Birth Control Behavior and Partner Notification of STI/HIV: Distinguishing Verbal and Non-Verbal forms of Behavior

Olugbemiga T. Ekúndayò
Jackson State University

Mian Bazle Hossain
Morgan State University

Mario Azevedo
Jackson State University

Kianre Eouanzoui
Jackson State University

ABSTRACT

Differentiating between forms of behavior provides basis for enhanced policy and practice for health promotion and disease prevention through transmission control. Related behavior was used to predict STI/HIV partner notification in the Republic of Guinea among married women in polygynous and monogynous family marital structures.

Demographic and Health Survey data from *MeasureDHS* (Macro International) were analyzed using mixed methods analyses to develop constructs in the theoretical model. The relationships of Birth Control

Behavior, Family Marital Structure, Family Planning and STI/HIV Knowledge with Partner Notification of STI/HIV among women of childbearing age were examined using logistic regression. Respondents were more likely to inform partners of their STI/HIV status if they had been discussing family planning, and/or if they had prior knowledge of STI/HIV. Participants were less likely to engage in partner notification if they practiced family planning, regardless of family marital structure or prior knowledge of family planning. Results showed differentiation between "verbal ritual" and "non-verbal ritual." Differentiation implications are discussed.

Introduction

Sub-Sahara Africa remains the region worst affected by the HIV/AIDS epidemic. Unlike women in the world's other regions, African women are considerably more likely to be infected with HIV than men are. Among young people aged 15 to 24 years, women were found to be two-and-a-half times as likely to be HIV-infected as their male counterparts. While Africa's sexually transmitted infection (STI) and HIV (STI/HIV) burdens are reported to be the world's heaviest, prevalence patterns vary widely from the world's highest in parts of East and Southern Africa to lowest in West and Central areas (UNAIDS 2003). Nevertheless, high HIV incident rates persist matched by AIDS morbidity and mortality. Thus, without appropriate effective prevention interventions tailored to specific local needs, potential for rising prevalence is high in areas where rates are currently low.

Certain conditions in Sub-Sahara Africa apparently make the populations more susceptible to higher levels of morbidity and mortality from different causes. These include social dislocation, war, poverty, famine, starvation, environmental hazards and a patent lack of needed economic strength to compete in a world that is becoming more so, even for Africa's own resources (Stillwaggon 2001, UNAIDS 2003).

In year 2005CE, Guinea's estimated population was 9.003 million with a median age of 18.1 years, and 48.1 percent of the women in reproductive age (United Nations Population Division, Department of Economic and Social Affairs, World Population Prospects 2006). However, HIV prevalence rate for year 2001CE was 1.8%, mainly in urban areas; the highest prevalence being in Conakry, the capital city. According to current estimates (Direction Nationale de la Statistique Guineé and ORC Macro 2006), adult prevalence rate declined to 1.5% (1.2-1.8), with the highest rate in Conakry (>2%). It is important to note that reports of these distributions are estimates at best, since for various reasons, appropriate infrastructures for accurate surveillance are not yet fully developed in Africa.

While STIs have been known to predispose to increased HIV transmission rates, the pathologies and social implications are different, even though their behavioral elements may be similar. A careful review of ten-sample literature covering three years from 2002 to 2004 shows that several authors performed epidemiological surveys related to STIs in Sub-Sahara Africa (Abóyèjí et al. 2003; Hawks et al. 2004; Holt et al. 2003; Kamali et al. 2003; Mullick et al. 2004; Nworah et al. 2002; Xueref et al. 2003; Tattevin et al. 2002; Otuonye et al. 2002; Lavreys et al. 2003). In the published works, incidence and prevalence reported for STIs showed a varied pattern. Most surveys involved pregnant women at Antenatal clinics, in urban settings of tertiary medical institutions. Some involved young women and few addressed the male population. Reasons for such a pattern are not stated, but may be logistical and financial. However, conclusion from studying these research reports is that patterns of distribution and levels of knowledge of STI are relatively known in urban areas but not in rural areas where most of the population resides.

Research shows STIs render individuals more susceptible to HIV transmission (Lehman and Biro 2001, Kaur and Johnson 2003) due to several factors. These include coincidence of transmission in the same anatomical locations and similar behavioral activities/rituals. Behets et al. (2003) indicated that further HIV transmission could be averted with effective STI control since this helps to provide appropriate setting for HIV screening, especially among sex workers in certain areas. STI can thus be used as a sentinel condition and an indication for HIV testing, screening and other interventions. Furthermore, STIs generally present symptomatically much earlier than HIV infection because anatomical and pathophysiological effects become apparent much earlier. This period is critical to the primary and secondary prevention of HIV infection and re-infection. The critical importance of time can however only be advantageous for preventing HIV transmission, when the individual can quickly identify symptoms of STI and take communicative action. Without adequate and appropriate notification

therefore, accessing testing, screening and other appropriate interventions may not take place. For communication of such information, discussions related to sexual activities, intimacy and their corollaries could be critical in creating appropriate settings. The discussions may allow those involved to take steps to prevent re-infection of one another, and possibly primary infection of others in their sexual networks. Therefore examining communication behavior patterns of notification for both STIs and HIV becomes important.

Social Context of STI/HIV:

Heterosexual distribution of STI and HIV in Africa is an important issue for many reasons. Sexual activity is important in procreation and issues of fertility and fecundity. Africa has the world's highest fertility and fecundity rates (Immerman and Mackey 2003; Mackey and Immerman 2002; McDevitt 1999; UNAIDS/WHO 2002; UNPD 2006), with having many children being highly valued in African cultural systems.

An important effect of the need for procreation is that normative value expectatytions for having children may sometimes override some of the concerns for STI, partly because there have been locally based and locally developed interventions used to address STI for millennia. Moreover, where living conditions demand survival behavior, having children becomes not a liability, but a valued genetic survival issue. Thus, cultural norms that value fertility are reinforced. Mertens and Carael (1998) wrote that sexual behavior in the third world is influenced by complex social and cultural contexts including peer influences, emotions, cultural beliefs, family marital settings, community social and demographic structures, and access to basic services. There is thus, a natural conflict between factors for procreation (genetic survival and thriving) and current most publicized ways to prevent STI/HIV transmission.

Since significant amounts of sexual activity takes place in family marital settings in Africa (Bandawe and Foster 1996), it is important to determine the effects of family marital dynamics and configurations on STI/HIV spread patterns among sexual partners within the marital setting. Polygynous families constitute a significant proportion of the household marital structure in sub-Sahara Africa (Modo 1999, 2001, 2002; Slap et al. 2001, 2003; UNPD 2002). The transmission of STI/HIV may thus be significantly influenced by family marital dynamics that will affect among others, family relationships (Kirshenbaum and Nevid 2002), fertility (Wesley et al. 2000), fecundity, and sexual activity among spouses (Flores et al. 2002; Mellins et al. 2002; Slap et al. 2001; Varga 2001; UNPD 2002, Wong and So-Kum Tang 2001). A key point is how the infected person deals with issues surrounding their relationships with their family after discovering they

are infected (Fortenberry et al. 2002), since this determines subsequent relationships, including sexual activity (Varga 2001).

Social Communication Context of STI/HIV Transmission:

Changes in social, physical and sexual relationships may affect communication and information sharing and vice versa (Ahmad 2000, Brown and Basil 1995, Kirshenbaum 1995, Mellins et al. 2002; Nevid 2002; Paxton 2002; Petrak et al. 2001; Serovich and Mosack 2003; Simoni and Mason 1997; Winstead et al. 2002). The communication and information sharing behavior of partner notification may therefore become a central issue in STI and HIV transmission control. It is thus important to identify how partner notification is influenced by such factors as stigma (Kirshenbaum and Nevid 2002; Paxton 2002; Mellins et al. 2002; Petrak et al. 2001; Winstead et al. 2002), family integrity and relationships, health, social communications, sexual communications, fear and other emotions.

Because sexual relationships are deeply embedded in social behavior and because social behavior is multi-contextual (Niccolai 2000; Vandervoort and Rokach 2003), STIs and HIV are essentially diseases with extensive social dimensions in norms, cultural contexts as well as mental, physical and emotional relationships. Winstead et al. (2002) pointed out that there were both negative and positive aspects of social interactions, regarding consequences of diagnosis for the infected and their significant others. Working through such considerations requires extensive internal and external negotiations. Negotiation processes include fact seeking, support seeking, emotional satisfaction and security (Vandervoort and Rokach 2003). Also included in negotiation elements is notification. Notification takes many forms, depending on the item of focus and valence derived from such exercise. For example, notification of pleasure by the receiving partner may reinforce and encourage a specific activity by the giving partner. In the sexual act for example, this may include caressing or kissing. On the other hand, before the sexual act, notification, verbal and non-verbal, is one of the principal tools for conveying/communicating desires, wishes and feelings. It also provides opportunities for identifying behavior-reinforcing or behavior-discouraging factors. One of the behavior modifying factors is absence or presence of STI and HIV. For these powerful factors, notification is a key communication behavior. Prediction of notification can help provide the basis for design, development, planning and implementation of prevention strategies to curb and eliminate the scourge of STIs and HIV with their human, social, economic and environmental costs. The purpose of this study was to identify the relationships between the communication behavior of partner notification and some predictors of this behavior in Sub-Sahara African families, using the Related Behavior Model (RBM).

Theoretical/Conceptual Framework

Several theoretical frameworks and models were examined to determine "best fit" for predicting partner notification behavior. These include Social Cognitive Theory – SCT (Bandura 1986 1991), Health Belief Model - HBM (Becker 1974; Janz and Becker 1984); Trans-theoretical Model - TTM (Prochaska and DiClemente 1985), Theory of Reasoned Action - TRA (Ajzen and Fishbein 1975 1980; Fishbein et al. 1991), Theory of Planned Behavior - TPB (Ajzen 1991) and Theory of Planned Behavior with Goal Importance - TPB-GI (Sideridis 2002).

Table 1 was used to identify features and gaps in each theoretical model, and select a framework for predicting partner notification. As shown, though the models were comprehensive in some contexts, they do have several key gaps that made them not fully adequate to address the predicting elements in behavior. The gaps include: 1) prior behavioral experiences, which play a key role in determining repetition; 2) gap between knowledge, attitude, decision making and behavior. 3) dynamics of differences between one type of behavior and another, which entail similar activities but different outcomes 4) time, a key factor in STI/HIV transmission behavior, and 5) resources which may or may not be available where and when needed. Additionally, Ogden (2003) evaluated published research on these models and commented on three core issues concerning their fundamental nature:

> "First, these models do not enable generation of hypotheses because their constructs are unspecific; they therefore cannot be tested. Second, the focus on analytic truths rather than synthetic ones, and the conclusions resulting from their application are often true by definition rather than by observation. Finally, they may create and change both cognitions and behavior rather than describe them" (Ogden 2003).

Ogden concluded that these models were useful in providing a framework for developing interventions designed to change health behavior, but were less useful when their conceptual bases were analyzed. A model that emphasizes and uses communication and other behavior interactions, and not solely cognitive and/or perceptual paradigms (knowledge, attitude and beliefs, perceptions or self-efficacy and decision-making), to assess and predict further or later behavior was thus needed. Combining various elements of the models examined above, a model that has measurable elements, which would provide the necessary structure for analyzing and predicting further or later behavior was developed.

The Related Behavior Model (RBM), consists of three themes and six elements, reflects the nature and relationships of the behavior being used to predict further behavior even though the outcomes may differ for the same behavior. The model as shown in Figure 1 was developed using current literature, evaluating their various elements to determine the most salient constructs.

Model Structure

The Related Behavior Model (RBM) consists of three main themes and six predicting elements, each with a set of defining variables, depending on the target condition being addressed, and identified target behavior (Figure 1). The three main themes are Cognition, Environment and Related Behavior as predictors. The elements are Demographic Characteristics, Knowledge of Related Behavior, Knowledge of Target Condition, Social Structure, Related Behavior Discussions (Verbal Rituals), Related Behavior Practice (Non Verbal Rituals), Target Behavior constitutes the sixth element and dependent construct.

Details of model development are addressed elsewhere. Figure 2 illustrates the structure and elements of RBM applied to relationships between family planning behavior and partner notification, within polygynous families.

Table 1:
Theoretical Models Examined for Partner Notification of STI/HIV; their Features and Gaps

Model	Features	Gaps
Social Learning Theory - (Miller and Dollard 1941), Social Cognitive Theory - (Bandura, 1986).	Value-expectancy based model. Underlying assumption: reciprocal determinism Continuing interaction between person, behavior and behavior environment. Variables: expectations, expectancies, self-control and self-efficacy. Phases: pre-training, training, initial self-testing and continued performance. Observational proces	-Does not specifically include societal/cultural norms -Mostly passive -Does not address effect of previous or prior behavior
Health Belief Model - Becker (1984)	Balance of driving and restraining forces in behavior; three domains: Individual context of perception - 2 basic constructs: Perceived susceptibility to disease and Perceived severity of the disease condition Modifying factors: three constructs: Demographic variables, Socio-psychological factors, Structural variables. Likelihood of action, addresses motivation to make decisions based on factors not otherwise defined in the first two domains. Three constructs: Balance between individual's perceived positive and negative forces. Appraisal of susceptibility. Estimation of benefits and barriers to action; Self-efficacy	- Does not Consider effect of Prior Behavior on Subsequent Behavior Does not look at whether similar or different expectancies affect subsequent behavior Mostly examines cognitive and perceptual effects on behavior
Theory of Reasoned Action / Theory of Planned Behavior – Fishbein and Ajzen (1975)	Predicts behavior based on attitude in accordance with intentions and perceptions of control over behavior. Intentions influenced by attitudes towards behavior, subjective norms and perceptions of behavioral control Perceived Behavioral Control, Attitudes versus Norms, Sufficiency, Past Behavior with Intentions and their mediating elements for influencing behavior itself.	- Structure constructs predict intention, not Behavior. -Predicts only 20% of variance (Armitage & Conner, 2001) -Societal/cultural norms
Stages of Change / Trans-Theoretical Model – Prochaska and DiClemente, (1985)	-Four stages of change to engage in behavior change: Pre-Contemplation Contemplation Action Maintenance -Ten processes of change for each stage	Time consuming -Requires
Theory of Planned Behavior with Goal Importance - Sideridis and Kaissidis-Rodafinos (2001)	Goal importance Predicting: - Perceived Control - Belief Strength - Outcome Evaluation - Normative Beliefs - Motivation to Comply Above predicting: Intention; and intention predicting Behavior - Goal-driven.	-Prior behavior -Different outcomes of the same behavior -More specific elements of behavior dynamics

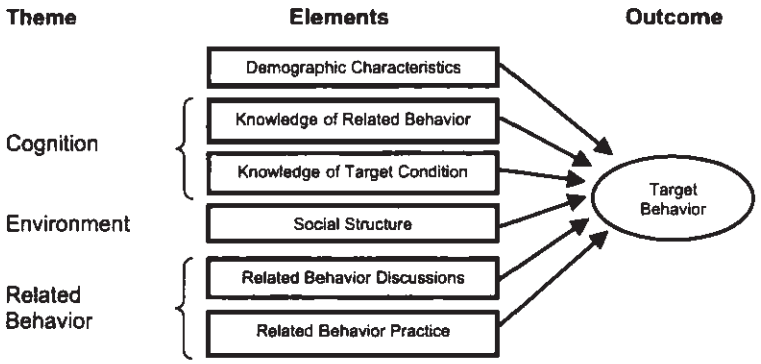


Figure 1: Related Behavior Model (RBM)

Operationalizing the constructs, predictors are Demographic Characteristics, Knowledge of Birth Control and Family Planning (Knowledge of Related Behavior), Knowledge of STI/HIV (Knowledge of Target Condition), Family Marital Structure (Social Structure), Family Planning Discussions (Related Behavior Discussions), Family Planning Practice (Related Behavior Practice). In this study, Target Condition operationalizes as Sexually Transmitted Infections and Human Immunodeficiency Virus (STI/HIV) while Discussions and Practice are classified as specific and unique behaviors. The dependent construct of Partner Notification of STI/HIV represented the Target Behavior.

Methods

Research Design

This was a retrospective cross sectional study, using secondary data, to determine whether STI/HIV partner notification in the West-African Republic of Guinea was predictable using the Related Behavior Model, among monogynous and polygynous families. Macro International Inc., at 11785 Beltsville Drive, Suite 300 Calverton, MD 20705, owns the data. Macro International Inc. is a non-profit research organization that worked with the Guinean National Government, funded by the United States Agency for International Development (USAID) to conduct demographic and health surveys (DHS). This dataset was collected in 1999 for the Republic of Guinea in West Africa.

Sampling Design and Survey Execution

This multi-stage, stratified, clustered, and weighted probability sampling design, based on the Guinean National Census, produced a sample that rep-

resented the entire Guinean population. Sampling and interviewing were executed by trained personnel, performing specific functions to ensure consistency. The sample comprised of 8,000 women in reproductive age (15 to 49 years) and 2,000 men, age 15 to 59 years. This study examined the data sets on the survey of women only. The sampling frame was constructed from the basic Enumeration Area (EA) into which the country was zoned during the census of 1996, which served as the sampling base. The survey identified five study areas/zones: Lower Guinea, Middle Guinea, Upper Guinea, Forest Guinea and Conakry. Sampling, survey and data collection techniques are detailed elsewhere in *Enquête Démographique et de Santé Guinée 1999* (Macro International 2000). Figure 3 shows a summary of the sampling and survey procedures for the women.

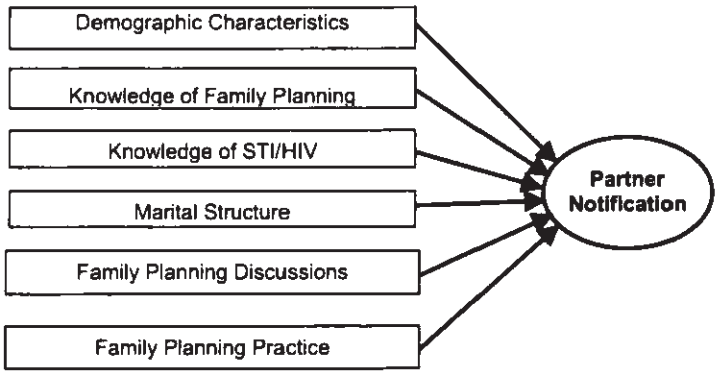


Figure 2: Related Behavior Model Applied to Prior Family Planning and Partner Notification in Polygynous and other Social Relationships

Data manipulations:

Microsoft Excel® was used to clean the data and create the spreadsheet for transference from and to SPSS. SPSS® and Stata™ software were adequate for analyses, because they had specific sets of analytic functions and reporting required for selected analytical approaches in this study. SPSS® 13.0 was used to select variables, code, recode and test for validity and reliability to develop constructs. After the final set of construct measures was developed, recoded and scored, the resulting data set was converted to Stata™ 7.0, using StatTransfer™ for further descriptive and inferential analyses.

First, the entire data set was filtered using "STI infection in the last 12 months (year)." This produced, from the total sample size of 6,753, a subsample of 461, which was used for further analyses. Thus, this study exam-

ined the responses of women who had STI in the last 12 months before the survey interview. Variables with extremely low sample sizes (<5) were eliminated.

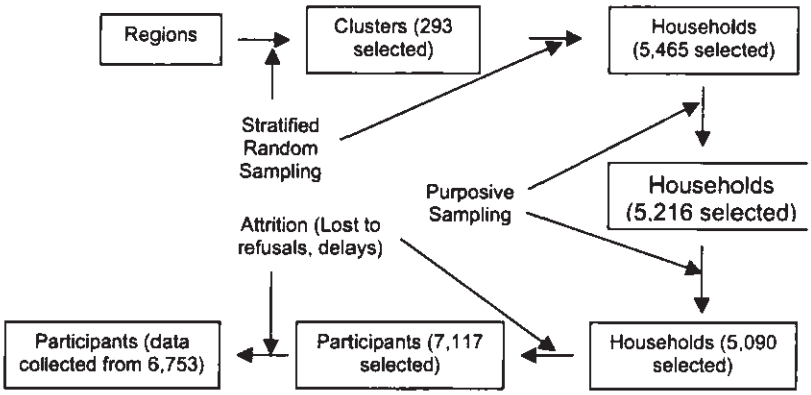


Figure 3: Thematic Flow Chart* for DHS II Sampling Frame
*Adapted from Macro International Report of Sampling Methodology for DHS II 1999

Variables with over ten percent missing data were also eliminated and those that had less than or equal to ten percent missing values had the cells replaced with imputed mean. These were then assessed for their distribution patterns using skewness and kurtosis values. Those with skewness larger than one were converted to their log values, which helped to centralize and normalize the distribution from either extreme left or extreme right.

Selection of Variables and Analyses

For each construct, variables were selected using qualitative and quantitative techniques that included thematic scanning, hermeneutic, factor and alpha analysis. Figure 4 is a thematic diagram (flow chart) describing methods used to select data for analyses. The variables were first selected by visual scanning, using thematic similarities and implications based on qualitative research methods (Alligood and Fawcett 2004; Conroy 2003; Cunningham 2004; Dowling 2004; Giannoni 2003; Geertz 2003; Landridge 2004; Levine-Silverman 1989), to select word meaning. The main themes were based on keywords reflecting Demographic Characteristics, HIV Knowledge, awareness or experience, STI Knowledge, awareness or experience, Polygynous and/or Monogynous Family Marital Structure, Discussions of Family Planning and Birth Control, Practice of Family Planning and Birth Control, Partner Notification (direct and indirect). Hermeneutic methods were then used to select variables based on linguistic meanings, cultural, social, philosophical and religious implications of the keywords,

and their relationships to constructs of the related behavior model (RBM).

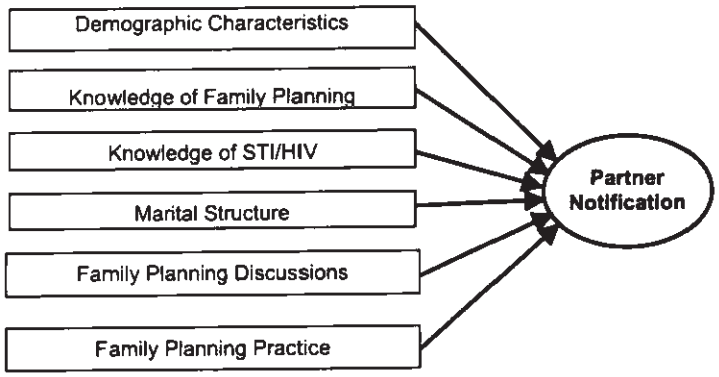
The resulting data set was then analyzed and manipulated through variable reselection using various quantitative techniques including use of the codebook, management of missing data, data coding and recoding, Exploratory Factor Analyses (EFA) and Alpha Analyses. Factor and alpha analyses were performed to determine what variables best defined each construct. Variables with low fit indices were eliminated from further analyses. Validity and reliability tests showed Eigenvalues and Cronbach's Alpha respectively were satisfactory for all constructs (Table 5). Details of selection analyses procedures are addressed and reported elsewhere. Finally, descriptive and inferential analyses were performed to describe the distribution of dependent and independent variables and determine their relationships. Final independent variables consisted of dichotomized scores (high vs. low) received in knowledge of family planning, knowledge of HIV/AIDS, family marital structure, family planning discussions and family planning practice. The dependent variable was partner notification (dichotomized to "high" and "low" scores)

Inferential Analyses consisted mainly of logistic regression of the independent and outcome constructs in both unadjusted and adjusted models. During logistic regression analyses, independent constructs were used to predict partner notification in three configurations of two outcomes (partner notification and no partner notification). The regression models were performed in four phases; 1. unadjusted demographic variable and construct models, 2. adjusted demographic model (within the demographic variables domain), 3. adjusted constructs model (within the constructs group separately), and 4. adjusted demographic and constructs model with all groups merged. Figure 4 is a thematic flow chart summarizing the steps in data management and analyses.

Results

Of the eligible women, 6,753 (94.89 percent) were successfully surveyed. Mean age of participants was 29.03 years (SD=9.48) with median and mode of 28 and 25 years, respectively. Of the total sample, a sub-sample of 461 was included in analyses, based on their infection status in the 12 months prior to survey. Results indicating demographic distribution of survey participants in the selected sub-group are shown in Table 2. Age distribution shows that women 25 to 34 years age formed the largest group (38.83% percent) in the sample. Most respondents lived outside the national capital, Conakry, from which 19.74 percent were sampled. In addition, most of the respondents (62.91%) lived in rural settings, while 81.44% were Muslim and three main ethnic groups formed the majority (26.21% Malinké, 18.06% Peulh and 35.46% Soussou). Nearly three of every four

resented the entire Guinean population. Sampling and interviewing were executed by trained personnel, performing specific functions to ensure consistency. The sample comprised of 8,000 women in reproductive age (15 to 49 years) and 2,000 men, age 15 to 59 years. This study examined the data sets on the survey of women only. The sampling frame was constructed from the basic Enumeration Area (EA) into which the country was zoned during the census of 1996, which served as the sampling base. The survey identified five study areas/zones: Lower Guinea, Middle Guinea, Upper Guinea, Forest Guinea and Conakry. Sampling, survey and data collection techniques are detailed elsewhere in *Enquête Démographique et de Santé Guinée 1999* (Macro International 2000). Figure 3 shows a summary of the sampling and survey procedures for the women.



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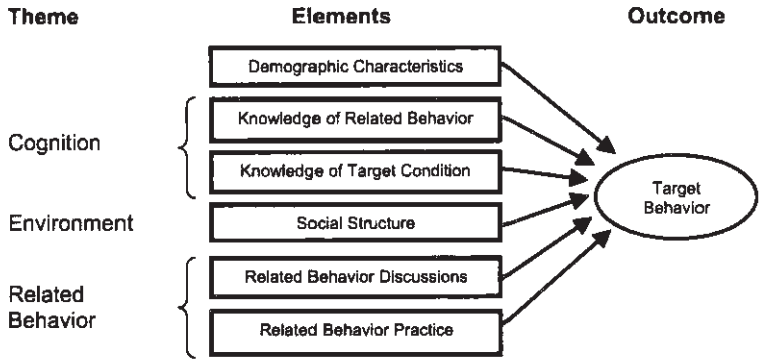

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Sampling Design and Survey Execution

This multi-stage, stratified, clustered, and weighted probability sampling design, based on the Guinean National Census, produced a sample that rep-

respondents in the sub-sample (72.67%) had no western style education while 15.40 percent had elementary level, and 11.93 percent had more than primary school education respectively. In addition, most respondents (82.21%) were currently working or productively engaged while only 17.79 percent were not employed.

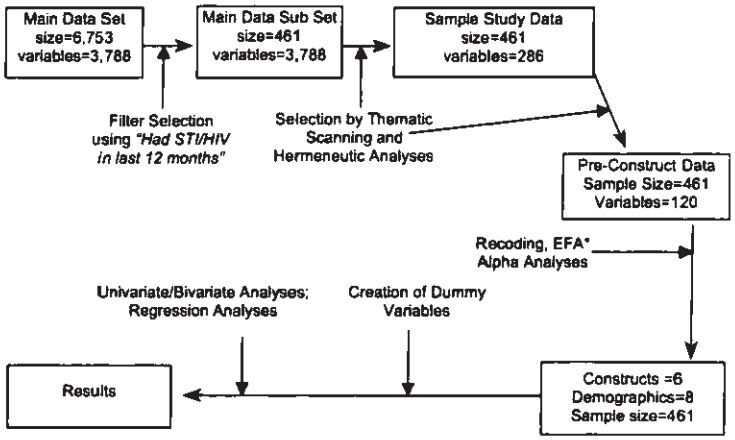

Figure 4: Thematic Flow Chart for DHS II (1999) Data Management Showing Steps for Data Preparation and Analyses for predicting partner notification among women who reported having STI/HIV in the past 12 months in the Republic of Guinea.
* EFA=Exploratory Factor Analysis

Results of validity and reliability analyses are shown in table 3. Three variables were selected by analyses for Knowledge of Family Planning (Related Behavior); Knowledge of STI/HIV included seven measures representing clinical presentation of STI and/or direct knowledge of HIV/AIDS. The two variables for Family Structure included number of other wives and wife rank number. Variables for Family Planning Discussions included three measures while those for Family Planning Behavior included three selected measures. Variables for Partner Notification consisted of two selected measures. The Eigenvalues and Cronbach's Alpha levels were satisfactory and statistically significant for all constructs.

Construct scores were dichotomized into high and low levels, based on total score of the measure variables (Table 4). High scores were those that indicated high or positive Knowledge of Family Planning and Disease, Stronger (monogynous or first ranked wife) Family Marital Structure for notification, presence of Family Planning Discussions and presence of Family Planning Practices/Activities. Table 4 shows distribution of high/low scores in the constructs. Associations of demographic variables and con-

struct scores with partner notification are shown in tables 5 and 6 respectively.

Age and Partner Notification showed borderline significant association (x^2=5.0012, p=0.082). Region of Residence and Partner Notification were not significantly associated (x^2=0.9649; p=0.326). Bivariate and within group multivariate logistic regression outcomes are shown in Tables 7 and 8 for demographic variables and constructs respectively. Significantly, in the unadjusted (bivariate) model, age (being 35-49 years old) and region of residence (living in Upper Guinea), more than any other variables in the group influenced partner notification (C.I.=1.12 to 3.80; p-value=0.021 and CI=1.77 to 12.25; p-value=0.002 respectively). Also, Religion, Ethnicity, Education and Employment were not significantly associated with Partner Notification. Overall, only Knowledge of Disease Condition (STI/HIV) and Family Planning discussions (Discussions of Related Behavior) showed any significant associations with partner notification.

Table 2:

Demographic Characteristics of Women, Age 15 to 49 years, who Reported Having STI/HIV in last Twelve Months: Guinea DHS 1999

Variable	n	Percent
Age (Total)	(461)	100.00
15-24	(158)	34.27
25-34	(179)	38.83
35-49	(124)	26.90
Region of Residence (Total)	(461)	100.00
Lower Guinea	(141)	30.59
Central Guinea	(55)	11.93
Upper Guinea	(21)	4.56
Forrest Guinea	(153)	33.19
Conakry	(91)	19.74
Type of Place of Residence (Total)	(461)	100.00
Urban	(171)	37.09
Rural	(290)	62.91
Religion (Total)	(458)	100.00
Muslim	(373)	81.44
Non Muslim	(85)	18.56
Ethnicity (Total)	(454)	100.00
Sousou	(161)	35.46
Peulh	(82)	18.06
Malinké	(119)	26.21
Others	(92)	20.26
Western Education (Total)	(461)	100.00
None	(335)	72.67
Primary	(71)	15.40
Secondary and Higher	(55)	11.93
Employment (Total)	(461)	100.00
No	(82)	17.79
Yes	(379)	82.21

Table 3:

Validity and Reliability Test Results for Independent and Dependent Constructs of the Related Behavior Model. Women Age 15 to 49 years, who Reported Having STI/HIV in the last Twelve Months: Guinea DHS1999

Construct (# of measure variables)	Factor Analyses (Validity Test) Results					Alpha Analyses (Reliability Test) Results			
	EV	% Var.	KMO	χ^2	$\delta f(\rho)$	α^{Cr}	F	ρ	n
Knowledge of Family Planning (2)	2.741	91.382	.739	1733.85	3 (.000)	0.7342	237.68	0.000	461
Knowledge of STI/HIV (7)	8.994	89.938	.616	169.697	45 (.000)	0.6831	881.44	0.000	461
Family Marital Structure (2)	4.000	100.00	.520	81.631	3 (.000)	0.7743	258.64	0.000	461
Family Planning Discussions (3)	3.361	84.018	.543	232.384	6 (.000)	0.6287	225.64	0.000	461
Family Planning Practices (3)	2.669	88.98	.501	656.425	3 (.000)	0.7381	81.54	0.000	461
Partner Notification (2)	6.000	100.00	-	-	-	0.7811	50.40	0.000	461

α^{Cr}=Cronbach's Alpha; δf=degrees of freedom; EV=Eigenvalues; F=F-Value; KMO=Kaiser-Meyer-Olkin Measure of Sampling Adequacy; ; n=Sample Size(Frequency); ρ=P-value, % Var=Percent Variance; χ^2=Chi Square Value.

When the models were adjusted for with the inclusion of other variables within the demographic set, the patterns of statistical significance remained the same. Only age group 35 to 49 years and living in Upper Guinea had strong relationships with Partner Notification (C.I.=1.30 to 4.86; *p*-value=0.006 and CI=1.88 to 24-63; *p*-value=0.003 respectively).

Odds ratios regarding the relationships of Partner Notification (table 8) examined with Knowledge of Family Planning, Knowledge of STI/HIV, Family Marital Structure, Discussing Family Planning, Engaging in Family Planning

Table 4:

Behavioral and Other Construct Scores, Showing Distribution of Women, Age 15 to 49 years, Who Reported Having STI/HIV in last Twelve Months: Guinea DHS 1999

Constructs	Score	Frequency	Percent
Family Planning Knowledge (n=461)	Low	(125)	27.11
	High	(336)	72.89
STI/HIV Knowledge (n=461)	Low	(290)	62.91
	High	(171)	37.09
Family Structure (n=384)	Low	(220)	57.29
	High	(164)	42.71
Family Planning Discussions (n=377)	Low	(204)	54.11
	High	(173)	45.89
Family Planning Practice (n=461)	Low	(396)	85.90
	High	(65)	14.10
Partner Notification (n=461)	Low	(55)	11.9
	High	(406)	88.1

Activities and having more than one wife showed only Knowledge of STI and Family Planning Discussions had any statistically significant relationships in the adjusted within constructs group (C.L.=1.05 to 3.04, *p*-value=0.032 and CL=1.36 to 4.31, *p*-value=0.003 respectively) and bivariate (C.L.=1.00 to 2.58; *p*-value=0.052 and CI=1.32 to 3.66; *p*-value=0.002 respectively) models. However, the Bivariate Odds Ratio for Knowledge of STI/HIV was only borderline significant. The relationships of Partner

Notification, with Demographic variables and Constructs, analyzed together in one model (Table 9) shows that age was not a significant influence.

However significant effects were observed with region of residence (Upper Guinea: C.I.= 1.50 to 21.96 *p*-value =0.011), Knowledge of STI/HIV (Upper Guinea: C.I.= 1. 90 to 3.74 *p*-value =0.025) and Family Planning Discussions (Upper Guinea: C.I.= 1.230 to 4.06 *p*-value =0.008).

With this geographical and socio-economic picture, changes and interactions in the predictions raise many questions regarding their true nature, their impact, and requirements for addressing them. In summary, significant positive demographic relationships included being 35 years to 49 years of age and living in Upper Guinea. There were no significant negative or inverse relationships with Partner Notification. For the independent constructs, having knowledge of STI/HIV and discussing family planning showed statistically significant relationships with partner notification.

Discussion

For the sample of women surveyed in the Republic of Guinea, using Macro International's 1999 Demographic and Health Survey of Guinea in West Africa (Guinea DHS 1999): 1) Partner notification was strongly positively associated with being 35 to 49 years old, from Upper Guinea. However, living in rural areas, level of education and Religion, Ethnicity and Employment status had no significant relationships; 2) Women who had knowledge of family planning were not significantly more likely than those who had little or no knowledge, to inform their partners of their STI/HIV status when known; 3) Women who had knowledge of STI/HIV were more likely to inform their husband of their status when known; 4) Women who engaged in family planning discussions were more likely to inform their husbands of their infection status when known. For this group, the less they discussed, the more likely they were to not inform their husbands; 5) Family planning practice and family marital structure were not significantly influential in determining if a woman would notify her spouse of her infection status.

Table 5:

Bivariate Distribution showing Association of Demographic Variables with Partner Notification for Women, Age 15 to 49 years, who Reported Having STI/HIV in last Twelve Months: Guinea DHS 1999

Variable		Partner Notification				χ^2-value	p-value
		No		Yes			
		n	Percent	n	Percent		
Age (Total)	15-24	22	13.32	136	86.08	5.0012	0.082
	25-34	34	18.99	145	81.01		
	35-49	30	24.39	93	75.61		
Region of Residence	Lower Guinea	23	16.31	118	83.69	16.0522	0.000
	Central Guinea	5	9.09	50	90.91		
	Upper Guinea	10	47.62	11	52.38		
	Forrest Guinea	32	21.05	120	78.95		
	Conakry	16	17.58	75	82.42		
Type of Place of Residence	Urban	28	16.32	143	83.63	0.9649	0.326
	Rural	58	20.07	231	79.93		
Religion (Total)	Muslim	68	18.23	305	81.77	0.4590	0.498
	None Muslim	18	21.43	66	78.57		
Ethnicity (Total)	Sousou	31	19.25	130	80.87	1.9510	0.377
	Malinké	27	22.69	92	77.31		
	Peulh, Kissi and Others	28	16.18	145	83.82		
Western Education	None	62	18.56	272	81.44	1.3662	0.505
	Primary	11	15.49	60	84.51		
	Secondary and higher	13	23.64	42	76.36		
Employment (Total)	No	14	17.07	68	82.93	0.1728	0.678
	Yes	72	19.05	306	80.95		

[1]Scoring: High scores indicate high or positive knowledge of family planning and disease, weak family structure for notification, presence of family planning discussions and presence of family planning activities/practices

Results of this investigation suggest that knowledge that is specific for the target condition, in this case STI/HIV knowledge, was a key predictor of partner notification. That is, those who knew more about the disease conditions tended to notify their partners of their STI/HIV status when known. Of the total number of respondents in this sample (461), only a minority (37.09 percent) scored high in knowledge of STI/HIV. However, when the scores were examined with respect to their individual defining variables, an overwhelming majority had heard of AIDS (89.80 percent of 461); and a significant majority had had abdominal pain (65.8 percent of 461) and discharge (56.40 percent of 461). However, abdominal pain and vaginal discharge can be caused by other than STI/HIV, thus those symptomatologies may be influenced by other confounders in generating behavior change. On the other hand, the overwhelming majority had no or low knowledge of the symptoms and signs of most STI, including gonorrhea, syphilis or other causes of genital ulceration, which may also indicate a level of familiarity and therefore comfort with discussions of both intimate issues and threat issues related to them.

The influence of Knowledge of HIV/AIDS may be an important factor since knowledge of HIV may have been based mainly on public health education, which may not necessarily provide adequate clinical presentation information to the public. This may explain the low knowledge of symptoms and signs of STI, which has been known to serve as a surrogate or sentinel

infection for HIV screening and secondary prevention. Thus, even though there was knowledge and familiarity with HIV/AIDS information in the population, it is difficult to determine conclusively in this sample with regard to knowledge of STI/HIV, what could be responsible for the high likelihood to notify their husbands.

On the other hand, however, knowledge of family planning did not have similar significant effects. This may be related to the social value and expectancy for children and the perceived threat levels for stigma, which are different from those of STI. Thus, women who became pregnant from sexual activity with their husbands were honored instead of being stigmatized.

Table 6:

Bivariate Distribution showing Association of Behavioral Constructs with Partner Notification for Women, Age 15 to 49 years, who Reported Having STI/HIV in last Twelve Months: Guinea DHS 1999

Variable	Partner Notification					
	No		Yes		χ^2-value	p-value
	n	Percent	n	Percent		
Family Planning Knowledge*	86	18.70	374	81.30	0.0024	0.961
High Score (1-2)	23	18.55	101	81.45		
Low Score (0)	63	18.75	273	81.25		
STI/HIV Knowledge*	86	18.70	374	81.30	5.2125	0.022
High Score (4-7)	45	15.52	245	84.48		
Low Score (0-3)	41	24.12	129	75.88		
Family Marital Structure	82	21.41	301	78.59	0.008	0.977
High Score (1-2)	35	21.34	129	78.66		
Low Score (0)	47	21.46	172	78.54		
Family Planning Discussions	80	21.28	296	78.72	9.5006	0.002
High Score (2-3)	31	15.27	172	84.73		
Low Score (0-1)	49	28.32	124	71.68		
Family Planning Practice	86	18.70	374	81.30	0.0027	0.958
High Score (2-3)	12	18.46	53	81.54		
Low Score (0-1)	74	18.73	321	81.27		

*Scoring: High scores indicate high or positive knowledge of family planning and disease, weak family structure for notification, presence of family planning discussions and presence of family planning activities/practices

Table 7:

Within Group Unadjusted (Bivariate) and Adjusted Odds Ratios from Logistic Regression Analyzing Relationships between Demographic Variables and Partner Notification for Women, Age 15 to 49 years Who Reported Having STI/HIV in last Twelve Months: Guinea DHS 1999

	Partner Notification (Dependent Variable)							
	Bivariate				Model Adjusted*			
Independent Variables	OR	Confidence Limits		p-value	OR	Confidence Limits		p-value
		Lower	Upper			Lower	Upper	
Demographic Variables								
Age Category (years)								
15-24 (RC)	1.00	-	-		1.00	-	-	-
25-34	1.44	0.80	2.59	0.224	1.51	0.83	2.77	0.180
35-49	2.06	1.12	3.80	0.021	2.52	1.30	4.86	0.006
Region of Residence								
Lower Guinea (RC)	1.00	-	-	-	1.00	-	-	-
Central Guinea	0.51	0.18	1.42	0.199	.098	0.24	4.07	0.976
Upper Guinea	4.66	1.77	12.25	0.002	6.81	1.88	24.63	0.003
Forrest Guinea	1.35	0.75	2.45	0.317	1.77	0.63	4.98	0.282
Conakry	1.08	0.54	2.19	0.822	1.26	0.51	3.07	0.618
Type of Residence								
Urban (RC)	1.00	-	-	-	1.00	-	-	-
Rural	1.24	0.76	2.05	0.391	1.49	0.67	3.32	0.333
Religion								
None Muslim (RC)	1.00	-	-	-	1.00	-	-	-
Muslim	0.80	0.45	1.44	0.464	0.56	0.15	2.12	0.395
Ethnicity								
Peulh & Others (RC)	1.00	-	-	-	1.00	-	-	-
Sousou	1.31	0.74	2.30`	0.352	2.78	0.86	8.97	0.087
Malinké	1.61	0.89	2.92	0.114	1.81	0.55	5.99	0.325
Educational Level								
None (RC)	1.00	-	-	-	1.00	-	-	-
Primary	0.81	0.40	1.63	0.556	1.29	0.60	2.77	0.519
Secondary &Higher	1.41	0.71	2.79	0.325	2.10	0.91	4.85	0.083
Employment Status								
Not Employed (RC)	1.00	-	-	-	1.00	-	-	-
Employed	1.10	0.58	2.07	0.774	1.09	0.50	2.39	0.824

OR=Odds Ratio; RC=Reference Category; *χ^2=26.43; p-value=0.0166 (demographics); *χ^2=13.84; p-value=0.167 (constructs)

Table 8:

Within Group Unadjusted (Bivariate) and Adjusted Odds Ratios from Logistic Regression Analyzing Relationships between Behavioral Constructs and Partner Notification for Women Age 15 to 49 years, Who Reported Having STI/HIV in last Twelve Months: Guinea DHS 1999

	Partner Notification (Dependent Variable)							
	Bivariate				Model Adjusted*			
Independent Variables	OR	Confidence Limits		p-value	OR	Confidence Limits		p-value
		Lower	Upper			Lower	Upper	
Behavioral Constructs								
Knowledge of Family Planning								
Low Score (0) (RC)	1.00	-	-	-	1.00	-	-	-
High Score (1-2)	1.05	0.62	1.78	0.862	1.08	0.61	1.90	0.796
Knowledge of STI/HIV								
Low Score (0-3) (RC)	1.00	-	-	-	1.00	-	-	-
High Score (4-7)	1.60	1.00	2.58	0.052	1.79	1.05	3.04	0.032
Family Marital Structure								
Low Score (0) (RC)	1.00	-	-	-	1.00	-	-	-
High Score (1-2)	0.99	0.60	1.63	0.970	0.78	0.46	1.33	0.361
Family Planning Discussions								
Low Score (0-1) (RC)	1.00	-	-	-	1.00	-	-	-
High Score (2-3)	2.20	1.32	3.66	0.002	2.42	1.36	4.31	0.003
Family Planning Practice								
Low Score (0-1) (RC)	1.00	-	-	-	1.00	-	-	-
High Score (2-3)	0.98	0.50	1.93	0.958	1.30	0.54	3.16	0.554

OR=Odds Ratio: RC=Reference Category: *χ^2=26.43; p-value=0.0166 (demographics); *χ^2=13.84; p-value=0.167 (constructs)

The data set however does not contain information for such analysis and such suppositions remain to be validated. This may have implications for education planning and the content of health education for the prevention of HIV/AIDS and other STIs in Guinea. This finding points to possible modifications in the content of education information and messages to include information about clinical presentation of STIs. The implications may be many, but it might be useful to look at the effect of such knowledge on decision-making and action with regard to partner notification and thus control of STI/HIV transmission. In this study, family planning discussions showed a significant relationship with partner notification. The higher scores (more discussions of family planning), when combined in a full model, were more likely to elicit partner notification by one hundred and twenty-four percent. From the first unadjusted model to the full, adjusted model, partner notification and family planning discussion associations were strong, and remained so.

The finding in this research that family planning activity did not have any strong or significant influence on partner notification suggests that talking about something seems to be more influential in predicting a behavior than actually doing it. This goes against the common cliché that action speaks louder than words. Such suggestion raises several questions. These include whether behavior similarity or behavior outcome were the more predictive. In this study, behavior that is verbal (talking about family planning)

predicted another mostly verbal behavior (notifying the partner of STI/HIV status). It is also to be noted that both outcomes: conception and STI/HIV transmission derive from the same activity (sex). Thus, the questions arise whether sexual activity is central to the issues involved in partner notification or whether it is discussing issues related to reproductive anatomy that generates the outcomes identified. Those questions are difficult to answer with this data set. On the other hand, it is important to identify that this study highlights two different classes of behavior: the talk or verbal behavior and the non-talk or non-verbal behavior.

Table 9:

Table 9: Full Model Adjusted Between Groups Odds Ratios for Logistic Regression Analyzing Relationships between Demographic Variables, Independent Constructs and Partner Notification for Women between Age 15 and 49 years Who Reported Having STI/HIV in the last Twelve Months: Guinea Demographic and Health Survey 1999

		Partner Notification (Dependent Variable)			
		All Variables Adjusted*			
Independent Variables		OR	Confidence Limits		p-value
			Lower	Upper	
Age Category (years)	15-24 (RC)	1.00	-	-	-
	25-34	0.92	0.47	1.83	0.820
	35-49	1.85	0.90	3.80	0.092
Region of Residence	Lower Guinea RC)	1.00	-	-	-
	Central Guinea	1.12	0.22	5.79	0.892
	Upper Guinea	5.74	1.50	21.96	0.011
	Forrest Guinea	1.36	0.40	4.64	0.619
	Conakry	0.89	0.29	2.66	0.830
Type of Residence	Urban (RC)	1.00	-	-	-
	Rural	1.12	0.22	5.79	0.892
Religion	None Muslim RC)	1.00	-	-	-
	Muslim	0.50	0.11	2.22	0.361
Ethnicity	Peulh & Others (RC)	1.00	-	-	-
	Sousou	3.25	0.86	12.27	0.082
	Malinké	2.25	0.60	8.36	0.228
Educational Level	None (RC)	1.00	-	-	-
	Primary	1.01	0.37	2.71	0.992
	Secondary and Higher	2.47	0.83	7.32	0.103
Employment Status	Not Employed (RC)	1.00	-	-	-
	Employed	0.73	0.32	1.68	0.465
F-P Knowledge	Low Score (0) (RC)	1.00	-	-	-
	High Score (1-2)	1.54	0.80	2.96	0.200
STI/HIV Knowledge	Low Score (0-3) (RC)	1.00	-	-	-
	High Score (4-7)	2.02	1.09	3.74	0.025
Family Structure	Low Score (0) (RC)	1.00	-	-	-
	High Score (1-2)	0.85	0.49	1.48	0.575
F-P- Discussions	Low Score (0-1) (RC)	1.00	-	-	-
	High Score (2-3)	2.24	1.23	4.06	0.008
F- P- Practice	Low Score (0-1) (RC)	1.00	-	-	-
	High Score (2-3)	1.40	0.51	3.84	0.512

OR=Odds Ratio; RC=Reference Category; F-P=Family Planning *χ^2=41.94; p-value=0.0011;

What may bear more scrutiny is the pointer that "talk behavior" can predict another "talk behavior," since partner notification, though involving many different rituals, depending on setting, is essentially a verbal communication behavior. Thus, with regard to STI/HIV transmission, identifying the verbal communication behavior and differentiating from the nonverbal type in predicting other talk behavior outcomes may be useful in designing appropriate messages and settings for either or both to occur effectively.

Reasons for the differences between those who engaged in discussions and those who practiced family planning may be many. One of the more salient ones may be that those who discussed family planning and those who engaged in family planning may have been two different groups of people and that one may be exclusive of the other in their socio-economic and other characteristics. This could not be deduced from the data set and further tools designed for this purpose would be needed to answer this and other questions related to the dynamic of interactions between the effect of discussions and actual practice, especially in limited time situations like HIV transmission, for behavior to be enacted.

Finally, the hypothesis that related behavior practice could predict partner notification was not supported. Higher scores in Family Planning Behavior (engaging in family planning activities) had no statistically significant predictive relationship with partner notification. This means those who did not engage in family planning activities were not more or less likely to inform their partners of their STI/HIV status than those who did. However, the opposite was not true for those who score lower in family planning activities. Those who score lower in family planning activities were not more likely to inform their partners (OR=1.40, CL=0.51 to 3.83; *p*-value=0.512). That these statistics were not significant, presents a unique situation. Any reluctance to notify the partner of infection status could present a problem for intervention when those who practice family planning and those who do not practice family planning fail to notify their partners. It is not clear how this will be addressed, but what is clear is that it will need to be addressed since it involves all of the population by implication (there can be only two groups, those who practice family planning and those who do not) unless the behavior of family planning discussions can be enhanced in both the infected and the at-risk.

Model Validity and Reliability Issues:

The model for this study was developed de novo, due to various weaknesses identified in extant models examined, which were relevant to this study. Although three of the five hypotheses were not supported, it is important to note that, generally, secondary data do not provide the best measures

for theoretical models that were not used to design the measurement tools. As a result, the hypotheses still stand to be tested in another study in which the tools would have been designed and tested for this purpose and better tailored to the model. However, the available measures were tested and validated in four main ways. The first was a thematic evaluation, using hermeneutic approaches. The strength of this approach is that it tends to select the most relevant measures, based on the key elements of the construct and both the internal, inferential and implicational meanings of the words used in the constructs, in order to achieve high fidelity with the theme and spirit of the construct of interest. For example, the specific construct of partner notification could be viewed from many angles, but the accuracy of measures and their specificity to the construct will have to consider the specific cultural communication behavior and the social relationships and values that drive modes and approaches to communication. In some African groups, for example the Yorùbá, providing direct information on some issue that is likely to generate turmoil or stress in either the individual or the relationship is a complex matter that may involve going either through surrogates or through related communication modes to alert the receiver to the information in a suggestive manner. This is sometimes a more effective approach than direct communication.

Implications for Transmission Control:

Current statistics regarding HIV/AIDS, especially in urban areas of the country illustrate the urgency of determining the underlying epidemiological patterns of transmission. From a general prevalence rate of 1.7 percent in 2003, the numbers had risen to 3.5 percent in 2005 and then dropped back to 1.2 percent in 2006. More ominously was that the rate is currently as high as 7 percent in the forest region of the country and 42.3 percent among sex workers (USAID 2004). Overall, resiliency factors for health promoting behavior that militate against the transmission of infection but enhance the transmission of health promoting and protective information and behavior may need to be explored in these populations, which have their own characteristics that have not yet been studied. In addition, because of the resource poor environment, it is even more important to focus on behavioral resilience that will require little, if any material resources that are already fixtures in other settings.

Sampling Frames and Generalizability Effects

The sampling frames used represent the Guinean population. This representative sampling methodology provides the basis for more significant generalization of the results among the Guinean population. In addition, because the samples are weighted, they actually represent a larger absolute

sample size, obeying the central limits theory. The effect is to increase the statistical power of the results obtained. It may be pertinent to point out that though knowledge seemed to have an edge over actual practice in this work, it may be prudent not to jump to any conclusions regarding the possible effect in other areas of research using this model. In addition, there has been no conclusively clear effect of Family/Social Structure on behavior. In polygynous settings, the complexities of underlying social dynamics are yet to be studied and understood. Also, the complexity of relationships among knowledge, social structure and related behavior are yet to be mapped. However, it is safe to conclude in this study that the model used, although developed de novo, possesses some predictive abilities, which may prove useful in this and other situations.

Research Strengths and Weaknesses

The weaknesses of this research methodology include the design itself, which is cross sectional, looking at only a specific and limited period. Thus, the findings and conclusions cannot be generalized to the population beyond that period. To determine if there are any trends, longitudinal studies would be needed. Furthermore, the study is performed with secondary data. The drawbacks to using secondary data in studies such as these include the fact that the survey was actually performed for different reasons than the one to which it was put for this evaluation. The skewed nature of some of the variables could have been responsible for the insignificant findings seen in some of the constructs and their effects. A conceptual and paradigm bias may have been introduced in the analyses, especially in validity and reliability exercises to ensure scientific parsimony. This kind of bias is hard to do anything about without acquiring fundamentally relevant conceptual and theoretical bases that fit the population of interest. This was attenuated by using thematic hermeneutic approaches that allowed the researcher to select the variables, based as much as possible, on the paradigms related to the special features of the study population and sample. Nevertheless, the answers provided were diligently reported with high fidelity to what the numbers reflect.

A final weakness may have been the use of a de novo model to try to devise means to predict or understand a phenomenon. While this may highlight a lack of long-term repeated testing and modification, it nevertheless provides a snap shot pointer and opening effort, for what may be a major area for study over time. However, the model remains to be tested over time in various settings for various phenomena, using various tools. Finally, the stratified, weighted nature of the sampling may have introduced some selection bias. This bias is usually difficult to detect from secondary data since it may be a systematic bias that is inbuilt into the data themselves. Correcting

for such a bias is futile.

Some strengths of this research included that the weighted sampling was representative of the population as a whole. As a result, the distribution patterns across all variables closely approximated that of the Guinean population. However, this has limited generalizeability but enough to point at a need for further research. Another strength is the relative demographic homogeneity of this population. This homogeneity may have prevented some confounding and therefore allowed analyses that are more direct. The general homogeneity by region especially allowed for a strengthening of the whole sample since there was appreciable regional homogeneity in terms of ethnic distribution. A further strength of the study may have been related to the analytic approaches used. The use of validity and reliability tests may have helped to produce a much less biased sample and immunized against researcher perceptual bias. This allowed for a balance of the need for fidelity to cultural sensitivity and the need for empirical scientific rigor. The use of several levels of screening for variables selection may have helped to remove bias, engender balance and make the constructs more reliable and valid for analyses, rendering the outcomes more reliable. Finally, the main strength of this analytical approach is that it allows the researcher to select variables and achieve some modicum of reliability and validity before recoding, allowing for the use of valid and reliable data for the research.

Implications of Research for Epidemiology

Although various elements of the conceptual model showed some weak associations, it is important to note that some specific behavioral epidemiological issues were highlighted. One important finding is that knowledge of a related outcome of one behavior itself may sometimes be a sufficient catalyst that may generate some other form of behavior. Included with these is that the reasons for behavior may have been due to the content and form of educational message circulating within the population. Behavior action or non-verbal activity can be strongly influenced by the kind of information shared. As a result, the implication of this for prevention behavior to avoid transmission of infection is that messages for prevention need to include adequate information that not only generated fear or other forms of emotion, but also provide information on both recognition of the problem and action steps to be taken to address the issue at the individual level. These may need to be woven into the cultural medium of the population itself. Hence, to be effective, communication may need to be based in the cultural context of interchange.

One more implication for the transmission of infection and the epidemiology of infection transmission is that prior behavior may not necessarily provide the basis for predicting further behavior. However, it is noteworthy that two kinds of behavior may have different pathways for expression.

These two pathways are those of "talking" about a behavior (a behavior by itself) and actually "acting" or "doing" "non verbal" form of the behavior itself. This study looked at an outcome behavior that is verbal (talking about) and discovered that knowledge of related outcome and talking about a related behavior may have some effect on another behavior that ends with "talking." This indicates some similarity in both predicting behavior and the outcome, since they are both talk-based (both discussing family planning and "notifying" partner of one's status are essentially "talk" or "verbal" communication activities) Using the "acting" or "doing" predictor may have a different effect than the "talking" predictor and this is borne out by the data and analyses. This may need more exploration and study for sharper and firmer definition. Another implication for transmission of phenomena is that in the "talking" environment, the transmission of information is most active and overt. Thus, encouraging dialogue and creating or supporting/enhancing conducive social, physical and cultural environments for these to occur may have some impact on the transmission of both resiliency and health promoting behavior at individual and group levels. This overt form of communication may be more tailored to specific populations based on their sensitivity to and utility of the "talk" mode. Thus, resiliency information that may be communicated may include health-promoting behavior discussions and communications. This mode of behavior modification may have strong import, when several issues are considered. The issues may include that in "resource poor" environments, being able to talk about and discuss health promoting and resiliency information may be the most easily and readily available as well as least expensive option for promoting health and preventing adverse health outcomes. Thus, encouraging such issues as partner notification may be an effective, non-resource intensive way to reduce STI/HIV transmission and curb the HIV epidemic.

Implications for Public Health Practice

The inference that "talking" about a behavior is as, if not more relevant to predicting another behavior as "acting" or "doing", points at a need to be alert to nuances of community needs and the dynamics of social and behavioral epidemiological concerns, which are sensitive to cultural norms. The need to identify these nuances could mean the difference between policy, program or project effectiveness and failure. Also, the impact of such sensitivity may be the catalyst that triggers other health promoting reactions and discussions that may be related to the first issue. This brings up identifying key issues that may serve as "gateway" or "sentinel" issues to other connected ones. The skill, precision and accuracy with which these key gateway/sentinel issues are selected may make the difference for success in program and policy development and impact. Finally, for effective disease prevention and health promotion, calls for an active, pro-active approach

to embedding resiliency paradigms and values in communities. Thus, with parsimonious principles, it may be possible to, on a long-term basis, prepare populations to prevent potentially catastrophic conditions or strengthen their health outcomes for higher quality of life.

Possible future research includes exploring those questions regarding the two threads of behavior namely "talking/verbal" and "doing/non-verbal" or "acting." These areas call for exploration since, in the real world, part of the human solution to problems is to engage in "talking about it." "Talking" has been the way people exchanged vital information, learn new ways to address issues and resolve thorny questions relating to real life. Talking however is sensitive to cultural and social cognitive paradigms. Researching with these paradigms requires high levels of cultural familiarity and competence, which only inclusive approaches to scientific team construction can bring.

Finally, this research points out that more concepts, theories, theoretical models and paradigms are needed that specifically reflect the worldviews of specific populations, without which resources may not have the optimum impact in health promotion and disease prevention.

REFERENCES

Abóyèjí, A.P. and C. Nwabuisi. 2003. "Prevalence of sexually transmitted diseases among pregnant women in Ilorin, Nigeria." *Journal of Obstetrics and Gynaecology* 23 (6): 637-639.

Ahmad, K. 2000. "Concerns Raised about Botswana's Proposed HIV Disclosure Law." The Lancet 356 (9230): 662.

Ajzen, I. and M. Fishbein. 1980. *Understanding Attitudes and Predicting Social Behavior* Englewood Cliffs, NJ: Prentice Hall.

_____. 1991. "The Theory of Planned Behavior." *Organizational Behavior and Human Decision Processes* 50: 179-211.

Alligood, M. R. and J. Fawcett. 2004. "An Interpretive Study of Martha Rogers' Conception of Pattern." Visions: *The Journal of Rogerian Nursing Science* 12 (1): 8-13.

Bandawe, C.R. and D. Foster. 1996. "AIDS-Related Beliefs, Attitudes and Intentions among Malawian Students in Three Secondary Schools." AIDS Care 8 (2):223-232.

Bandura, A. 1986. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall.

Becker, M.H. 1984. "The Health Belief Model and Personal Health Behavior." *Health Education Monographs*. 2: 324-508.

Behets, F.M., R. Andriamahenina, J. Andriamiadana, J.F. May, and A. Rasamindrakotroka. 1996. "High Syphilis and Low but Rising HIV Seroprevalence Rates in Madagascar." *The Lancet* 347 (9004):831.

Brown, W.J., and M.D. Basil. 1995. "Media Celebrities and Public Health: Responding to 'Magic' Johnson's HIV Disclosure and its Impact on AIDS Risk and High Risk Behaviors." *Health Communication*, 7(4): 345-370.

Conroy, S.A. 2003. "A Pathway for Interpretive Phenomenology." *International Journal of Qualitative Methods* 2 (3). Article 4. Retrieved November 21, 2007 from http://www.ualberta.ca/~iiqm/backissues/2_3final/pdf/conroy.pdf.

Cunningham, J.B. 2004. "Case study principles for different types of cases." *Quality and Quantity* 31: 401-423.

Direction Nationale de la Statistique (Guinée) et Macro International Inc. 2000. *Enquête Démographique et de Santé au Guinée 1999*. Calverton, MD: Direction Nationale de la Statistique et Macro International, Inc.

Dowling, M. 2004. "Hermeneutics: an Exploration." *Nurse Researcher 11 (4):30*.

Fishbein, M. 1967. *Readings in Attitude Theory and Measurement*. New York: John Wiley & Sons.

_____ and I. Ajzen. 1975. *Belief, Attitude, Intention and Behavior: An Introduction in Theory and Research*. Reading, MA: Addison-Wesley.

Flores, E., J.M. Tschann, and B.V. Marin. 2002. "Latina Adolescents: Predicting Intentions to Have Sex." *Adolescence* 37 (148): 659-79.

Fortenberry, J.D., M. McFarlane, A. Bleakley, S. Bull, M. Fishbein, D.M. Grimley, K.C. Malotte, and B.P. Stoner. 2002. "Relationships of Stigma and Shame to Gonorrhea and HIV Screening." *American Journal of Public Health* 92 (3): 378-381.

Geertz, A.W. 2003. "Ethnohermeneutics and Worldview Analysis in the Study of Hopi Indian Religion." *Numen: International Review for the History of Religions* 50(3): 309-348.

Giannoni, M. 2003. "Psychoanalysis and Empirical Research." *Journal of Analytical Psychology* 48 (5): 643-658.

Hawkes, S., S. Miller, L. Reichenbach, A. Nayyar, and K. Buse. 2004. "Antenatal syphilis control: people, programmes, policies and politics". *Bulletin of the World Health Organization* 82 (6): 417-423.

Holt, B.Y., P. Effler, W. Brady, J. Friday, E. Belay, K. Parker, and M. Toole. 2003. "Planning STI/HIV Prevention among Refugees and Mobile Populations: Situation Assessment of Sudanese Refugees." *Disasters* 27(1): 1-15.

Immerman, R.S. and W.C. Mackey. 2003. "The Feminist Paradox: An Index of Cultural Evolution." *The Journal of Social, Political, and Economic Studies* 28 (2): 217-248.

Janz, N.K. and M.H. Becker. 1984. "The Health Belief Model, Ten Years Later." *Health Education Quarterly* 11: 1-47.

Kamali, A., M. Quigley, J. Nakiyingi, J. Kinsman, J. Kengeya-Kayondo, R. Gopal, A. Ojwiya, P. Hughes, L.M. Carpenter, and J. Whitworth. 2003. "Syndromic management of sexually-transmitted infections and behaviour change interventions on transmission of HIV-1 in rural Uganda: a community randomised trial." *The Lancet* 361 (9358): 645-652.

Kaur, A. and R.P. Johnson. 2003. *HIV Pathogenesis and Vaccine Development. Topics in HIV*

Medicine, International AIDS Society - USA 11 (3):76-85.

Kirshenbaum, S.B. and J.S. Nevid. 2002. "The Specificity of Material Disclosure of HIV/AIDS in Relation to Children's Adjustment." *AIDS Education and Prevention* 14(1): 1-16.

Langdridge, D. 2004. "The Hermeneutic Phenomenology of Paul Ricoeur." *Existential Analysis: Journal of the Society for Existential Analysis* 15 (2): 243-255.

Lavreys, L., B. Chohan, R. Ashley, B.A. Richardson, L. Corey, K. Mandaliya, J.O. Ndinya-Achola, and J.K. Kreiss. 2003. "Human Herpesvirus 8: Seroprevalence and Correlates in Prostitutes in Mombassa, Kenya. *The Journal of Infectious Diseases* 187:359-63.

Levine-Silverman, S. 1989. "The Menopausal Hot Flash: a Procrustean Bed of Research." *Journal of Advanced Nursing* 14 (11): 939-949.

Mackey, W.C. and R.S. Immerman. 2002. "Cultural Viability and Gender Egalitarianism: An Elusive Balance Yet to be Struck." *Journal of Comparative Family Studies* 33(4): 475-494.

McDevitt, T.M. 1999. *World Population Profile: 1998*. Washington, DC: U.S. Census Bureau, Population Division.

Mellins, C.A., J.F. Havens, E.O. McCaskill, C.S. Leu, K. Brudney, and M.A. Chesney. 2002. "Mental Health Substance Use and Disclosure are Significantly Associated with the Medical Treatment Adherence of HIV-Infected Mothers." *Psychology, Health & Medicine* 7(4): 451-460.

Millar, M.G. 1997. "The Effects of Emotion on Breast Self-Examination: Another Look at the Health Belief Model." *Social Behavior and Personality* 25 (3): 223-232.

Modo, I.V.O. 1999. "A Cultural Panacea to the Problem of 'Malelessness' in Igboland of Nigeria: The Study of Eze-Chima Clan. *The African Anthropologist* 6 (2): 198-205.

_____. 2001. Migrant Culture and Changing Face of Family Structure in Lesotho. *Journal of Comparative Family Studies* 32 (3): 443-52.

_____. 2002. "Dual Legal System, Basotho Culture and Marital Stability." *Journal of Comparative Family Studies* 22 (6): 377-386.

Mullick, S., N. Broutet, Ye Htun, M. Temmerman, and F. Ndowa. 2004. "Controlling congenital syphilis in the era of HIV/AIDS." *Bulletin of the World Health Organization* 82 (6): 431-432.

Neff, J.A. and S.L. Crawford. 1998. "The Health Belief Model and HIV Risk Behaviours: A Causal Model Analysis among Anglos, African-Americans and Mexican-Americans." *Ethnicity & Health* 3 (4): 283-299.

Niccolai, L.M. 2000. "Partner Notification for HIV Prevention: Effects on Partnerships and Behaviors." Ph.D. Dissertation, UMI # 9971315, Department of Epidemiology, Tulane University, New Orleans, LA.

Nworah, J. A., K.D. Obiechina, and O. C. Ikpeze. 2002. "Knowledge, Awareness and Perception of Sexually Transmitted Diseases (STDs) among Nigerian Adolescent Girls." Journal of Obstetrics and Gynaecology 22 (3): 302-305.

Ogden, J. 2003. "Some problems with social cognition models: A pragmatic and conceptual analysis." *Health Psychology* 2: 424-428.

Otuonye, N.M., D.K. Olukoya, W.N. Odunukwe, E.O. Idigbe, M.N. Udeaja, M. Bamidele, J.I. Onyewuchie, C.T. Oparaugu, O.S. Ayelari, and B. Oyekunle. 2002. "HIV association with conventional STDs (sexual transmitted diseases) in Lagos State, Nigeria." *West African Journal of Medicine* 21 (2):153-156.

Paxton S. 2002. "The Paradox of Public HIV Disclosure." AIDS Care 14(4): 559-567.

Petrak, J.A., A.M. Doyle, A. Smith, C. Skinner, and B. Hedge. 2001. "Factors Associated With Self-Disclosure of HIV Serostatus to Significant Others." *British Journal of Health Psychology* 6: 69-79.

Prochaska, J. O. and C.C. DiClemente. 1983. "Stages and Processes of Change: Toward an Integrative Model of Change." *Journal of Consulting and Clinical Psychology* 51: 390-395.

Serovich, J.M., and K.E. Mosack. 2003. "Reasons for HIV Disclosure and Non-Disclosure to Casual Sexual Partners." *AIDS Education and Prevention* 15(1): 70-80.

Sideridis, G.D. and A. Kaissidis-Rodafinos. 2001. "Goal Importance within Planned Behavior Theory as 'The' Predictor of Study Behavior in College." *British Journal of Educational Psychology* 71: 595-618.

_____. 2001. "The Causal Role of Goal Importance for the Explanation of Student Study Behaviour: Cross-Validation with Multiple Samples." *Educational Psychology* 21(3): 277-298.

Sideridis, G.D. 2002. "Goal Importance for Students at Risk of Having Language Difficulties: An Under-explored Aspect of Student Motivation." *Journal of Learning Disabilities* 35 (4): 343-356.

Simoni, J.M., H.R.C. Mason, and G. Marks. 1997. "Disclosing HIV Status and Sexual Orientation to Employers." *AIDS Care* 9(5): 589-599.

Slap, G.B., L. Lot, B. Huang, C.A. Daniyam, T.M. Zink, and P.A. Succop. 2003. "Sexual Behavior of Adolescents in Nigeria: Cross Sectional Survey of Secondary School Students". *British Medical Journal* 326: 15.

Stillwaggon, E. 2001. "AIDS and Poverty in Africa." *Nation* 272 (20): 22-25.

Tattevin, P., P. Renault, V. Joly, R. Bastos, E. Coelho, E., Adda, A. Ebel, and P. Yeni. 2002. "Treatment of Latent Syphilis in HIV-infected Patients with 10 megaunits dose of Benzylpenicillin G Benethamine: A Prospective Study in Maputo, Mozambique." *Scandinavian Journal of Infectious Diseases* 34: 257-261.

UNAIDS. 2002. *AIDS Epidemic Update: December 2002*. Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO) Geneva.

_____. 2003. *AIDS Epidemic Update: December 2003*. Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO) Geneva.

_____. 2006. *AIDS Epidemic Update: December 2006*. Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO) Geneva.

United Nations Population Division (UNPD), Department of Economic and Social Affairs. 2003. *World Population Prospects 2003*. New York: United Nations.

_____. 2006. *World Population Prospects 2006*. New York: United Nations.

Vandervoort, D. and A. Rokach. 2003. "Posttraumatic Relationship Syndrome: The Conscious Processing of the World of Trauma". *Social Behavior & Personality: An International Journal* 31(7): 675-686.

Varga, C.A. 2001. "Coping with HIV/AIDS in Durban's Commercial Sex Industry." *AIDS Care* 13(3): 351-365.

Wesley, Y., S.C. Smeltzer, N.S. Redeker, S. Walker, P. Palumbo, and B. Whipple. 2000. "Reproductive Decision Making in Mothers with HIV-1." *Health Care for Women International* 21: 291-304.

Williams, P.B., O. Ekúndayò, I.E. Udezulu, and A.M. Omishakin. 2003. "An Ethnically Sensitive and Gender-Specific HIV/AIDS Assessment of African American Women: A Comparative Study of Urban and Rural American Communities." *Family and Community Health* 26(2): 108-123.

Winstead, B. A., V.J. Derlega, A.P. Barbee, M. Sachdev, B. Antle, and K. Greene. 2002. "Close Relationships as Sources of Strength or Obstacles for Mothers Coping with HIV." *Journal of Loss and Trauma* 7(3): 157-184.

Wong, C. and C.S. Tang. 2002. "Understanding Heterosexual Chinese College Students' Intention to Adopt Safer Sexual Behaviors." *Journal of Sex Research* 38(2): 118-126.

Xueref, S., J. Holianjavony, R. Daniel, D. Kerouedan J. Fabry, and P. Vanhems. 2003. "The absence of HIV seropositivity contrasts with a high prevalence of markers of sexually transmitted infections among registered female sex workers in Toliary, Madagascar." *Tropical Medicine and International Health* 8 (1): 60-66.