Shifts in Contraception Use across Relationship Trajectories: A Longitudinal, Couple-Level Study on the Effects of Fertility Preferences and Perceived HIV Infection Likelihood on Contraceptive Use in Rural Malawi

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Due to high rates of maternal mortality and the HIV/AIDS epidemic, contraceptive choice in sub-Saharan Africa (SSA) can be characterized as a decision of vital importance. The HIV/AIDS epidemic in SSA permeates innumerable aspects of an individual's life and consciousness, including relationship decision-making regarding fertility preferences and HIV protection. The choice to use contraception varies by relationship- and life-stage and contraceptive method choice can depend on availability, acceptability, and accessibility of the method. For both men and women, researchers have found that the utilization of specific methods of contraception within relationships depends largely on the stage of the relationship (Adetunji 2000; Maharaj and Cleland 2004; Westercamp et al. 2010). Yet, little research has explored how the reasons for use and non-use of certain contraceptive methods shift within relationships *and* across stages of the relationship.

BACKGROUND & STUDY CONTEXT

The Southeastern African country of Malawi offers a unique study context for exploring the question of contraceptive use transitions for two reasons. First, the fertility climate in Malawi provides a distinctive setting for contraceptive research, as "childbearing is nearly universal" (National Statistical Office and ICF Macro 2011). Indeed, the average ideal family size for women in 2010 was 4.0 children with a total fertility rate of 5.7 (National Statistical Office and ICF Macro 2011). Malawi does appear to have a declining fertility rate, albeit slowly. Fertility preferences clearly inform contraceptive use, but few studies look at the fertility-related reasons for choosing barrier versus hormonal contraceptives.

Second, Malawi has been especially hard hit by the AIDS epidemic and researchers have noted that Malawi's AIDS crisis is one of the world's most severe (National Statistical Office and ORC Macro 2005). In 2010, around 10 percent of Malawi's population was HIV positive, with women showing higher rates of seropositivity than men (National Statistical Office and ICF Macro 2011). For married men and women, the percentage of HIV positivity is almost triple that of never married individuals (National Statistical Office and ICF Macro 2011). A recent study in Zambia and Rwanda reports that over one half of HIV infections occur within marriage (Dunkle et al. 2008). The importance of contraceptive choice is exemplified by the current research on the relationship between contraceptives and HIV risk. Choosing some modern forms of contraception may, in fact, increase HIV risk. Recent clinical studies suggest an association between hormonal contraception use and increased HIV acquisition, infectivity, and multi-drug interaction[1] (World Health Organization 2010). Research has also shown that perceived risk of HIV is intricately linked to child-bearing preferences (Trinitapoli and Yeatman 2011). Despite the connection between HIV and fertility, researchers frequently look at the influence of HIV risk on contraceptive use (usually condoms) without including fertility preferences in the model (see Adetunji 2000; Akwara, Madise, and Hinde 2003). The HIV-related and fertility-related spheres of decision-making cannot and should not be separated when analyzed within relationships, particularly in countries experiencing persistent AIDS epidemics and shifting fertility trends.

In Malawi, knowledge of contraceptive use for family planning is universal with 98 percent of women and 99 percent of men reporting knowledge of modern methods of contraception (National Statistical Office and ICF Macro 2011). However, rates of use across the different types of contraceptive method vary greatly. For example, almost 50 percent of women report ever using injectables while only 18 percent report ever using a male condom (National Statistical Office and ICF Macro 2011). Researchers frequently find gendered reasons for contraceptive choice. For example, men have been shown to prefer condoms before marriage and the pill after transition into marriage (Adetunji 2000). There are also strong attitudinal aversions to certain types of contraception, such as condom use (Mantell et al. 2011; Tavory and Swidler 2009). Some researchers have shown that the mix of contraceptive

[1] The possible increase in infectivity due to hormonal contraceptive use is unlikely to be visible at the individual level because respondents are unlikely to be aware of its possibility; however, hormonal contraceptive use trajectories can be potentially informative for future studies interested in understanding the levels of HIV infectivity across stages of relationships.

methods is transitioning across SSA (see Seiber, Bertrand, and Sullivan 2007), but at the individual level researchers tends to compartmentalize studies of contraceptive use. The male condom is often singled out as the primary method of interest, due to its dual-protective nature (i.e. protection against both HIV infection and pregnancy) (Maharaj 2001). The proposed study attempts to return to the "big picture" of contraceptive method choice by not limiting the analysis to any one method of contraception.

The absence of couple level data in Malawi generally precludes an examination of contraceptive use as a dyadic phenomenon (for a notable exception see Anglewicz and Clark 2013). It is crucial that this level of analysis be applied to contraceptive research, as the decision to use contraception is rarely made alone. Becker (1996) and others have noted that the sexually active couple, as opposed to the individual, needs to be the focus of reproductive health studies and policies. The choice to use specific forms of contraception is a choice made by the couple, rooted in their fertility preferences and perceived level of HIV infection at the specific stage of their relationship. For example, looking at condom use behavior at the couple level for non-married partners is critical, largely due to the concept of "marital shopping," defined as the time period in which individuals search for their spouse (Magruder 2011). Condom use is critical during the period of marital shopping due to the high viral load during the first 3 months or so of infectivity, and longer periods of spousal search may increase an individual's risk of transmission (Magruder 2011). Couples navigate these perceived (or not perceived) HIV risks at the level of the dyad and model their contraceptive behaviors accordingly.

It follows that individuals' perception of their own risk of HIV infection shifts across relationship stage and, subsequently, shifts occur in contraception use across relationship trajectories. Anglewicz and Clark (2013) show that the perceived risk of HIV shifts with the transition into marriage and condom use decreases accordingly, although their study fails to control for fertility preferences and intentions. A couple's formative reproductive years provide the context for many relationship transitions, such as shifting from dating to marriage or making the decision to start a family. The path each couple takes may differ from that of other couples', which points to the importance of mapping the associations between relationship and contraceptive use trajectories. Fully understanding contraceptive use requires that couples are followed across their relationship trajectories, and that both HIV risk perceptions *and* fertility preferences are included in the analysis.

RESEARCH QUESTIONS

This paper will address the research questions below using a longitudinal, couple-based analysis of relationship trajectories. The first question deals with the choice whether to use any contraception at all. The second research question asks what influences the choice of method and the frequency of use of the method.

(1) How do both perceived likelihood of HIV infection *and* fertility preferences influence the choice to use contraception or to not use contraception, across different stages of relationship trajectories?

(2) Of individuals who do use contraception, how and why do they make the choice of which method to use (condoms, other modern contraceptives, or both)? Does the method of choice vary across time and stage of relationship?

   a. Does the influence of one's perceived likelihood of HIV infection on condom use vary across relationship stage?

   b. How do a couple's fertility preferences influence their choice of contraceptive method, and does this influence vary across the stage of the relationship and across time?

TLT DATA & OVERVIEW OF THE SAMPLE AT BASELINE

The data for this study come from the research project titled Tsogolo la Thanzi (TLT), which translates to "Healthy Futures." TLT aims to measure the ways in which young adults navigate reproduction and the transition to adulthood amidst an AIDS epidemic. The baseline sample consists of 1,500 females and 600 male respondents aged 15 to 25 years. These respondents were randomly selected from census enumeration areas within 7 kilometers of the district capital, Balaka. Additionally, the partners of the female respondents were recruited with a success rate of 95 percent. Eight waves of data were collected and processed over a period of three years, between May 2009 and April 2012.

Table 1 displays the distribution of the sample at Wave 1, split by relationship type. On average, married[2] men and women are older than their not married counterparts. A larger proportion of married individuals never use condoms than individuals who are dating but not married, this is consistent with current research on condom use. The percent of married men and women that use other forms of modern contraception besides condoms is more than 6 times that of unmarried men and women. Very few men and women use traditional forms of contraception. Married individuals tend to have a slightly higher ideal family size than non-married individuals. Married women's perceived risk of HIV infection in their lifetime (measured on a self-reported 0 to 10 scale, with 0 meaning no likelihood of infection and 10 representing certainty of infection) is higher than unmarried women's perceived risk, while the relationship between married and not married men and risk perception is reversed. Suggesting that, in terms of HIV risk, marriage may be viewed as protective by men, but risky by women. Not shown in the tables, but important to note, is that over the three year time period, around 400 individuals transition into marriage.

The regressions at Wave 1 (see Tables 2 & 3) show some exploratory results, although the final paper will leverage all waves of data longitudinally. These individual level models suggest that the determinants of contraceptive use vary across relationship status. Table 2 shows the predictors of contraceptive use across relationship stage. Ideal family size is a significant predictor of contraceptive use in married or cohabiting relationships, but is not significantly predictive for dating couples or infrequent sexual partners. Predictors of levels of condom use are shown in Table 3, with "never uses condoms" as the reference group. Once again, ideal family size significantly predicts condom use for married couples, but not for any of the other relationship categories. For dating couples, individuals with higher perceived HIV infection likelihood are significantly more likely to have used condoms at the beginning of their relationship, as opposed to never using condoms. Both of these models control for age, education, distance from research center, concurrent partnerships, and attitudes towards condom use, and the model in Table 3 controls for use of other modern contraceptives. Overall, Tables 2 and 3 suggest that, indeed, reasons for contraceptive use and nonuse vary across relationship stage.

ANALYTIC APPROACH & FUTURE DIRECTIONS

The planned study will employ all eight waves of data and the couples that were successfully matched at baseline. The partners of the randomly selected women were enrolled in the study through respondent driven sampling. Each woman was given up to three tokens to give to her recent or current romantic partners. Partners who returned to the research center with tokens completed a full interview and subsequent interviews at each wave. A couple-level dataset that consists of these matched partners serves as the basis for my proposed analysis. Seven couples were excluded from the sample due to missing data on key variables and three couples in a nonsexual partnership were excluded. The final analytic sample consists of 426 couples.

The paper will utilize a longitudinal, fixed-effects model in order to predict change in contraceptive use over time by change in relationship type, fertility preferences, and perceived HIV risk, while controlling for a range of individual and couple-level variables. In order to predict contraceptive use versus non-use and use of (non-condom) modern contraception, a fixed effects logit model will be used. A fixed effects multinomial logistic regression will be used to predict choice of modern contraceptive method and levels of condom use. The "KHB" ado for Stata 12 will be used to decompose the effects in the non-linear probability models (Kohler, Karlson, and Holm 2011). KHB tests for mediating relationships and allows for comparison across models.

Visual models will demonstrate the findings by mapping focal relationship trajectories alongside their contraceptive use trajectories with associated fertility preferences and perceived HIV risk (modeled after Boileau et al. 2009). The descriptive value of the trajectory maps will be supplemented by the significant coefficients from the logistic regression models. The relationship trajectories will provide the framework for a critical discussion of the policy implications of the expected findings, specifically in regard to family planning and HIV prevention at the couple-level.

[2] In this section, for the sake of brevity the term "married" refers to both spousal and cohabiting partnerships.

Table 1. Distribution of TLT Sample, Wave 1

	Infrequent Partner (n = 57)				**Dating** (n=266)				**Married/Cohabiting** (n=686)			
	Males		Females		Males		Females		Males		Females	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Age	18.49	3.21	18.32	3.01	19.94	3.03	18.94	2.73	26.18	4.42	21.52	2.45
Never uses condoms	0.61	-	0.52	-	0.33	-	0.40	-	0.50	-	0.55	-
Used condoms at beginning	0.01	-	0.06	-	0.09	-	0.15	-	0.13	-	0.10	-
Sometimes uses condoms	0.38	-	0.42	-	0.58	-	0.45	-	0.38	-	0.35	-
Other Modern Contraceptive Use	0.02	-	0.03	-	0.02	-	0.05	-	0.38	-	0.34	-
Traditional Contraceptive Use	0.00	-	0.01	-	0.01	-	0.01	-	0.01	-	0.02	-
Ideal Family Size	3.41	1.14	3.06	1.12	3.20	1.07	3.08	1.06	3.56	0.96	3.50	1.03
Lifetime HIV Infection Likelihood	3.55	2.90	4.30	3.04	3.33	2.94	3.77	2.76	2.93	2.77	4.56	2.81
Years Education	8.11	2.42	7.90	2.46	9.17	3.00	9.31	2.43	7.88	3.03	6.75	2.81
Sex with condoms is not sweet	0.26	-	0.28	-	0.27	-	0.27	-	0.34	-	0.44	-
Condom acceptability growing in marriage	0.77	-	0.69	-	0.76	-	0.71	-	0.75	-	0.76	-
Suspect concurrent partnership (1=yes)	0.28	-	0.30	-	0.19	-	0.21	-	0.05	-	0.28	-
Distance from research site (normed)	0.12	0.95	0.11	1.11	-0.01	1.07	-0.20	0.90	0.10	1.06	0.15	0.99

Table 2. Logistic Regression Results Predicting Use versus Nonuse of Contraceptives, Odds Ratios

Use Contraceptives	**Infrequent Partner**	**Dating**	**Married/Cohabiting**
Female	0.749	0.520*	0.903
	(0.54)	(0.16)	(0.26)
Ideal Family Size	1.06	0.92	0.791*
	(0.35)	(0.12)	(0.07)
Lifetime Likelihood of HIV Infection	0.856	1.053	1.032
	(0.11)	(0.06)	(0.03)
N	57	265	684
pseudo R-sq	0.25	0.053	0.069
BIC	98.12	376.1	858.2

Exponentiated coefficients; Standard errors in parentheses + p<.10, * p<.05, ** p<.01, *** p<.001

Note: model controls for education, distance from research center, age, concurrent partnership, and attitudes towards condom use.

Table 3. Multinomial Logistic Regression for Condom Use by Partnership, Odds Ratios

Level of Condom Use	**Infrequent Partner**	**Dating**	**Married/Cohabiting**
Never (Reference)	-	-	-
Only at Beginning			
Female	22.58	0.78	0.599
	(70.92)	(0.40)	(0.22)
Ideal Family Size	0.913	0.97	0.739*
	(0.75)	(0.20)	(0.10)
Lifetime Likelihood of HIV Infection	0.399	1.152+	1.063
	(0.29)	(0.10)	(0.05)
Sometimes Use			
Female	0.65	0.418**	0.86
	(0.47)	(0.13)	(0.23)
Ideal Family Size	1.033	0.818	0.768**
	(0.35)	(0.11)	(0.07)
Lifetime Likelihood of HIV Infection	0.902	1.017	1.017
	(0.13)	(0.05)	(0.03)
N	57	265	684
pseudo R-sq	0.294	0.081	0.067
BIC	149.9	566.3	1332.8

Exponentiated coefficients; Standard errors in parentheses + p<.10, * p<.05, ** p<.01, *** p<.001

Note: model controls for use of other modern contraception, education, distance from research center, age, concurrent partnership, and attitudes towards condom use.

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