important. Further research and measurement of pregnancy intentions is needed in this population in order to distinguish between mistimed and unwanted pregnancies.

Qualitative in-depth interviews with clients and nurses revealed factors at the health facility that influence in post-partum modern contraceptive use. These factors included client waiting times, duration and content of the client-provider interaction, staffing levels and patient overload, and knowledge of nurses and clients about modern contraceptive methods.

Clients who waited for shorter periods of time reported higher satisfaction than clients who waited for long periods of time. Even though the clinic is open 24 hours a day, the volume of patients affected the client-provider interaction time, which in turn affected the quality of care. Nurses reported feeling overloaded and clients reported feeling rushed. Clients and nurses suggested that one nurse be dedicated to family

planning only as a way to increase interaction time and improve quality and confidentiality.

Although many clients reported in-depth conversations with nurses about different family planning methods, side effects, risk of pregnancy and STIs, several clients did not discuss these topics with nurses, even though nurses said that they discuss these topics with all clients. This has important implications for client contraceptive adoption and continuation. A majority of clients reported experiences with side effects, yet many clients never discussed the possibility of side effects with a nurse and some clients discontinued the method. Further, few women discussed their HIV status or risk for HIV infection with nurses. In a population where women are at high risk for HIV infection or are likely to be HIV infected, it is imperative that nurses discuss HIV with every client.

Lack of information on the part of nurses and clients about contraceptive initiation and methods creates unnecessary barriers to post-partum contraceptive use in this population. Nurses require that patients are menstruating to confirm that they are not pregnant in order to initiate them on contraceptives. This creates an unnecessary barrier to post-partum contraceptive use and requires women to return for multiple visits, further overloading the public health clinic and increasing costs. Additionally, nurses promote Nuristerate to younger women and Depo-provera to older women, although there are no medical indications that one should be preferred over the other based on age (109, 112). Nuristerate requires more injections (every 2 months) than Depo-provera and therefore costs more (65). Finally, clients are interested in sterilization but did not discuss this method with nurses. Nurses perceived that clients were not interested in sterilization and

are confused about the process for clients seeking sterilizations at a nearby hospital.

Increasing client's access to permanent methods would also alleviate overcrowding and reduce long-term costs.

Utilizing mixed research methods in this dissertation I sought to understand how knowledge of HIV status, unwanted fertility experience and health facility factors affect women's intent to use modern contraceptives and actual modern contraceptive use in the post-partum period. In a population of women where the HIV prevalence exceeds 30% and unplanned pregnancies are high, women's control over the timing, spacing and limiting of births is important for maternal and child health. The South African government's Prevention of Mother to Child Transmission of HIV program includes goals to reduce unwanted fertility in HIV positive women through modern contraceptive use. Findings from this dissertation indicate the PMTCT programs to reduce unwanted pregnancy in HIV positive women are succeeding in reaching them with messages about condom use and dual protection. However, PMTCT program managers must ensure that messages of condom use and dual protection reach HIV negative women as well. The measure of unwanted fertility experience likely underestimated unwanted fertility in this population. Further research is needed to understand unwanted versus mistimed pregnancies. Mistimed pregnancies may be of more scientific importance because this population is highly contracepting, yet many pregnancies were reported as unplanned. The findings also indicate areas where PMTCT programs could improve post-partum contraceptive promotion to clients. Educating nurses about contraceptive initiation and more permanent methods, such as sterilization, could improve post-partum contraceptive use and reduce costs and patient overload. Creating opportunities for nurses and clients to

have more in-depth discussions about contraceptive methods, side effects, condoms and STIs would improve post-partum contraceptive use and continuation.

References

1. UNAIDS. Report on the Global AIDS Epidemic. Geneva: UNAIDS. 2010.
2. WHO. Glion Consultation on Strengthening the Linkages between Reproductive Health and HIV/AIDS: Family Planning and HIV/AIDS in Women and Children. Geneva: World Health Organization 2006. Report No.: WHO/HIV/2006.02.
3. HealthSystemsTrustReports. South Africa Health Review. Pretoria: Health Systems Trust 2001.
4. Coovadia H, Jewkes R, Barron P, Sanders D, McIntyre D. The Health System of South Africa: Historical Roots of Current Public Health Challenges. *The Lancet*. 2009. Published online August 25, 2009.
5. SouthAfricanDepartmentsofHealthandTreasury. South African Joint Health and Treasury Task Team Report. Pretoria 2003.
6. HumanSciencesResearchCouncil. Nelson Mandela/HSRC Study of HIV/AIDS Household Survey, 2002. Pretoria: Human Sciences Research Council 2002.
7. UNAIDS. 2008 Report on the Global AIDS Epidemic. Geneva: UNAIDS 2008.
8. Cooper D, Harries J, Myer L, Orner P, Bracken H. "Life is still going on": Reproductive Intentions among HIV-Positive Women and Men in South Africa. *Social Science and Medicine*. 2007;65(2):274-83.
9. Reynolds HW, Janowitz B, Homan R, Johnson L. The Value of Contraception to Prevent Perinatal HIV Transmission. *Sexually Transmitted Diseases*. 2006;33:350-6.
10. Reynolds HW, Janowitz B, Wilcher R, Cates W. Contraception to Prevent HIV-Positive Births: Current Contribution and Potential Cost Savings in PEPFAR Countries. *Sexually Transmitted Infections*. 2008;84(Supplement II):ii49-ii53.
11. Sweat MD, O'Reilly KR, Schmid GP, Denison J, deZ I. Cost-effectiveness of Nevirapine to Prevent Mother-to-Child HIV Transmission in Eight African Countries. *AIDS*. 2004;18:1661-71.
12. Wilcher R, Petruney T, Reynolds HW, Cates W. From Effectiveness to Impact: Contraception as an HIV Prevention Intervention. *Sexually Transmitted Infections*. 2008;84(Supplement II):ii54-ii60.
13. Chopra M, Daviaud E, Pattinson R, Fonn S, Lawn JE. Saving the Lives of South Africa's Mother, Babies, and Children: Can the Health System Deliver? *The Lancet*. 2009 August 25, 2009;374(9692):835-46.

14. Department of Health MRC, OrcMacro. South Africa Demographic and Health Survey 2003. Pretoria: Department of Health.20032007.
15. Halperin DT, Stover J, Reynolds HW. Benefits and Costs of Expanding Access to Family Planning Programs to Women Living with HIV. *AIDS*. 2009;23(Supplement 1):S123-S30.
16. Burgard S. Factors Associated with Contraceptive Use in Late-and Post-apartheid South Africa. *Studies in Family Planning*. 2004;35(2):91-104.
17. Camlin CS, Garenne M, Moultrie TA. Fertility Trend and Pattern in a Rural Area of South Africa in the Context of HIV/AIDs. *African Journal of Reproductive Health*. 2004;8(2):39-54.
18. Mauldin WP, Segal SJ. Prevalence of Contraceptive Use: Trends and Issues. *Studies in Family Planning*. 1988;19(6):335-53.
19. Maharaj P, Cleland J. Women on Top: The Relative Influence of Wives and Husbands on Contraceptive Use in KwaZulu-Natal. *Women & Health*. 2005;41(2):31-41.
20. Maharaj P. Reasons for Condom Use Among Young People In KwaZulu-Natal: Prevention of HIV, Pregnancy or Both? *International Family Planning Perspectives*. 2006;32(1):28-34.
21. Hoffman IF, Martinson FEA, Powers KA, Chilongozi DA, Msiska ED, Kachipapa EI, et al. The Year-Long Effect of HIV-Positive Test Results on Pregnancy Intentions, Contraceptive Use, and Pregnancy Incidence Among Malawian Women. *Journal of Acquired Immune Deficiency Syndrome*. 2008;47(4):477-83.
22. Allen S, Serufilira A, Gruber V, Kegeles S, VandePerre P, Carael M, et al. Pregnancy and Contraception Use among Urban Rwandan Women after HIV Testing and Counseling. *American Journal of Public Health*. 1993;83:705-10.
23. Mark KE, Meinzen-Derr J, Stephenson R, Haworth A, Ahmed Y, Duncan D, et al. Contraception among HIV Concordant and Discordant Couples in Zambia: A Randomized Controlled Trial. *Journal of Women's Health*. 2007;16(8):1200-10.
24. Elul B, Delvaux T, Munyana E, Lahuerta M, Horowitz D, Ndagije F, et al. Pregnancy Desires, and Contraceptive Knowledge and Use among Prevention of Mother-to-Child Transmission Clients in Rwanda. *AIDS*. 2009;23(Supplement 1):S19-S26.
25. Heys J, Kipp W, Jhangri GS, Alibhai A, Rubaale T. Fertility Desires and Infection with the HIV: Results from a Survey in Rural Uganda. *AIDS*. 2009;23(Supplement 1):S37-S45.

26. Keogh SC, Urassa M, Kumogola Y, Mngara J, Zaba B. Reproductive Behavior and HIV Status of Antenatal Clients in Northern Tanzania: Opportunities for Family Planning and Preventing Mother-to-Child Transmission Integration. *AIDS*. 2009;23(Supplement 1):S27-S35.
27. Johnson KB, Akwara P, Rutstein SO, Bernstein S. Fertility Preferences and the Need for Contraception among Women Living with HIV: The Basis for a Joint Action Agenda. *AIDS*. 2009;23(Supplement 1):S7-S17.
28. Ngubane N, Patel D, Newell ML, Coovadia HM, Rollins N, Coutsoodis A, et al. Messages About Dual Protection in Areas of High HIV Prevalence are not Heeded. *South African Medical Journal*. 2008;98(3).
29. Peltzer K, Chao L, Dana P. Family Planning Among HIV Positive and Negative Prevention of Mother to Child Transmission (PMTCT) Clients in a Resource Poor Setting in South Africa. *AIDS Behavior*. 2008 Feb 20;Epub ahead of print.
30. Cwiak C, Gellasch T, Ziemann M. Peripartum Contraceptive Attitudes and Practices. *Contraception*. 2004;70:383-6.
31. Whiteman MK, Kissin DM, Samarina A, Curtis KM, Akatova N, Marchbanks PA, et al. Determinants of Contraceptive Choice among Women with HIV. *AIDS*. 2009;23(Supplement 1):S47-S54.
32. Smith KB, vanderSpuy ZM, Cheng L, Elton R, Glasier AF. Is postpartum contraceptive advice given antenatally of value? *Contraception*. 2002;65:237-43.
33. Sambisa W, Curtis S. *Contraceptive Use Dynamics in Zimbabwe: Postpartum Contraceptive Behavior*. Calverton, Maryland: Macro International Inc.1997.
34. Curtis SL, Westoff CF. Intention to Use Contraceptives and Subsequent Contraceptive Behavior in Morocco. *Studies in Family Planning*. 1996;27(5):239-50.
35. Steele F, Curtis S, Choe M. The Impact of Family Planning Service Provision on Contraceptive-use Dynamics in Morocco. *Studies in Family Planning*. 1999;30(1):28-42.
36. Brown BB. Facing the 'Black Peril': The Politics of Population Control in South Africa. *Journal of Southern African Studies*. 2003;13(2):256-73.
37. Moultrie TA, Timaeus IM. The South African Fertility Decline. Evidence from Two Censuses and a Demographic and Health Survey. *Population Studies*. 2003;57(3):265-83.
38. Moultrie TA. Racism and Reproduction-Population Rhetoric in South Africa 1900-1974. *African Studies*. 2005;64(2):217-42.

39. Moultrie TA, Hosegood V, McGrath N, Hill C, Herbst K, Newell M-L. Refining the Criteria for Stalled Fertility Declines: An Application to Rural KwaZulu-Natal, South Africa, 1990-2005. *Studies in Family Planning*. 2008;39(1):39-48.
40. Moultrie TA, Timaeus IM. Trends in South African Fertility Between 1970 and 1998: An Analysis of the 1996 Census and the 1998 Demographic Health Survey. Cape Town 2002.
41. Moultrie TA, Dorrington R. Estimation of Fertility from the 2001 South African Census Data. Cape Town: Center for Actuarial Research for Statistics South Africa 2004.
42. Stephenson R, Beke A, Tshibangu D. Contextual Influences on Contraceptive Use in the Eastern Cape, South Africa. *Health and Place*. 2008;14:841-52.
43. Bongaarts J. The Causes of Stalling Fertility Transitions. *Studies in Family Planning*. 2006;37(1):1-16.
44. Eltigani EE. Stalled Fertility Decline in Egypt, Why? *Population and Environment*. 2003;25(1):41-59.
45. Westoff CF, Cross AR. The Stall in the Fertility Transition in Kenya. Calverton ORC Macro 2006.
46. Mqhayi MM, Smit JA, McFadyen ML, Beksinska M, Connolly C, Zuma K, et al. Missed Opportunities: Emergency Contraception Utilization by Young South African Women. *African Journal of Reproductive Health*. 2004;8(2):137-44.
47. Kaufman CE, deWet T, Stadler J. Adolescent Pregnancy and Parenthood in South Africa. *Studies in Family Planning*. 2001;32(2):147-60.
48. Mfono Z. Teenage Contraceptive Needs in Urban South Africa: A Case Study. *International Family Planning Perspectives*. 1998;24(4):180-3.
49. Casterline JB, El-Zeini LO. The Estimation of Unwanted Fertility. *Demography*. 2007;44(4):729-45.
50. Roy TK, Sinha RK, Koenig M, Mohanty SK, Patel SK. Consistency and Predictive Ability of Fertility Preference Indicators: Longitudinal Evidence from Rural India. *International Family Planning Perspectives*. 2008;34(3):138-45.
51. Lightbourne RE. Individual Preferences and Fertility Behavior. In: Cleland J, Hobcraft J, editors. *Reproductive Change in Developing Countries: Insights from the World Fertility Survey*. Oxford: Oxford University Press; 1985. p. 165-98.

52. Feldman R, Maposhere C. Safer Sex and Reproductive Choice: Findings from 'Positive Women-Voices and Choices' in Zimbabwe. *Reproductive Health Matters*. 2003;11:162-73.
53. Grieser M, Gittelsohn J, Shankar AV, Koppenhaver T, Legrand TK, Martindo R. Reproductive Decision-making and the HIV/AIDS Epidemic in Zimbabwe. *Journal of Southern African Studies*. 2001;27:225-43.
54. Barreiro P, Duerr A, Beckerman K, Soriano V. Reproductive Options for HIV-Serodiscordant Couples. *AIDS Behavior*. 2006;8:158-70.
55. Bell E, Mthembu P, O'Sullivan S, Moody K. Sexual and Reproductive Health Services and HIV Testing: Perspectives and Experiences of Women and Men Living with HIV and AIDS. *Reproductive Health Matters*. 2007;15(29-Supplement):113-5.
56. Bharat S, Mahendra VS. Meeting the Sexual and Reproductive Health Needs of People Living with HIV: Challenges for Health Care Providers. *Reproductive Health Matters*. 2007;15(29-Supplement):93-112.
57. Myer L, Morroni C, Cooper D. Community Attitudes Towards Sexual Activity and Childbearing by HIV-Positive People in South Africa. *AIDS Care*. 2006;18(7):772-6.
58. Maier M, Andia I, Emenyonu N, Guzman D, Kaida A, Pepper L, et al. Antiretroviral Therapy is Associated with Increased Fertility Desire, but not Pregnancy or Live Birth, among HIV+ Women in an Early HIV Treatment Program in Rural Uganda. *AIDS Behavior*. 2008;E-publication ahead of print.
59. McCarraher D, Cuthbertson C, Kung'u D, Otterness C, Johnson L, Magiri G. Sexual Behavior, Fertility Desires and Unmet Need for Family Planning among Home-Based Care Clients and Caregivers in Kenya. *AIDS Care*. 2008;20(9):1057-65.
60. Hirsch JS. Gender, Sexuality, and Antiretroviral Therapy: Using Social Science to Enhance Outcomes and Inform Secondary Prevention Strategies. *AIDS Behavior*. 2007;21(Supplement 5):S21-S9.
61. Baylies C. The Impact of HIV on Family Size Preference in Zambia. *Reproductive Health Matters*. 2000;8:77-86.
62. Gregson S, Zhuwau T, Anderson RM, Chandiwana SK. Is there Evidence for Behaviour Change in Response to AIDS in Rural Zimbabwe? *Social Science and Medicine*. 1998;46:321-30.
63. Rutenberg N, editor. HIV Status, Fertility Intentions, and the Demand for Contraception: Assessing the Current Research to Improve the Integration of Reproductive Health and HIV Programs. Annual Meeting of the Population Association of America; 2006; Los Angeles, California.

64. Stephenson R, Baschieri A, Clements S, Hennink M, Madise N. Contextual Influences on Modern Contraceptive Use in Sub-Saharan Africa. *American Journal of Public Health*. 2007;97:1233-40.
65. Morroni C, Myer L, Moss M, Hoffman M. Preferences Between Injectable Contraceptive Methods among South African Women. *Contraception*. 2006;73:598-601.
66. Hatcher RA, Nelson AL, Zieman M, Darney PD, Creinin MD, Stosur HR, et al. *Managing Contraception*. Tiger: Bridging the Gap Foundation; 2003.
67. Frost J, Darroch JE. Factors Associated with Contraceptive Choice and Inconsistent Method Use, United States 2004. *Perspectives on Sexual and Reproductive Health*. 2008;40:94-104.
68. Pariani S, Heer DM, Van AM. Does Choice Make a Difference to Contraceptive Use? Evidence from East Java. *Studies in Family Planning*. 1991;22:384-90.
69. Bradley H, Gillespie D, Kidanu A, Bonnenfant Y-T, Karklins S. Providing Family Planning in Ethiopian Voluntary HIV Counseling and Testing Facilities: Client, Counselor and Facility-Level Considerations. *AIDS*. 2009;23(Supplement 1):S105-S14.
70. Chabikuli NO, Awi DD, Chukwujekwu O, Abubakar Z, Gwarzo U, Ibrahim M, et al. The Use of Routine Monitoring and Evaluation Systems to Assess a Referral Model of Family Planning and HIV Service Integration in Nigeria. *AIDS*. 2009;23(Supplement 1):S97-S103.
71. Liambila W, Askew I, Mwangi J, Ayisi R, Kibaru J, Mullick S. Feasibility and Effectiveness of Integrating Provider-Initiated Testing and Counselling within Family Planning Services in Kenya. *AIDS*. 2009;23(Supplement 1):S115-S21.
72. Ngure K, Heffron R, Mugo N, Irungu E, Celum C, Baeten JM. Successful Increase in Contraceptive Uptake among Kenyan HIV-1-Serodiscordant Couples Enrolled in an HIV-1 Prevention Trial. *AIDS*. 2009;23(Supplement 1):S89-S95.
73. Spaulding AB, Brickley DB, Kennedy C, Almers L, Packel L, Mirjahangir J, et al. Linking Family Planning with HIV/AIDS Interventions: A Systematic Review of the Evidence. *AIDS*. 2009;23(Supplement):S79-S88.
74. Cheraghi-Sohi S, Hole AR, Mead N, McDonald R, Whalley D, Bower P, et al. What Patients Want from Primary Care Consultations: A Discrete Choice Experiment to Identify Patients' Priorities. *Annals of Family Medicine*. 2008;6:107-15.
75. Taylor C, Benger JR. Patient Satisfaction in Emergency Medicine. *Emergency Medicine Journal*. 2004;21:528-32.

76. Myer L, Harrison A. Why Do Women Seek Antenatal Care Late? Perspectives From Rural South Africa. *Journal of Midwifery and Women's Health*. 2003;48(4):268-72.
77. Stephenson R, Beke A, Tshibangu D. Community and Health Facility Influences on Contraceptive Method Choice in the Eastern Cape, South Africa. *International Family Planning Perspectives*. 2008;34(2):62-70.
78. Mullick S, Khoza K, Askew I, Maluka T, Menziwa M, editors. Integrating Counseling and Testing into Family Planning Services: What Happens to the Existing Quality of Family Planning when HIV Services are Integrated in South Africa? Linking Reproductive Health, Family Planning, and HIV/AIDS in Africa; 2006 9-10 October; Addis Ababa.
79. Maharaj P, Cleland J. Integration of Sexual and Reproductive Health Services in KwaZulu-Natal, South Africa. *Health Policy and Planning*. 2005;20(5):310-8.
80. Gatsinzi G, Maharaj P. Women's Experiences of Maternal and Child Health and Family Planning Services in KwaZulu-Natal. *Curationis*. 2008;31(2):14-21.
81. Montano D, Kasprzyk D. The Theory of Reasoned Action and the Theory of Planned Behavior. In: Glanz K, Rimer B, Lewis F, editors. *Health Behavior and Health Education: Theory, Research, and Practice*. Third ed. San Francisco: Jossey-Bass; 2002. p. 67-98.
82. Azjen I, Fishbein M. The Prediction of Behavior from Attitudinal and Normative Beliefs. *Journal of Personality and Social Psychology*. 1970;6:466-87.
83. Fishbein M, Ajzen I. *Belief, Attitude, Intention and Behavior: An Introduction to the Theory and Research*. Reading, MA: Addison-Wesley; 1975.
84. Albarracin D, Fishbein M, Johnson BT, Muellerleile PA. Theories of Reasoned Action and Planned Behavior as Models of Condom Use: A Meta-Analysis. *Psychological Bulletin*. 2001;127(1):142-61.
85. Eaton L, Fisher AJ, Aaro LE. Unsafe Sexual Behavior in South African Youth. *Social Science and Medicine*. 2003;56:149-65.
86. Giles M, Liddell C, Bydawell M. Condom Use in African Adolescents: The Role of Individual and Group Factors. *AIDS Care*. 2005;17(6):729-39.
87. Madden TJ, Ellen PS, Ajzen I. A Comparison of the Theory of Planned Behavior and the Theory of Reasoned Action. *Personality and Social Psychology Bulletin*. 1992;18(1):3-9.

88. Munoz-Silva A, Sanchez-Garcia M, Martins A. Gender Differences in Condom Use Prediction with Theory of Reasoned Action and Planned Behavior: The Role of Self-Efficacy and Control AIDS Care. 2007;19(9):1177-81.
89. Peyman N, Oakley D. Effective Contraceptive Use: An Exploration of Theory-Based Influences. Health Education Research. 2009;24(4):575-85.
90. Wulfert E, Wan CK. Safer Sex Intentions and Condom Use Viewed from a Health Belief, Reasoned Action, and Social Cognitive Perspective. The Journal of Sex Research. 1995;32(4):299-311.
91. Marlow HM, Maman S, Groves AK, Moodley D. Fertility Intent, Contraceptive Use and Decision-making among HIV Positive and HIV Negative Antenatal Clinic Attendees in Durban, South Africa. 2009.
92. Earp JA, Ennett ST. Conceptual Models for Health Education Research and Practice. Health Education Research. 1991;6(2):163-71.
93. Peltzer K, Chao L, Dana P. Family Planning Among HIV Positive and Negative Prevention of Mother to Child Transmission (PMTCT) Clients in a Resource Poor Setting in South Africa. AIDS Behavior. 2009;13:973-9.
94. Rogers R. A Protection Motivation Theory of Fear Appeals and Attitude Change. Journal of Psychology. 1975;91:93-114.
95. Rogers RW, Prentice-Dunn S. Protection Motivation Theory. In: Gochman DS, editor. Handbook of Health Behavior Research New York: Plenum Press; 1997. p. 113-32.
96. Rippetoe P, Rogers R. Effects of Components of Protection Motivation Theory on Adaptive and Maladaptive Coping with a Health Threat. Journal of Personality and Social Psychology. 1987;52:596-604.
97. Boerma JT, Weir SS. Integrating Demographic and Epidemiological Approaches to Research on HIV/AIDS: The Proximate-Determinants Framework. The Journal of Infectious Diseases. 2005;191(Supplement 1):S61-S7.
98. Abdool-Karim Q, Kharsany A, Frolich J, Werner L, Mashego M, Mlotshwa M, et al. Stabilizing HIV Prevalence Masks High HIV Incidence Rates amongst Rural and Urban Women in KwaZulu-Natal, South Africa. International Journal of Epidemiology. 2011;40:922-30.
99. Thumboo S. Durban: Introduction to Our Town 2011.
100. Mullick S, Kunene B, Wanjiru M. Involving Men in Maternity Care: Health Service Delivery Issues. New York: Population Council 2005.

101. Integrated Development Durban: Ethekewini Municipality: Ethekewini Municipality2007.
102. StataCorp. Statistical Software: Release 11. College Station, TX: StataCorp; 2008.
103. Jaccard J. Interaction Effects in Logistic Regression. Thousand Oaks, CA: Sage; 2001.
104. Roy T, Ram F, Nangia P, Saha U, Khan N. Can Women's Childbearing and Contraceptive Intentions Predict Contraceptive Demand? Findings from A Longitudinal Study in Central India. *International Family Planning Perspectives*. 2003;29(1):25-31.
105. Agadjanian V. Fraught with Ambivalence: Reproductive Intentions and Contraceptive Choices in a sub-Saharan Fertility Transition. *Population Research and Policy Review*. 2005;24:617-45.
106. Speizer I, Irani L, Barden-O'Fallon J, Levy J. Inconsistent Fertility Motivations and Contraceptive Use Behaviors among Women in Honduras. *Reproductive Health*. 2009;6(10).
107. Pettifor A, Hudgens M, Levandowski B, Rees H, Cohen M. Highly Efficient HIV Transmission to Young Women in South Africa. *AIDS*. 2007;21:861-5.
108. Berg BL. *Qualitative Research Methods for the Social Sciences*. Boston: Pearson Education Inc.; 2004.
109. DOH. National Contraception Policy Guidelines: Department of Health2001.
110. Laher F, Todd C, Stibich M, Phofa R, Behane X, Mohapi L, et al. Role of Menstruation in Contraceptive Choice among HIV-Infected Women in Soweto, South Africa. *Contraception*. 2010;81:547-51.
111. Smit J, Gray A, McFayden L, Zuma K. Counting the Costs: Comparing Depot Medroxyprogesterone Acetate and Norethisterone Oenanthate Utilization Patterns in South Africa. *BMC Health Services Research*. 2001;1(4).
112. WHO. *Medical Eligibility Criteria for Contraceptive Use*. Geneva: World Health Organization2004.
113. Imbuki K, Todd C, Stibich M, Shaffer D, Sinei S. Factors Influencing Contraceptive Choice and Discontinuation among HIV-Positive Women in Kericho, Kenya. *African Journal of Reproductive Health*. 2010;14(4):103-14.

114. Nattabi B, Li J, Thompson S, Orach C, Earnest J. Family Planning among People Living with HIV in Post-conflict Northern Uganda: A Mixed Methods Study. *Conflict and Health*. 2001;5(18):1-12.
115. Bradley H, Tsui A, Kidanu A, Gillespie D. HIV Infection and Contraceptive Need among Female Ethiopian Voluntary HIV Counseling and Testing Clients. *AIDS Care*. 2010;22(10):1295-304.
116. Kharsany A, Hancock N, Frolich J, Humphries H, Abdool-Karim S, Abdool-Karim Q. Screening for 'Window Period' Acute HIV Infection among Pregnant Women in Rural South Africa. *HIV Medicine*. 2010;11:661-5.
117. Harrison A, O'Sullivan L. In the Absence of Marriage: Long-Term Concurrent Partnerships, Pregnancy, and HIV Risk Dynamics among South African Young Adults. *AIDS Behavior*. 2010;14:991-1000.
118. MacPhail C, Terris-Prestholt F, Kumaranayake L, Ngoako P, Watts C, Rees H. Managing Men: Women's Dilemmas about Overt and Covert Use of Barrier Methods for HIV Prevention. *Culture, Health and Sexuality*. 2009;11(5):485-97.
119. Rispel L, Metcalf C, Moody K, Cloete A, Caswell G. Sexual Relations and Childbearing Decisions of HIV-discordant Couples: An Exploratory Study in South Africa and Tanzania. *Reproductive Health Matters*. 2011;19(37):184-93.