AGENTS OF CHANGE: EMPOWERMENT IN ADULTS AND ADOLESCENTS FOR HIV PREVENTION IN EASTERN AND SOUTHERN AFRICA

by

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(Under the Direction of Joel Lee and Amara Ezeamama)

ABSTRACT

Statement of the Problem: Of the 19.4 million people living with HIV in eastern and southern Africa in 2016, 59% of them were women and girls. The elevated risk of acquiring HIV is due to many factors that drive disempowerment in heterosexual relationships and HIV risk behaviors. Few studies employ a comprehensive framework to examine divisions between men and women and HIV risk behaviors in an African context.

Purpose: To assess the association between empowerment indicators and attitudes based on the Theory of Gender and Power and HIV risk behaviors in couples by country.

Methods: In the first study, we defined the women's empowerment predictor as household decision-making, female economic independence, wife-beating attitudes, and age and educational differences between partners. The outcomes of interest were infidelity by the man and self-efficacy for a woman to initiate safe sex and refuse sex. In the second study, we analyzed associations between attitudes towards women's empowerment (household decision-making and wife-beating attitudes) and the same HIV risk behaviors. Overall, we conducted cross-sectional analyses, using logistic regression, of couples aged 15-64 in countries with

Demographic and Health Survey data and high HIV prevalence: Malawi, Namibia, Zambia, and Zimbabwe.

Results: Female economic independence, household decision-making involvement, and rejecting all reasons for wife-beating were strong indicators of high levels of empowerment. High versus low women's empowerment was associated with an increased likelihood of safer sex negotiation among women in Malawi (AOR=1.57, 95% CI: 1.08-2.00) and Zambia (AOR=1.60, 95% CI:1.34-1.91), and sex refusal among women in Malawi (AOR=1.62, 95% CI: 1.29-2.04) and Zimbabwe (AOR=1.29, 95% CI:1.04-1.59). Empowerment attitude discordance was associated with infidelity among men in Zambia and Zimbabwe (AOR=1.94, 95% CI: 1.39-2.40; AOR=1.88, 95% CI: 1.27-2.77), and a decreased likelihood of safer sex negotiation in Zambia (AOR=0.58, 95% CI: 0.42-0.81) and of sex refusal in Malawi (AOR=0.66, 95% CI: 0.45-0.97), Zambia, (AOR=0.74, 95% CI: 0.58-0.95), and Zimbabwe (AOR=0.72, 95% CI: 0.57-0.91).

Conclusions: Empowerment indicators and attitudes drive relationship dynamics, sexual power, and sexual behavior in African couples. Policymakers should incorporate these factors to enhance programs that facilitate empowerment for HIV prevention.

INDEX WORDS: Empowerment, HIV, Sexual Behavior, Couples, Sub-Saharan Africa, Theory of Gender and Power

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DEDICATION

This dissertation is especially dedicated to God, my provider and protector, and my Lord and Savior Jesus Christ, who has strengthened me throughout this process. "Brothers and Sisters, I do not consider myself yet to have taken hold of it. But one thing I do: Forgetting what is behind and straining toward what is ahead. I press on toward the goal to win the prize for which God has called me heavenward in Christ Jesus" (Philippians 3:13-14).

To my parents, Dr. and Mrs. Ghislain Kabwit, who have encouraged me, supported me, and prayed for me from afar, I will always appreciate your sacrifice to immigrate to the United States, pursue higher education, and raise me into adulthood.

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TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1

INTRODUCTION

Public Health Significance

The HIV Epidemic in Eastern and Southern Africa

Over the past two decades, global health agencies such as the President's Emergency Program For AIDS Relief (PEPFAR) and the United Nations Joint Program on AIDS (UNAIDS) have expanded access to antiretroviral therapy and, in turn, averted an estimated 13 million deaths due to Acquired Immune Deficiency Syndrome (AIDS) [1, 2]. However, eastern and southern Africa carry a large burden of the Human Immunodeficiency Virus (HIV) compared to other countries. UNAIDS reported that this region had the highest HIV prevalence in the world in 2016 (Figure 1.1). In contrast with other regions, the primary mode of HIV transmission in Sub-Saharan Africa (SSA) has been heterosexual contact leading to generalized epidemic patterns, making it difficult to target interventions toward clearly identifiable most at-risk groups [3].

Young women in eastern and southern Africa are at especially high risk of contracting HIV. Of the estimated 19.4 million people living with HIV in eastern and southern Africa, 59% of them were female adults and adolescents [4]. Despite a 29% decline in HIV incidence between 2010 and 2016 [4], an estimated 790,000 new infections occurred in 2016 [5]. Although just 10% of the region's population were females aged 15-24 years, young women accounted for 25% of new HIV infections and acquired the disease five to seven years earlier than young men [1, 5]. The generalized nature of the epidemic among young women has drawn

attention to how broad social factors related to gender inequality have contributed to the epidemic in the region. Thus, one of UNAIDS' primary targets for 2015 was to "eliminate inequalities and gender-based abuse and violence and increase the capacity of women and girls to protect themselves from HIV" [6].

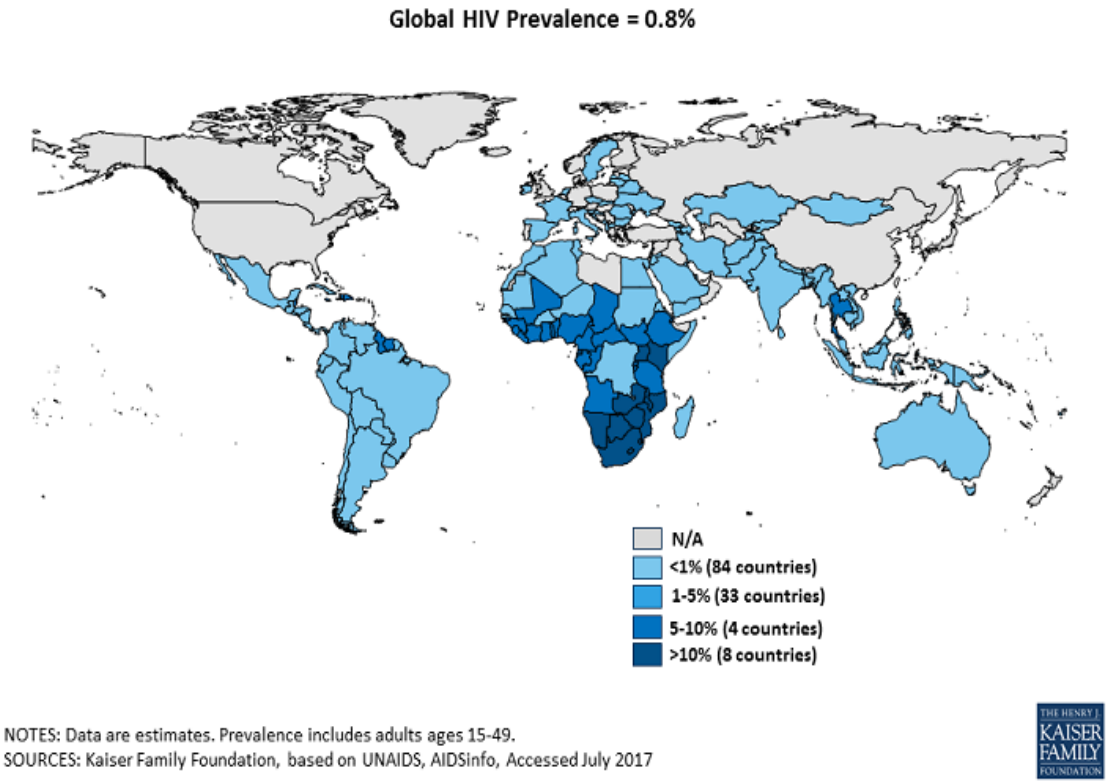

Figure 1.1 HIV Prevalence Rates Around the World, 2016.

Addressing Gender Inequalities for HIV Prevention

The reasons for women's and girls' heightened vulnerability to HIV has been the subject of much scholarship. At the ecologic level, high gender inequality (measured by reproductive health, empowerment, and participation in the labor market) correlates with countries having predominantly heterosexual epidemics [7]. Moreover, studies have found specific social factors

that contribute to HIV transmission in young women: earlier ages at sexual debut, having older male partners, experiences of gender-based violence (GBV), low access to education, and the absence of essential health services [1, 8-11]. These factors contribute to HIV disparities in women and the lack of optimal progress in curbing the spread among them. Specific risk behaviors linked to HIV transmission in SSA include multiple sexual partners, low condom use, the inability for a woman to ask a man to wear a condom given a sexually transmitted infection (STI), and lower levels of male circumcision [3, 12]. In response to these factors and risk behaviors, Kishor and Subiya emphasized solutions that address female empowerment, or "investments in power," and mechanisms that "increase women's control over their own lives, bodies, and environments" [13].

In response to the HIV burden on women, public health research and programs have attempted to address gender inequities with female-controlled empowerment programs (e.g., by addressing intimate partner violence) and prevention methods (via condoms and pre-exposure prophylaxis). However, Higgins and colleagues and Wathuta have criticized these individualized approaches for emphasizing the "women as victims, male as perpetrator" discourse [14, 15]. In response to this critique, Gupta and colleagues have focused on how structural factors (cultural, economic, and social) contribute to individual behaviors, gender imbalances, and HIV risk and have attempted to develop interventions designed to address these deeper underlying forces [16]. Structural interventions for women have included microfinance and education programs at the individual level and mobilization and economic collaboratives at the community level [14]. Further, the literature on female HIV risk has evolved to acknowledge that men are also vulnerable to HIV because of masculine ideologies embedded in households and communities (e.g., notions that a strong African man must be dominant in all levels of

society including the household) [14, 15]. Thus, researchers have developed couple-level interventions and male-centered approaches to HIV risk reduction, including couples-based skills-building, couples' HIV testing and counseling, "Treatment as Prevention," and a scale-up of male circumcision programs [17].

In achieving the UN Sustainable Development Goal to end the AIDS epidemic by 2030, recent calls have centered on addressing sexual and social norms as one of the drivers of new infections, holding men and women equally accountable for behavior change [18]. Presently, attention has shifted towards studies that examine gender dynamics, empowerment, economics, physical and social structures [15, 19]. Accordingly, studies acknowledge the female vulnerability-HIV link but aim to de-emphasize the "female victim, male perpetrator" discourse" [20] and engage men as active participants in HIV prevention initiatives [21, 22]. These approaches center around collaborative efforts among men and women [15], as HIV transmission is bidirectional [23]. Moreover, analyzing social drivers of HIV must start with a clear understanding of the level at which the response will work and what behavioral patterns remain or change [24]. As a multi-dimensional construct [25] that involves structural divisions of power in relationships, empowerment involves structural divisions of labor (socioeconomics) and broader social conditions that influence men and women [26]. One theory that aims at combining gender dynamics operating at different levels of analysis is the multidimensional Theory of Gender and Power (TGP), which addresses sexual divisions in heterosexual relationships and is applicable for HIV prevention in women [27].

Gaps in the Literature

Few studies examine empowerment and HIV risk among couples using a framework that explains divisions between men and women with relevant structural factors in an African context

(e.g., decision-making, economics, education and age differences, etc.). Current theories in couple-level interventions emphasize individual behavior change and rarely address what risk factors and exposures lead to gender imbalances for HIV risk. Research that examines African men's cultural experiences and perspectives alongside their partners to understand these divisions in association with HIV risk is limited. Furthermore, gender dynamics research rarely collects nationally representative data from African countries with high HIV prevalence to inform policy. Therefore, this dissertation comprises two studies. The first study assessed the association between two major TGP constructs for empowerment (the sexual division of labor and the sexual division of power) assessed in married/cohabitating women and HIV risk behaviors (multiple sexual partners, safer sex negotiation, and sex refusal) along with relevant sociodemographic and contextual (cathexis) variables. The second study examined the association between discordant empowerment perspectives within couples (differences in empowerment attitudes from the sexual division of labor and the sexual division of power) and the same HIV risk behaviors. Although eastern and southern African countries may have similarities at a national level (geographic, economics, etc.), I assumed that sociocultural factors, power dynamics, and sexual behavior at a subnational level would depict heterogeneous outcomes. Thus, I analyzed each country separately and compared results.

Purpose of the Research

The purpose of this dissertation is to assess differences among countries in the association between attitudes and indicators of empowerment (the sexual division of labor and the sexual division of power constructs) and HIV risk behaviors in heterosexual couples. Both of the studies described above apply an adapted version of the Theory of Gender and Power [26] that analyzes empowerment at interpersonal and structural levels to explore HIV acquisition in

women [27]. All analyses use nationally representative cross-sectional couples data from the Demographic and Health Survey (DHS) from countries with high HIV prevalence in eastern and southern Africa: Malawi, Namibia, Zambia, and Zimbabwe. Since 1999, the DHS has included an empowerment module that asks men and women from low-income and middle-income countries relevant household questions regarding household decision-making, wife-beating attitudes, and ownership of property [25, 28].

The DHS empowerment modules capture the major underlying constructs embedded in the TGP framework. These indicators include household decision-making and female economic independence (the sexual division of labor), attitudes towards wife-beating, age and education differences (the sexual division of power), and polygamy and place of residence (cathexis or social norms). The DHS further collects sociodemographic data (age of partners, education level of partners, history of an STI, and household wealth) and HIV-related behaviors (multiple sexual partnerships, the woman's ability to ask her partner to wear a condom given an STI, and the woman's ability to refuse sex). The analyses treat sociodemographic variables as control variables, which may confound the association between the predictor (the sexual division of labor and the sexual division of power constructs) and HIV-related behaviors as outcomes. Per the two-stage sample design of the DHS, all analyses apply statistical weights; thus, all results are generalizable to households in the corresponding countries. The public health significance of this study is the identification of constructs of the TGP that drive gender dynamics that contribute to HIV risk behaviors in African couples, which in turn can inform future HIV prevention interventions. Both studies address specific UN Sustainable Development Goals: Three (end the AIDS epidemic by 2030), Five (address gender inequality), and Ten (reduce inequalities) [18, 29]. Overall, the new literature aims to add to gender dynamics research for

HIV prevention guided by the TGP in coupled relationships in SSA at interpersonal and structural levels.

Study Design and Questions

This dissertation consists of two cross-sectional studies using secondary data from couples who participated in the DHS in Malawi (2010), Namibia (2013), Zambia (2013-14), and Zimbabwe (2010-11) (Figure 1.2). The overall predictor includes empowerment indicators combined into a composite score while the outcomes of interest refer to behaviors cited in literature associated with HIV risk. The first study asks two research questions with corresponding hypotheses:

Question 1.1: Are African married/cohabitating women with high levels of empowerment less likely to be involved in relationships with risky sexual behaviors (multiple sexual partnerships, woman's inability to ask a partner to wear a condom given an STI, and woman's inability to refuse sex) than women with lower levels of empowerment?

Null Hypothesis 1.1: There is no association between levels of empowerment and risky sexual behaviors in African married/cohabitating women.

Alternative Hypothesis 1.1: African married/cohabitating women with high levels of empowerment will be less likely to be involved in relationships with risky sexual behaviors (multiple sexual partnerships, woman's inability to ask a partner to wear a condom given an STI, and woman's inability to refuse sex) compared to women with lower levels of empowerment.

Study II asked two research questions, with the following corresponding hypotheses:

Question 2.1: Is discordance in attitudes towards women's empowerment within African couples associated with an increased likelihood of risky sexual behaviors compared to couples with gender-equitable attitudes?

Null Hypothesis 2.1: Discordance in attitudes towards women's empowerment is not associated with risky sexual behaviors.

Alternative Hypothesis 2.1: African couples with discordance in attitudes towards women's empowerment will be more likely to be in relationships with risky sexual behaviors compared to couples with gender-equitable attitudes.

In summary, HIV persists as a public health problem in eastern and southern Africa, especially among women. Although HIV incidence has stabilized, and people are living longer with HIV/AIDS, in many countries, HIV incidence continues to increase, and couple interventions remain necessary to implement combination prevention strategies. While biomedical, social, and structural efforts to facilitate empowering women have had some success, these interventions may fail to address underlying gender dynamics between men and women at various levels. Few studies analyze gender dynamics across interpersonal and structural levels, consider couples as the unit of analysis, include men's perspectives, and focus on nationally representative data to inform HIV prevention interventions. Thus, this research measured empowerment indicators and attitudes towards women's empowerment in couples using the TGP (the sexual division of labor and the sexual division of power constructs) to determine an association with risky sexual behaviors in countries in eastern and southern Africa with high HIV prevalence. Each study is illustrated in Figure 1.2 to outline the population, data sources, epidemiologic methods, and outcomes of interest. This dissertation provides a snapshot of African men's and women's perspectives and experiences that can give researchers insight into how sexual divisions and context drive behaviors that ultimately lead to HIV acquisition.

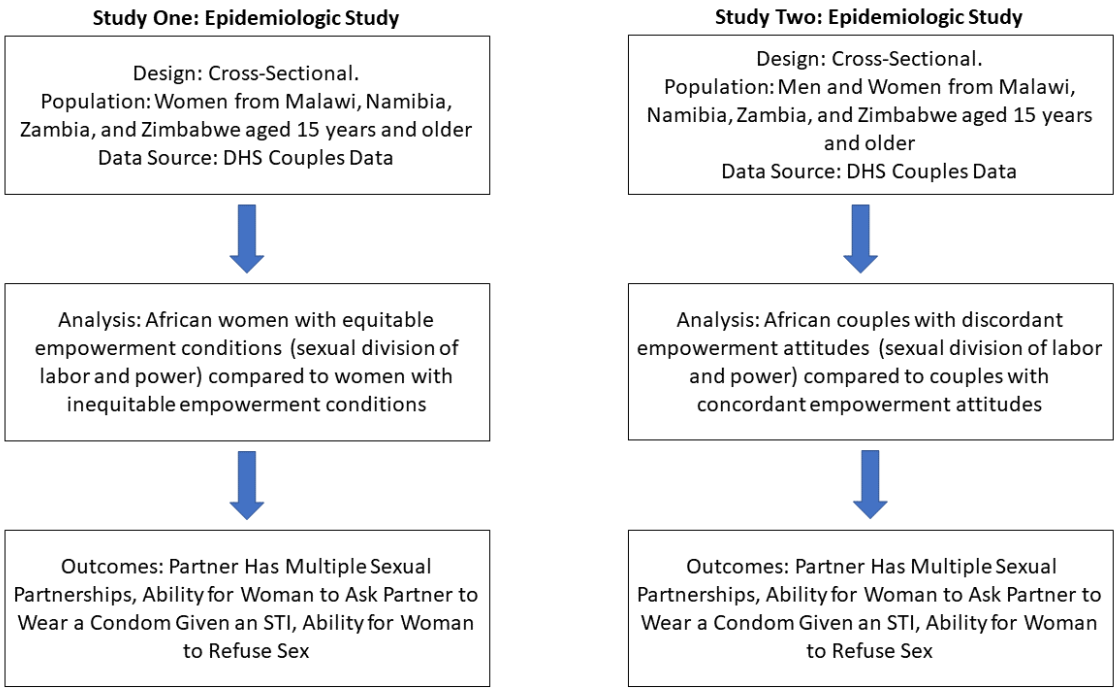

Figure 1.2 Study Designs for Empowerment and HIV Risk Behaviors Research Applying the TGP in African Couples.

Description of Manuscripts

Research Plan

The purpose of the research was to (1) utilize secondary data analysis to assess the association between women's empowerment in coupled relationships and HIV risk behaviors and to (2) analyze secondary data to examine discordance in attitudes towards empowerment among couples and its association with HIV risk behaviors. Both studies used cross-sectional couples data from the DHS that includes questions asked of men and women aged 15-64. The research included African countries with high HIV prevalence (10% or higher) in eastern and southern Africa with the recent completion of a DHS data collection cycle: Malawi, Namibia, Zambia, and Zimbabwe. Each study examined associations separately by country.

Each epidemiologic study applied TGP concepts to measure indicators of empowerment (the sexual division of labor, the sexual division of power) as predictors, control variables (sociodemographics), and HIV behaviors of interest (multiple sexual partnerships and self-efficacy in safer sex negotiation and sex refusal) as outcomes in multivariable models. Per the adapted TGP framework, the predictor corresponded to specific DHS questions in household decision-making and female economic independence (the sexual division of labor), attitudes towards wife-beating (the sexual division of power), and age and education differences (the sexual division of power). Study designs assessed relevant socio-economic exposures and risk factors (age of partners, education level of partners, male and female history of STIs, and household wealth) from the DHS as potential control variables in multivariable models. Additionally, the analysis assigned urban versus rural living and polygamy control variables (cathexis) that may shape empowerment and HIV risk behaviors per the TGP. Finally, the analysis treated physical exposures, biological properties, and behavioral risk factors (multiple sexual partnerships, the woman's ability to ask her partner to wear a condom given an STI, and the woman's ability to refuse sex) as outcomes of interest. Per the two-stage sample design of the DHS, all analyses applied statistical weights, and results were generalizable to couples' households in corresponding countries.

CHAPTER 2

LITERATURE REVIEW

The purpose of this review is to examine how empowerment is defined, studied in research, and implemented for HIV prevention and treatment programs. The dissertation further conceptualizes empowerment according to the Theory of Gender and Power (TGP), where an operational definition relies on an individual's personal and social environment and how this may influence their HIV risk behaviors. This section begins with an overview of the evolution of the broader literature on women's empowerment and gender equality in the development literature. The chapter then reviews the TGP and its evolution and applications to public health research, as well as recent adaptations to the context of Sub-Saharan Africa (SSA). The chapter concludes with a description of important gender equality indicators by country.

Defining Women's Empowerment

Women's empowerment is a contested concept that has evolved over the last several decades of research on the subject. In early research, circa 1980, researchers defined empowerment primarily in terms of female autonomy, but later, this narrower notion of autonomy was expanded to encompass relationship dynamics including interdependence and collaborative decision-making in addition to autonomy [30]. Moreover, early concepts attached women's empowerment to the female condition: educational attainment, labor force participation, and marriage [31]. Researchers in psychology, social science, development, and economics established theories to analyze empowerment as a predictor, outcome of interest, and a process involving items such as the attainment of resources and choice [13, 32-39]. Currently,

population health researchers define women's empowerment as a process of a woman attaining power, particularly when this ability was previously denied: getting married, making a living, accessing healthcare, childbearing, and, in the case of HIV/AIDS, getting tested and reducing risky sexual behaviors [36]. Researchers have analyzed this "attainment of power" in HIV research extensively around the world. However, these ultimate resources and achievements resulting from the attainment of power arguably need to be kept conceptually distinct from the enabling factors, such as changes in underlying gender ideologies, that support the achievement of, for instance, reduced risky sexual behaviors [29]. As the definition of women's empowerment has evolved, research in empowerment and HIV has also advanced to address the complexities of heterosexual relationships and the environments that shape them.

Empowerment and HIV Research

Research on gender and empowerment in the context of HIV has experienced several waves, as discussed below. Arguably, the first wave of studies focused on how relationship violence (perpetrated by men) and the lack of sexual empowerment within relationships heightens HIV risk in women; however, others criticized such female-centered approaches (female condoms and anti-violence campaigns) for largely depicting "women as victims" and "males as perpetrators" [15]. Moreover, these approaches were less effective in curbing the spread of HIV since they relied on women as agents of change even while recognizing constraints in their ability to implement these approaches.

The literature found consensus on the empirical finding that young women who experienced intimate partner violence were at an increased risk for HIV infection [15]. However, a review of interventions that address gender-based violence (GBV) found that women-centered and "male-perpetrator" programs in Asian and SSA countries showed

insufficient evidence of reducing violence against women and girls [40]. In addition, a largely coordinated intervention that engaged men and women – the "Stepping Stones" program in South Africa – led to a reduction of GBV but did not reduce HIV infection in women [41].

Efforts to scale up use of female-controlled methods, including the female condom and pre-exposure prophylaxis (PrEP) (antiretroviral medication in pill form and vaginal microbicides), have seen disappointing results [15, 42]. The research found women themselves had challenges accepting the female condom due to accessibility, aesthetics, and insertion problems, as well as partner objections, among other concerns [43]. Furthermore, female study participants in a multi-country PrEP trial who did not adhere to the pill regimen had issues with side effects, peer pressure (sexual partners, other participants, and family), and low risk perception of HIV acquisition [44]. This issue raised concerns that women might engage in riskier sexual behaviors due to a reduced perception of risk with the use of PrEP [15]. A recent review of microbicide trials reported a lack of evidence to recommend the use of vaginal microbicides for the prevention of HIV transmission in randomized trials across Africa, Asia, and North America [42].

The second wave of literature shifted from a "male perpetrator, female victim" discourse to an examination of how structural factors contribute to individual behavior, gender imbalances, and HIV risk [15, 20, 45]. At various levels of society, structural factors such as social marginalization of groups, cultural attitudes (acceptance of infidelity and GBV), economic development leading to migration, policies, and changes in the living conditions have been found to be directly or indirectly associated with HIV risk [16]. However, the relationship between structural factors and HIV risk has been found to be complex and can change as the epidemic evolves [16]. For example, researchers challenge the notion that "poverty drives HIV" and

instead pinpoint different circumstances that lead to risky sex practices across socioeconomic levels (e.g., living in poverty can lead to survival sex for goods, while wealthier individuals are driven to display masculinity and socio-economic status through accessing larger sexual networks) [24]. Research has also increasingly acknowledged that African women may not perceive themselves as economic or social victims in comparison to their male counterparts and may be exerting a form of agency even as they put themselves at risk for HIV. For instance, studies in Southern Africa found that urban women engaged in concurrent partnerships, intergenerational relationships, and transactional sex (sex exchanged for gifts, money, or consumer goods) to attain a sense of economic and social empowerment [15]. As a consequence of this shift in thinking towards the more structural dynamics of HIV risk, researchers and policy-makers have developed interventions at various levels of society. Examples of structural interventions include policy-legal enforcements (decriminalization of HIV transmission modes; reforming the medico-legal system to address rape and HIV risk), environmental enablers (access to HIV prevention services), shifting harmful social norms (reducing stigma), promoting advocacy, community mobilization, and economic programs [24].

Among these, microfinance programs for women have emerged as the most popular structural approach to HIV prevention. Researchers have identified women's economic dependence on men as an underlying structural HIV risk factor for women [46]. Thus, studies have advanced microfinance programs to empower women economically and enable them to have control over their incomes [16, 47]. Microfinance and economic collaboratives are designed to provide the "distribution of small loans, small savings, and provision of financial products for people with economic vulnerability" [48] and facilitate economic independence [27, 46]. Additionally, microfinance interventions incorporate empowerment concepts to train young

women in financial literacy, HIV, and gender relationship skills [49]. In eastern and southern Africa, the use of microfinance and gender equity programs in HIV prevention had mixed results in reducing sexually transmitted infections (STIs) and sexual behavior changes [50, 51] and proved challenging to implement with younger women [52]. Two comprehensive reviews of microfinance and gender equality programs for HIV prevention recommended the inclusion of gendered perspectives and comparative studies with men and boys for future success [46, 47].

A related shift in focus in HIV and women's empowerment research, therefore, moved towards programs focused on increasing male involvement in national program initiatives, interventions, and clinical trials [15]. The current research discusses the notion that men are not disengaged perpetrators but instead are active agents in HIV prevention [14, 15]. Researchers attempt to advance the well-being of both sexes, dispel notions of women solely as victims and their male partners as culprits, and reduce distortions in understanding African gender dynamics in the HIV epidemic [15]. This approach acknowledges that men are also vulnerable to HIV via idealized social norms related to masculinity (e.g., toughness, dominance, early sexual debut, sexual violence, competition for women and material possessions, etc.) [53-55] and structural forces (e.g., class, ethnicity, socioeconomics) embedded in communities [14]. In fact, studies theorize that African women contribute to these norms via a concept called "acquiesced femininity," in which women accept men with sexual prowess, associate violence with love and strength, and reject men with gender-equitable views [15]. Research has highlighted the fact that official statistics do not reflect African men's risk for HIV in the epidemic. For example, HIV incidence is higher in women, but men are more likely to die from AIDS due to less use of healthcare services, later initiation of treatment, and shorter duration of antiretroviral treatment [56]. Additionally, men may perceive HIV as a "poor person's disease," or programs may

misclassify a “wealthy man” as a stereotypical “5-C sugar daddy” (cars, cash, clothes, cell phone, and crib) who entices women with financial or material goods [1, 56, 57]. In reality, a rural community may define a “wealthy man” more basically as someone who owns a home and property [56].

Attention has also shifted to couples-based interventions that do not necessarily assume an adversarial relationship between partners. As research has found that a husband or male partner’s HIV status is a strong predictor of a woman’s HIV status [58, 59], researchers have begun implementing interventions for couples and men in SSA. These initiatives mix behavioral and clinical methods for HIV prevention: reducing serodiscordance (one partner is living with HIV) through couples-based education and skills building, reducing risky behaviors, encouraging couples’ HIV testing and counseling, “Treatment as Prevention (TASP),” and a scale-up of male circumcision programs [17]. These couple-based counseling and testing studies, compared to individual studies (primarily in Africa and Asia), have yielded promising results such as increased condom use, increased HIV knowledge, increased disclosure, and a willingness to get tested [17]. Nevertheless, in other cases, overall levels of HIV risk perception, consistent condom use, testing, and receipt of HIV testing results remain low across the continent even though eastern and southern Africans had a higher knowledge of where to test for HIV compared to western Africans [60]. Moreover, a risk reduction and HIV testing trial for couples in Malawi found that seroconversion rates, perceptions of seroconversion, and false beliefs about HIV did not differ between testing and control groups [61].

Recently, HIV research has shifted more fully towards TASP initiatives that use antiretroviral treatment to decrease HIV transmission and strategies with couples, such as PrEP, post-exposure prophylaxis, vaginal microbicides, and “test and treat” (link a person to care who

is newly diagnosed) [62]. Critics assert that medical strategies move away from the more socially transformative interventions of the past towards a more technocratic, biomedical, "pills into bodies" approach that fails to address the structural drivers of HIV previously discussed [63]. Successful implementation of TASP has its challenges, as it requires men and women to willingly test for HIV, adhere to medication regimens, and navigate a host of community norms that may influence HIV risk [18, 62]. Moreover, due to financial constraints, national governments may prioritize TASP for those living with HIV/AIDS but not behavioral prevention interventions for those not already infected; thus, it is unclear as to whether this effort alone will reduce the surge of new infections driven by social norms of behavior [18]. Finally, adult male circumcision (MC) (removal of the foreskin on the penis) as a male-controlled intervention has demonstrated progress in lowering HIV transmission in many African countries [64-66]. Nevertheless, MC studies including demographic surveys have reported mixed results in HIV and STIs risk [67, 68], variable levels of condom use, and inconsistent MC procedures across SSA (e.g., incomplete removal of the foreskin) [69].

As TASP emphasizes the biomedical aspects of HIV prevention in couples, unique aspects of gender dynamics and risky behaviors such as male perspectives on communication, relationship quality, economics, and partner violence may go unnoticed. Previous critiques of structural interventions for HIV have alluded to the need for the inclusion of gendered perspectives [46, 47]. Thus, social and behavioral research can go further to assess men's involvement in empowerment and provide insight into mechanisms that influence gender inequality, risky behaviors, and HIV in an African context. The next section provides examples of how gender dynamics between men and women are associated with sexual behaviors.

In Rwanda, a study of couples' communication specific to STIs found associations with condom use [70]. In Kenya, couples with higher education and female decision-making were more likely to communicate about HIV prevention [71]. In Southern Africa, studies found associations between couples with positive gender dynamics (shared power, female empowerment, positive relationship quality, self-efficacy) and better communication [72], a higher likelihood of consistent condom use [73], and fewer sexual partners [74]. Conversely, men's control of economic resources in SSA correlated with multiple sexual partnerships, indicating their freedom from controls on sexual behavior in society [75]. Finally, higher levels of gender imbalance and norms in couples had strong associations with unprotected sex, intergenerational sex, multiple/concurrent partners, perpetration of rape by men, and even HIV prevalence [12, 76, 77]. In conclusion, adding men's voices to the conversation of empowerment and HIV is critical for research and policy to provide the full range of information needed to identify and transform gender norms.

Though current HIV prevention interventions have seen some success, mixed results may stem from a failure or inability of interventions to comprehensively address the underlying gender dynamics in heterosexual couples at various levels of empowerment (interpersonal, sexual, and societal). The TGP can synthesize the diverse threads of literature that highlight how gender and power combine to increase HIV risk in women and men. The TGP recognizes that empowerment in a heterosexual context is a multi-dimensional construct involving structural divisions between men and women [26]. Furthermore, the TGP involves constructs that correspond to all approaches in empowerment research and HIV: the sexual division of power (domestic violence), the sexual division of labor (control of financial resources), and social contexts (broader structural conditions acting on both men and women) [26, 27].

The Theory of Gender and Power (TGP)

The Theory of Gender and Power (TGP), developed by Robert Connell, proposes that specific structures characterize gendered relationships and roles: labor, power, and cathexis or social norms [26]. Previous research has identified the sexual divisions of labor and the sexual division of power as two fundamental structures that illustrate gender dynamics [27]. TGP structures overlap, do not necessarily originate from each other, explain gender roles assumed by both sexes, and exist at societal and institutional levels [26]. Research applying the TGP has found that women in heterosexual relationships often have less power than men due to gendered roles and norms operating at these different conceptual levels [78]. In the end, these structures and other mechanisms result in gender inequities for women in earning a living, controlling resources, and living up to expectations of female roles in society [26].

Wingood and DiClemente adapted the TGP using constructs for a public health model (the sexual division of labor, the sexual division of power, and cathexis or social norms and affective attachments) to develop a framework that could comprehensively address women's vulnerability to HIV [27]. Through this framework, they outlined concretely how gender inequalities grounded in the sexual division of labor, the sexual division of power, and cathexis create factors that, in turn, influence women's disease risk [27]. Wingood and DiClemente outline the relationship between each of the TGP components and its associated health risks (i.e., outcomes (increased likelihood of disease), exposures (influencers of disease risk in groups), and biological factors (female anatomy)) that impact women's health (Figure 2.1) [27]. Risk factors and exposures can be socioeconomic, behavioral, or personal and operate at individual and interpersonal levels; accordingly, biological factors function at the individual level [27]. The

following paragraphs describe each TGP structure and examples of corresponding exposures/risk factors from Figure 2.1 with research from around the world.

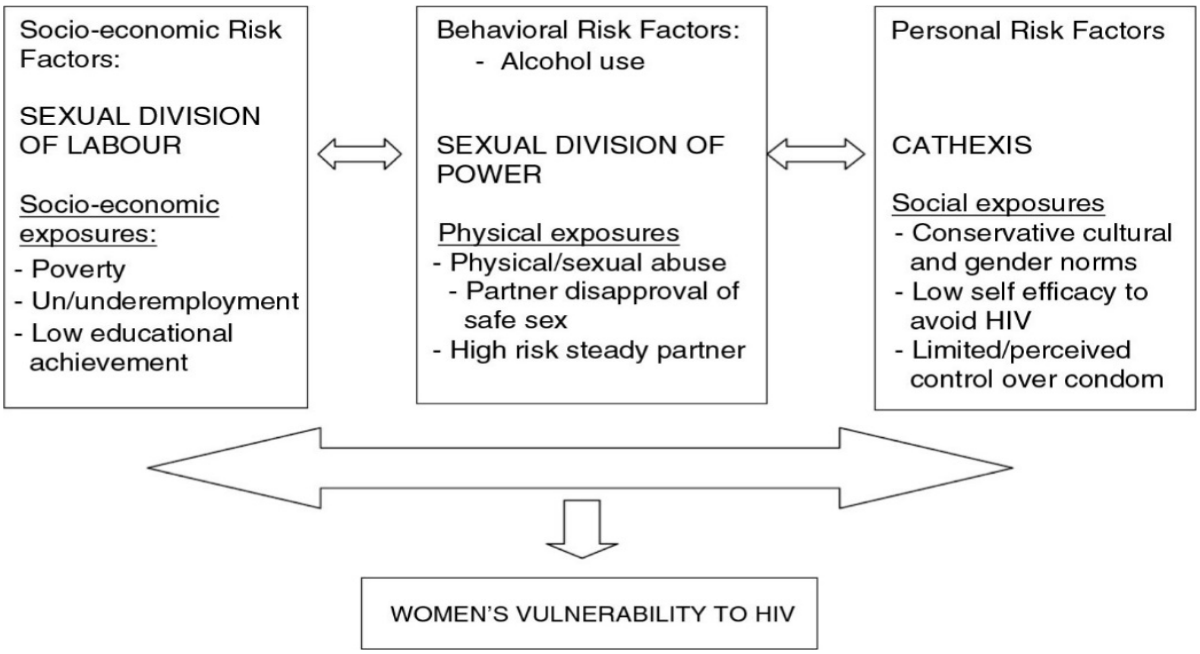

Figure 2.1 Theory of Gender and Power: Exposures, Risk Factors, and Biomedical Properties.

Source: Adapted from Connell, 1987: *Gender and Power*; Wingood and DiClemente, 2000: *Application of the theory of gender and power to examine HIV-related exposures, risk factors, and effective interventions for women.*

Sexual Division of Labor

The sexual division of labor is the first of the two fundamental structures of the TGP. At the societal level, men and women are assigned gendered roles in which women receive different and unequal positions compared to men, leading to restrictions in financial gains and career choices [27]. At the institutional level, the sexual division of labor includes mechanisms such as unpaid work for women (e.g., caring for children, the sick, and elderly), leading to an economic

imbalance in the household and reliance on men for financial stability [27]. In the segregation of "income-generating work," opportunities for educational attainment and actual pay for men are highly valued, while women's work has less value socially and even financially [27]. Thus, as economic inequalities within the sexual division of labor increase, the likelihood of adverse health outcomes among women also increases. Wingood and DiClemente suggest that women burdened by the sexual division of labor will experience adverse economic exposures and risk factors that will lead to worse health outcomes compared to women without those factors [27].

In Wingood and DiClemente's operationalization, economic exposures that influence risky sexual behavior and HIV infection in men and women include lower educational attainment, living in poverty, having a high-demand/low-control work environment, having no permanent home (i.e., being homeless) and having limited or no health insurance [27]. However, many of these constructs do not seem to capture the relational elements of the sexual division of labor that have links to HIV risk behaviors (i.e., decision-making and economic dependence on a partner (unpaid labor within the home or overrepresentation in the informal sector)) [13, 79-90]. In the context of Africa, this definition has been adapted to include low wealth status or income inequality [13, 56, 57, 59, 75, 91-96].

Sexual Division of Power

The structure of labor is interwoven tightly with the sexual division of power structure [27], the second fundamental structure of the TGP. Wingood and DiClemente define power as the ability "to act or change or having power over others" [27]. Power differentials exist at various levels. At the institutional level, social mechanisms such as abuses in authority and relationship control by men in a community may influence adverse outcomes in women (such as women in physically abusive relationships) [27]. The assumption is that as power imbalance

between men and women increases, adverse health outcomes for women increase [27]. Thus, women with more adverse exposures and behavioral risk factors face burdens from the sexual division of power more so compared to women without these factors.

At the interpersonal level, Wingood and DiClemente identify specific physical exposures as factors that exert power over women and increase vulnerability to HIV. These factors include a history of sexual or physical abuse [97], a high-risk steady partner [98], a partner who refuses safer sex practices [99], and, per the DHS, attitudes towards wife-beating [90]. Wingood and DiClemente also conceptualize the sexual division of power as encompassing a wide range of other physical exposures to HIV. Examples of physical exposures include a history of alcohol and drug abuse, a partner who disapproves of practicing safer sex, greater exposure to sexually explicit media, and limited access to HIV prevention (e.g., drug use treatment, female-controlled methods, school-based HIV prevention education) [26]. Wingood and DiClemente assert that the sexual division of power operating at the social and institutional levels limits women's sexual power and, ultimately, their sexual behavior [27]. For example, women in abusive relationships are less likely to use condoms and are more likely to experience other forms of abuse (verbal, emotional, and threats) [100] and fear of their partner's anger during condom negotiation [101]. Some of these factors are less relevant to the African context or better capture the outcomes of power dynamics (e.g., low sexual negotiation capability) rather than the causes of power differentials in relationships. For example, an African woman's reduced agency to negotiate safer sex (poor assertive communication skills; poor condom-use skills; lower self-efficacy to avoid HIV; limited perceived control over condom) could originate from existing divisions in power, leading to increased HIV risk.

Lower educational attainment in women contributes to the sexual division of labor [27], and differences in educational attainment at the interpersonal level may manifest in sexual divisions in power as well. For example, women may experience limitations in understanding of HIV concepts, restrictions in accessing HIV prevention programs, or an inability to engage in safer sex [102, 103]. Moreover, lower levels of education in a woman vis-à-vis her partner generate a power differential not only through control of family finances but also regarding who has decision-making authority and status within the relationship. In developing countries, imbalances in educational attainment in couples are measured by the DHS as indicators for women's empowerment and, ultimately, as a division of power in relationships [90]. Research in international development has shown that women with higher educational attainment are more open to equitable gender norms, are more likely to reject violence, and are more likely to acquire more knowledge of safer sex practices [13]. Additionally, associations of educational attainment and spousal education differences with HIV risk have been well documented [13, 27, 82, 83, 87-90, 104-114].

Age differentials in relationships may also translate into power differentials in relationships among American and, especially, African couples [4, 27]. This risk factor also corresponds to two other TGP structures. For example, per cathexis, imbalances of power may exist via stereotypes of what types of sexual relationships by age (older men and younger women) are more attractive at a societal level [115]. Research has demonstrated that younger women are less likely to use condoms [103, 116] and, compared to older women, possibly have less control over sexual relationships [117]. Spousal age differences, age-disparate partnerships (relationships between men and women who are five or more years apart) and early sexual debut

are measures of gendered power and HIV/STI risk in heterosexual relationships around the world [13, 27, 77, 88, 93, 103, 105, 106, 116, 118-133].

At an interpersonal level, age and educational asymmetries may ultimately influence the sexual division of power through imbalances in decision-making authority within relationships where men are assumed to have more authority. In an African context, women's decision-making capabilities capture a woman's degree of control over her environment (household items, control over earnings, etc.) [13, 90] and have associations with HIV prevention (safer sex negotiation and HIV testing) [134]. At an institutional level, factors from policy such as the customary law regulating women's inheritance rights and rights regarding marriage and divorce have also been discussed [135-138] and may correspond to sexual divisions of power and even cathexis.

Cathexis

Finally, broader social norms around gender shape gender dynamics and form the third TGP construct [27]. Cathexis is a contemporary structure of the TGP in which social norms shape sexual behavior, perceptions, experiences, and even moral codes (impurity and immorality) [27]. At the institutional level (policies, relationships, family, church), social mechanisms preserve social norms such as personal biases that lead to social constraints, inequalities, and additional vulnerabilities to HIV [27]. For example, conflicting messages may exist across institutions (e.g., churches restrict safer sex discussions while schools implement sexual health curricula) that can impact safer sex practices and, ultimately, STI and HIV risk [20]. Personal risk factors refer to limited knowledge, negative beliefs about safer sex, perceived invulnerability to HIV, and mental health issues [27]. Social exposures may include

intergenerational relationships and conservative cultures/gender norms in American and African cultures (e.g., it is taboo to discuss condoms or for females to have multiple partners) [27, 136].

In SSA, a woman's place of residence as a social norm may impact her daily life and serve to reinforce her acceptance of traditional gender roles in society [13]. Women's empowerment may be reduced if they live in a rural setting where harmful traditional practices (early child marriages, bride price and less freedom to divorce, wife cleansing, wife inheritance, polygamy, female circumcision, and pre-marital initiation ceremonies) are perpetuated by existing laws, with links to HIV risk [135-138]. On the other hand, women in urban settings could face power differentials as their partners explore other sexual relationships due to an increase in economic and social resources and the cultural acceptance of multiple partners in metropolitan cities [24, 53, 54, 136, 139]. The literature has reported mixed results for associations between where someone lives and HIV risk (e.g., rural persons having lower HIV prevalence than in urban slums or a transition of the epidemic into rural settings) [13, 140-144]. Accordingly, in the DHS, polygamy is included separately from place of residence and is one of the few traditional practices collected consistently from recent surveys in eastern and southern Africa [90, 145-148]. The HIV risk for a woman in a polygamous union (a man having multiple wives) differs by country and the type of wife she is (junior versus senior) [126, 149-151].

HIV Risk Behaviors and Self-Efficacy as Outcomes

Intertwined with the sexual division of power and cathexis are physical exposures (high-risk steady partner), biological properties, and behavioral risk factors (lack of perceived control or self-efficacy to negotiate safer sex) that increase a woman's risk for acquiring HIV at a proximal level [27]. Women's sexual behaviors depend on their relationship with their partners. For example, American women in steady relationships were less likely to use condoms compared

to those with casual or secondary partners [99]. Furthermore, these women were at increased risk for HIV if the partner did not use condoms, did not disclose other sexual partnerships (with men or women), or had an STI [27, 152]. As a biological property, women as the receptive partner of heterosexual intercourse are biologically vulnerable to STIs and HIV, as they have a higher chance of acquisition from men with multiple female and male sexual partners [27, 152, 153]. In addition, DHS reports and other population-based studies have stated that men in SSA typically reported more multiple sexual partnerships than women in coupled relationships [154-156]. In Africa, STIs such as herpes simplex virus, bacterial vaginosis, trichomonas vaginalis, and vaginal yeast increase the likelihood of HIV-1 transmission in men and women [10, 157-160]. If a couple's sexual behaviors intertwine, a history of an STI by either partner may alter future behavior. Thus, DHS includes an extensive HIV/AIDS module that assesses male and female perceptions of self-efficacy given these infections and asks whether a woman can refuse sex or ask a partner to wear a condom given an STI [90].

Bandura defines self-efficacy as "the confidence one has in his or her ability to effect change in a specific practice" [161]. Women with higher self-efficacy may have the confidence to communicate and engage in safer sex behaviors, considering challenges with interpersonal relationships (e.g., partners that are older, abusive, or long-term) [27]. Studies in the United States reported that women with low self-efficacy in condom use, low self-efficacy to avoid HIV [162], and limited perceived control over relationships [99] were more likely to engage in sexual risk taking [27]. Within the DHS, population researchers examine condom negotiation and sex refusal in many ways to assess empowerment in relationships and predictors of HIV/STI risk [13, 90]. A DHS study from Cambodia demonstrated that an empowered woman (fully involved in health care decision-making) was more likely to refuse sex but less likely to request her

partner wear a condom [163]. Thus, researchers hypothesized that participation in decision-making, as a function of autonomy, was associated with trust and risk compensation [163]. Furthermore, women with self-efficacy (to refuse sex if their partners have an STI) had increased odds for HIV testing in Tanzania [134].

In conclusion, the TGP asserts that underlying social structures (sexual divisions and cathexis) lead to gender inequities for women and, ultimately, impact health. Furthermore, physical exposures, biological properties, and behavioral risk factors work in concert with social structures to influence health. Existing literature has used constructs of the TGP and in combination with other frameworks to assess relationship dynamics, risk factors and exposures, and HIV risk in various settings. The next sections of this review illustrate how research operationalizes TGP constructs from the United States and SSA and describe comparative theories and approaches to HIV prevention.

The TGP in Research

As an ecological theory, the TGP has been applied in research to conceptualize HIV risk, measure the disparate factors/exposures that shape gender dynamics across multiple levels (sexual divisions and social norms), and to inform future prevention initiatives in many settings [27, 164]. TGP views gender-based inequalities as ubiquitous and aims to explain the disproportionate power of men in society, their control in safer sex negotiation, and, ultimately, the negative effects of these norms on the health of men and women [27, 165]. To date**,** TGP's use in HIV research has focused primarily on the United States [27, 78, 118, 165-171], but it is also increasingly applied to contexts in Africa [172, 173].

TGP Research in the United States

Constructs from the TGP and other theories have primarily been used in interviews and focus groups, conducted with Hispanic American, African American, and Asian American women, focused on understanding unsafe sexual risk behaviors and HIV risk. Researchers have used overlapping exposures and risk factors but have rarely mapped them to TGP structures (sexual divisions and cathexis) to assess which social, cultural and individual factors influence risk-taking and protective practices (safer sex practices, condom use, etc.) [27, 78, 118, 165-171]. One study guided by the TGP assessed an association between education level (the sexual division of labor) (survey) and STI/HIV vulnerability (laboratory-confirmed) in young women aged 18-29 [171]. In this analysis, age and public assistance (the sexual division of labor) were control variables, and mediators included condom use, asking for an STI test, relationship control (the sexual division of power), STI knowledge, and having an older male sex partner (cathexis) [171]. Only this study among all others mentioned above had sufficient power to detect associations between increased educational attainment (the sexual division of labor) and reduced STI/HIV vulnerability due to the large sample size of young women [171].

Overall, most studies with TGP have not clarified how constructs, exposures, and risk factors explain gender dynamics and outcomes of interest. Moreover, most studies omitted information regarding marital status and lacked sufficient statistical power due to small sample sizes. Given that the TGP was tested primarily in African American women, more research is needed to determine if TGP concepts apply to HIV research with other minorities in the United States. Moreover, as the HIV epidemic in SSA is primarily heterosexual with high gender inequality [3, 174], more empowerment research with the TGP is needed in SSA.

TGP Research in SSA

Few studies have explicitly incorporated the TGP as a framework in gender dynamics and HIV research in SSA. One qualitative case study in Tanzania used thematic analysis to examine associations between gender imbalance and sexual violence along with HIV risk in married women [173]. Focus group discussions included questions mapped from all TGP constructs: factors that influenced sexual violence in marriage, probes regarding the role of disparities in ownership of resources and sexual relationships, and societal expectations regarding women's sexual behavior leading to HIV risk [173]. Researchers noted that the adaptation of the TGP by Wingood and DiClemente [27] for thematic analysis was useful in studying gender imbalances and HIV risk in married African women [173]. In Malawi, young women along with their male partners participated in a longitudinal study of how relationship power (TGP constructs) shaped decisions to test for HIV [172]. The framework assumed that socioeconomic inequalities (the sexual division of labor), relationship dominance and violence (the sexual division of power), and relationship disunity via infidelity (social norms/cathexis) were barriers to HIV testing [172]. That study also found that a couple's perceived HIV risk to self and partner could impact the likelihood of testing [172]. Consequently, the role of socioeconomic inequalities (age, education, and employment), male dominance with relationship violence, and perceptions of risk with HIV testing varied among participants [172].

This dissertation's review of the literature on the use and adaptation of the TGP to HIV research demonstrates that, to date, the TGP framework has been applied to the study of heterosexual HIV research, primarily in the United States. Only recently have attempts been made to adapt the framework to an African, or even non-Western, less-developed country context. Most American studies do not connect exposures and risk factors to major TGP

constructs, which leads to challenges in applying the framework in future research. The literature is also limited to qualitative analysis with small sample sizes and younger women regardless of marital status. Nevertheless, the adaptation of Wingood and DiClemente for public health provides researchers the flexibility needed to apply TGP constructs to HIV interventions.

Comparative Theories and Approaches to HIV Prevention in Relationships

Although gender dynamics are at the core of couples-based interventions, to date, most couples-based interventions are likely to omit an explicit gender theory. Rather, a systematic review of couples-based HIV intervention and prevention studies indicated that several theories and frameworks, particularly from cognitive and social psychology, have guided intervention study designs in Asia, Africa, and the United States [17]. The most popular frameworks besides the TGP for biobehavioral research were the social cognitive theory, the theory of reasoned action, the HIV/AIDS risk reduction model, and theories in ecological systems [17]. The core components of the interventions included knowledge, skill-building regarding HIV, STIs, condom use, negotiations, problem-solving, and discussing power imbalances in relationships [17].

Social Cognitive Theory (SCT) suggests that the interplay between personal, behavioral, and environmental factors (reciprocal determinism) impacts human behavior [175]. The SCT further emphasizes how one's self-efficacy impacts behavior change [164]. However, researchers argue for a framework that analyzes a deeper understanding of how factors affect self-efficacy (such as in negotiating safer sex), work together, and ultimately shape behavior [164]. The theory of reasoned action (TRA) emphasizes behavioral intention as the main determinant of human behavior [176]. Moreover, a person's attitude or behavioral and normative beliefs (perceived acceptance or disapproval of behavior by peers) influence

intentions [176, 177]. Some researchers claim that TRA, along with other theories (such as the health belief model and stage theories of change), does not fully illustrate how people move from expectations, values, and intentions to long-term actions [164]. The HIV/AIDS risk-reduction model (ARRM) is a three-stage framework that describes a person's motivation to change sexual behaviors in the context of HIV transmission [178]. ARRM further assumes that social and psychological factors (e.g., risk knowledge, risk perception, self-efficacy, emotional states, and social support) drive how high-risk behaviors are (1) labeled, (2) changed through commitment, and (3) reduced through problem solving [178]. Overall, the ARRM and previous theories mentioned include approaches for individual behavior change within relationships but may not account for which factors drive inequalities or how they operate at structural levels.

Ecological approaches focus on systems of people and broader environments to impact policy and social determinants of health [164]. These frameworks (ecological systems theory, social exchange theory, and gender attitudes-sexual-power-risk model) are used in combination with the TGP or use its components [165, 170, 179, 180]. Bronfenbrenner's ecological systems theory assumes that parts of a system (individual, couple, family, and community) influence a person's actions (e.g., control in sexual behavior) [181, 182]. Typically, the unit of analysis in HIV research is the individual versus a couple or community [170, 183, 184]. However, critics have suggested that few researchers in human development and family science use the mature version of the theory (the relationship between four concepts: "process-person-context-time") due to challenges with direct translation into research [185]. Social exchange theory addresses interpersonal relationship control and decision-making dominance [186, 187]. Between two actors, greater power exists in the member who dominates all actions, resources, and alternative options in the relationship (e.g., outside sexual partners) [165]. Couples research with social

exchange theory is limited to HIV counseling and testing or focus group assessments of sexual behavior and may not include other structural factors that shape dominance and control [179, 188]. The Gender Attitudes-Sexual Power-Risk (GAPR) Risk Model uses components from TGP and social exchange theory to predict risk behaviors from attitudes and sexual relationship power scales [180]. GAPR assumes that if traditional male roles support negative views against women, sexual relationship power will mediate the relationship between gender attitudes and HIV risk behavior [180]. One study noted that although South African men who had negative attitudes towards women were more likely to engage in HIV risk behaviors, sexual relationship power did not mediate gender attitudes and HIV risk behavior associations [180]. The author of that study noted from focus groups that an underlying structural change (the shift of economic opportunity from men to women) threatened masculine ideology and perceptions of control in relationships [180]. In summary, empowerment and HIV research should use a theoretical framework that is grounded in gender theory and conceptualizes HIV risk using attitudes, values, and intentions to action. Studies must also assess empowerment as a multidimensional construct and measure factors (structural divisions, exposures, and risk factors) that drive gender inequality in couples and transform gender roles and norms that influence behavior.

Gaps in the Literature

In addressing empowerment, HIV risk behaviors, and HIV vulnerability, a comprehensive approach is needed, especially in countries with high HIV prevalence. Current HIV interventions around the world emphasize biomedical, behavioral, and structural approaches, either alone or together. However, they may not address underlying gender dynamics and norms in a multidimensional format, namely, what shapes relationships and HIV risk at various levels (sexual divisions and cathexis). Thus, the TGP alone or in combination

with other frameworks is utilized in research to illustrate these complexities. Existing TGP research literature rarely specifies how key exposures and risk factors work together in each construct. Moreover, published studies have been located primarily in the United States, with a focus on younger single women and a lack of generalizable results for populations of interest. Only one study in a country with high HIV prevalence (Malawi) assessed TGP constructs in couples, but it reported mixed results for the role of those constructs with HIV testing. Currently, in the US, the primary mode of HIV transmission among adults and adolescents is among men who have sex with men [175] versus heterosexual contact in SSA [3, 4]. Thus, research with full implementation of the TGP must provide representative results and fit the appropriate epidemic. Furthermore, other theoretical approaches used in couple-level interventions are rarely grounded in gender theory, instead emphasizing individual behavior change within a relationship, and they rarely consider the mechanisms by which specific factors drive gender inequalities leading to HIV acquisition.

This dissertation proposes the use of Connell's adapted TGP as a framework for contextualizing heterosexual HIV risk in SSA to address the gaps in the literature. The research will examine how TGP constructs (the sexual division of labor, the sexual division of power, and social norms/cathexis) shape gender inequalities (empowerment) between men and women and influence HIV risk behaviors (multiple sexual partnerships and self-efficacy in safer sex negotiation and sex refusal), which ultimately impact disease risk. The proposed measure of the TGP constructs is similar to the Malawi study. However, this research assigns empowerment attitudes and experiences (measured by the sexual divisions of labor and power) as predictors and the HIV risk behaviors as outcomes. Finally, two separate studies will analyze married/cohabitating couples data from DHS countries with high HIV prevalence to provide

nationally representative results in an African context: Malawi, Namibia, Zambia, and Zimbabwe. These countries have geographic proximity to one another, high HIV prevalence (10% or higher) (refer to Figure 1.1 and 2.2), and the recent completion of the standard DHS with available empowerment data across countries (2010-2014).

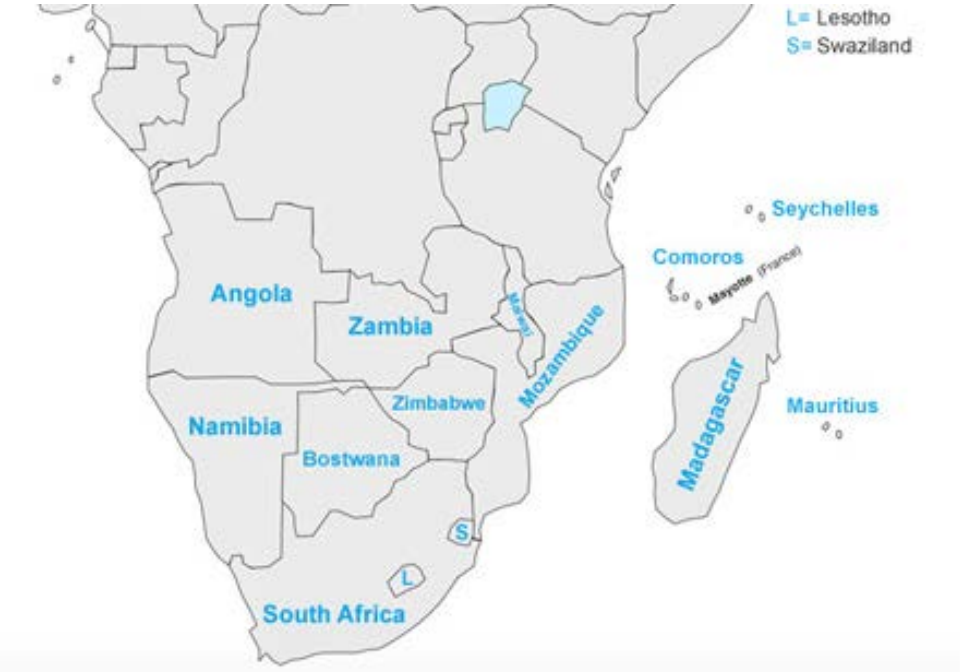

Figure 2.2 Map of Eastern and Southern Africa.

Gender Equality Indicators by Country

The Theory of Gender and Power stipulates that gender inequality and power relations are reproduced at various levels, including social and institutional levels. As the ultimate institutions responsible for the health of their citizens, national governments are responsible for adopting policies that can either serve to exacerbate unequal gender power relations or to advance women's position and promote gender equality. National governments adopt legal and policy frameworks and respect, protect and promote sexual and reproductive health rights aimed at

eliminating gender-based violence, encouraging the uptake of HIV treatment, care, and support among others [45]. Moreover, government action on these fronts has the potential to influence all components of the TGP. Accordingly, countries at the subnational and local level may enforce laws regulating women's status [189], such as those addressing violence against women, access to contraception, and harmful traditional practices such as child marriage and female circumcision.

Critics argue that policymakers in eastern and southern Africa have not included women and girls in national strategic plans to address these issues [15, 45]. Thus, it is important to examine how each country of interest performs with respect to current gender equality indicators (economy, education, population health, etc.), to evaluate how policy shapes gender norms at various levels, and to provide context for examining countries separately for the current research. Table 2.1 illustrates measures of population, gender equality, development, and health indicators, followed by HIV prevalence and policy compliance data [190-194]. Malawi is the only country in this group in which more women than men participate in the labor force. Moreover, these nations have much higher labor force ratios compared to the rest of the world (0.66) [190]. Namibia and Zimbabwe had the largest female share of parliament members and had almost double the world average in 2015 (20%) [190]. Namibia has the smallest gender gap among all African countries and ranks in the top 15 countries for the overall global measure [191]. Furthermore, Namibia is one of the few African countries with high performance in human development (gender development and low inequality) (ranked 125th in the world for "medium development," behind South Africa) and is ahead of many other African countries like Zambia (139th) [194].

The DHS defines the age at first marriage as the age at which the respondent begins living with his/her partner [195]. Zambia's report stated that because the median age at first sex was lower than the age of first marriage, women were possibly having sex one year before marriage [147]. Finally, the Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW) assesses whether countries are compliant with effective enforcement and prioritizing women in national governments at a policy level [189]. Unfortunately, in 2010 the United Nations reported that only 22 member states out of 192 had adopted national action plans to address women's issues [189]. In Africa, only Namibia (besides Libya) was compliant with CEDAW laws, but had spotty enforcement and variable interest by the government in challenging cultural norms [189]. In conclusion, although Namibia performs well in many gender equality indicators, work must continue to curb the spread of HIV there and in neighboring countries.

Table 2.1 Countries of Interest by Socioeconomic, Gender Equality, and Health Indicators

	Malawi	Namibia	Zambia	Zimbabwe
Population (millions)	17.2	2.5	15.5	17.4
World Bank Classification	Low-income	Middle-income	Low-middle	Low-income
Labor Force Ratio[a]	1.04	0.86	0.85	0.93
% Women in Parliament	17.0	38.0	13.0	35.0
Africa Gender Equality Index[b]	72.8	73.3	58.3	69.1
Global Gender Gap Index[c]	0.672	0.777	*	0.717
Gender Development Index[d]	0.921	0.986	0.924	0.927
Gender Inequality Index[e]	0.614	0.474	0.526	0.540
DHS-Median age of woman at first marriage in years	17.9	**	18.4	19.7
DHS-Median age of woman at first sex in years	17.3	19.0	17.3	18.9
DHS-% HIV Serodiscordance in couples[f]	9.0	13.5	11.0	11.0
CEDAW Compliance[g]	No	Yes, somewhat	No	No

*Data was unavailable.

**The DHS stated that the median age at first marriage could not be calculated since less than 50 percent of women and men began living with partners for the first time before reaching the beginning of the age group.

[a]The World Bank's labor force ratio refers to the ratio of the female participation rate divided by the male participation rate. The closer the number to one, the higher the female participation

[b]The Africa Gender Equality Index consists of three main components: (1) equality in economic opportunities, (2) equality in human development (education and reproductive health services), and (3) equality in law and institutions. The higher the index, the higher the gender equality.

[c]The Global Gender Gap Index includes female-to-male ratios to assess gaps in economic participation and opportunity, educational attainment, health and survival, and political empowerment. The higher the score, the smaller the gender gap.

[d]The Gender Development Index measures the ratio of female-to-male human development indicators in healthy living, knowledge (expected years of schooling), and a decent standard of living (income per capita). The higher the score, the better the development in the country.

[e]The Gender Inequality Index measures inequality in achievements of reproductive health, empowerment (proportion of women in parliament and attainment of some secondary education), and participation in the labor force between women and men. The higher the score, the higher the gender inequality.

[f]HIV serodiscordance refers to the percentage of couples where one person is HIV-positive and the other is HIV-negative.

[g]CEDAW assesses whether countries are compliant with effective enforcement and prioritizing women in national governments (e.g., laws addressing discrimination, stereotyping, political life and representation, economic and social rights, women's right to equality in marriage and family life, and equality before the law).

Public Health Significance

Per the literature, much of the HIV/AIDS burden in eastern and southern Africa persists in adults; however, new HIV infections are occurring faster in young adults and adolescents, and particularly women. Furthermore, gender inequalities gaps remain in other sectors as well (economy, education, general health, and female representation in politics), which correspond to aspects of the TGP. First, the results of this research add to the body of knowledge regarding which TGP constructs contribute to sexual risk behaviors in SSA. Ultimately, this research can identify drivers of empowerment to inform current couple-level interventions and ongoing research in the African diaspora [17]. For example, Project Eban (the word "fence" in the Yoruba language) is an HIV/STI intervention for African American couples that utilizes an ecological framework (SCT and the Afrocentric Paradigm-cultural factors) to address factors (individual, interpersonal, and community) that influence risk behaviors [196]. Similarly, the Rwanda-Zambia HIV Research Project conducts observational studies to examine heterosexual HIV transmission in serodiscordant couples [197] and provides HIV counseling and condom skills training [198]. Also, as the increasing focus is on TASP and addressing sero-discordance in couples, this research may draw attention to gender dynamics within couples and is critical in understanding how empowerment might affect efforts to scale up testing and treatment.

Second, although social epidemiological research for HIV prevention is complex, it is especially critical for young adults who are in the earliest stages of development and marital relationships. Thus, these results may support findings from the multifaceted DREAMS initiative, which stands for Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe women in SSA [199]. The emphasis of the initiative's core PEPFAR areas involves community-based capacity building; increasing educational opportunities; linking young men to counseling,

testing, and voluntary circumcision services; supporting pre-exposure prophylaxis; and building bridges to employment [199]. Third, initiatives must facilitate empowerment programs that are consistent with country-level findings from the analysis [13]. This research with DHS data can provide policymakers with nationally representative results to assist with policy choices on the ground, build upon existing population data, and improve survey methods for gender equality measures [195]. Finally, the research addresses specific UN Sustainable Development Goals: Three (sub-goal: end the AIDS epidemic by 2030), Five (address gender inequality), and Ten (reduce inequality) [18, 29].

In conclusion, the definition of women's empowerment and empowerment research in the HIV space has evolved to address the complexities of heterosexual relationships and the surrounding environments that shape them. In essence, researchers should incorporate men's attitudes and experiences to depict the full range of power dynamics in light of the HIV epidemic. Empowerment is a multidimensional construct that involves divisions of labor (financial resources), divisions of power (physical abuse), and social norms that act on both men and women. The TGP involves all of these constructs, which correspond to approaches in empowerment and HIV research. Most studies apply TGP constructs in an American versus African context and emphasize behaviors and intentions in women only rather than also at the couple level. Couple-level interventions in published literature rarely use frameworks grounded in gender theory or assess which factors drive power dynamics in couples. Thus, this research will address many gaps in the empowerment and HIV in African couples research space. Furthermore, research results may provide evidence for policymakers and researchers that addressing empowerment concepts is critical to curbing the spread of HIV in households and communities.

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CHAPTER 3

EMPOWERMENT AND HIV RISK BEHAVIORS IN COUPLES: MODELING THE THEORY OF GENDER AND POWER IN AN AFRICAN CONTEXT[1]

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Abstract

Introduction: Women and girls in eastern and southern Africa are at elevated risk of acquiring HIV due in large part to power dynamics within heterosexual relationships that contribute to HIV risk behaviors. Though studies have separately examined individual, couple-level and stuctural processes that contribute to women's HIV risk, few studies employ a comprehensive framework to examine divisions between men and women and HIV risk behaviors in couples in an African context. Thus, we examined associations between levels of women's empowerment and HIV risk behaviors.

Methods: We used dyadic couples data from Demographic and Health Surveys from countries with high HIV prevalence: Malawi, Namibia, Zambia, and Zimbabwe. We conducted cross-sectional analyses of the association between several empowerment indicators (household decision-making, female economic independence, wife-beating attitudes, age and educational differences between partners) and HIV risk behaviors in couples aged 15-64, applying the Theory of Gender and Power (TGP). The TGP illustrates power dynamics in three separate constructs (the sexual division of labor, the sexual division of power, and cathexis or social norms). We used logistic regression to assess associations between women's empowerment indicators and HIV risk behaviors (multiple sexual partners) and self-efficacy (ability to negotiate sex/sex refusal) by country.

Results: Female economic independence, household decision-making involvement, and rejecting all reasons for wife-beating were strong indicators of high levels of empowerment. Specifically, higher levels of women's empowerment in coupled relationships was associated with safer sex negotiation in Malawi (AOR=1.57, 95% CI: 1.08-2.00) and Zambia (AOR=1.60, 95% CI: 1.34-1.91) and sex refusal in Malawi (AOR=1.62, 95% CI: 1.29-2.04) and Zimbabwe (AOR=1.29,

95% CI: 1.04-1.59). However, empowerment was not associated with the likelihood of infidelity across all countries studied.

Conclusions: These findings provide evidence that high levels of women's empowerment were associated with safer sex practices, namely, safer sex negotiation and sex refusal, though this varied by country. Furthermore, key drivers of high levels of empowerment among women were household decision-making involvement, female economic independence, and rejecting all reasons for wife-beating. Policymakers should incorporate empowerment indicators to address women's empowerment and HIV prevention issues within African couples.

Keywords: Empowerment, HIV, Sexual Behavior, Couples, Sub-Saharan Africa, Theory of Gender and Power

Introduction

Of the estimated 19.4 million people living with HIV in eastern and southern Africa in 2016, 59% of them were female adults and adolescents [1]. Compared to young men, young women between 15 and 24 years old contract the disease five to seven years earlier [2, 3]. Overall, high gender inequality correlates with countries having predominantly heterosexual epidemics [4]. Women and girls in Sub-Saharan Africa (SSA) are also at elevated risk of acquiring HIV due to earlier age at sexual debut, older male partners, gender-based violence (GBV), lower access to education than young men, and the absence of essential health services [2, 5-8]. At the individual and interpersonal levels, these factors drive power dynamics in heterosexual relationships and lead to HIV risk behaviors such as multiple sexual partners and low condom use [9].

Solutions that address female disempowerment and interventions that "empower women to control their own lives, bodies, and environments" are expected to reduce HIV risk in women [10]. Public health research and programs have addressed gender inequities with female condoms, pre-exposure prophylaxis, and anti-violence campaigns, though these approaches have at times been criticized for emphasizing the "women as victims, male as perpetrator" discourse [11, 12]. Other researchers have addressed structural factors linked to gender imbalances with programs in microfinance, education, and economic collaboratives in communities [11, 13]. Further, reviewers of HIV research acknowledge the vulnerability of men to HIV due to masculine ideologies of sexual dominance [11, 12], and this acknowledgement has resulted in couples-based skills-building, couples' HIV testing and counseling, "Treatment as Prevention," and a scale-up of male circumcision programs [14]. As a multi-dimensional construct, empowerment involves structural divisions of power, structural divisions of labor, and broader

social conditions that influence men and women [15, 16]. One theory that combines gender dynamics operating at different levels is the multidimensional Theory of Gender and Power (TGP), which addresses sexual divisions in heterosexual relationships and is applicable for HIV prevention in women [15, 17].

Few studies employ a comprehensive use a framework like the Theory of Gender and Power (TGP) to examine divisions between men and women and HIV risk behaviors in couples in an African context. Current theories used with couple-level interventions emphasize individual behavior change and rarely address what risk factors and exposures lead to gender imbalances for HIV risk. Furthermore, gender dynamics research rarely collects nationally representative data from African countries with high HIV prevalence to provide context for findings.

Finally, policymakers in eastern and southern Africa rarely include women and girls in national strategic plans for gender equality and HIV/AIDS prevention [12, 18]. It is thus important to examine which women's empowerment indicators (economy, education, GBV attitudes, etc.), influence associations with sexual behaviors to provide health officials with appropriate context to address this issue. Therefore, our research assessed the association between TGP constructs for empowerment (the sexual division of labor and the sexual division of power) in married/cohabitating women and HIV risk behaviors. We hypothesized that women with higher levels of empowerment would have a lowered likelihood of infidelity in the relationship and an increased likelihood for self-efficacy (in this case, a woman's ability to ask a man to wear a condom given an STI and to refuse sex) compared to women with lower levels of empowerment.

Methods

Study Design and Population

This study was a cross-sectional analysis of couples data from the Demographic and Health Survey (DHS) with men and women aged 15-64 in Malawi, Namibia, Zambia, and Zimbabwe. These countries represented nations in which a) respondents had complete empowerment and HIV risk behavior information, b) recent data was available (2010-2014), c) the geographic location was in southern or eastern Africa, and d) HIV prevalence was 10% or higher in the sample.

The DHS is a cross-sectional, nationally representative household survey implemented in low- to middle-income countries around the world [19], with a two-stage sample of households and individuals, mainly children, women (aged 15-49), and men (aged 15-64) [20, 21]. The DHS randomly selects households at district or province levels, and individuals are picked at random within households for interviews and clinical tests [20]. Individuals for whom the primary determinant, empowerment, could not be defined and those without information on the outcome measures were excluded (Figure 3.1). Finally, we assigned higher values to categories of greater empowerment [16].

Outcomes

Multiple Sexual Partnerships

In assessing HIV risk, we measured the number of multiple sexual partnerships, not including the spouse/partner, reported by the man in the past 12 months before the survey. We calculated frequencies for man's non-marital multiple sexual partnerships and dichotomized responses as a "Yes" or "No" answer.

Ability to Ask Partner to Wear a Condom Given an STI

This survey question asked women, "Can you/a woman ask a man to wear a condom if he has an STI?" We placed "Yes" answers in a separate category from "No" answers, which included "Don't Know" responses.

Ability to Refuse Sex

The next question asked women, "Can you/a woman refuse sex?" We placed "Yes" answers in a separate category from "No" answers, which included "Don't Know" responses.

Predictor

Women's Empowerment Index

We defined women's empowerment as incorporating household decision-making, attitudes toward wife-beating, female economic dependence, age and educational differences between partners using the TGP conceptual framework in Figure 3.1, adapted from Wingood and DiClemente, and the Survey-based Women's Empowerment Index [16, 17]. We addressed our hypothesis with weighting each indicator equally, assigned responses for each survey response as high versus low levels of empowerment (using a scheme of "1" as high and "0" as low), and added all numerical components to create a final composite empowerment score by country. Finally, we used the median value of each index by country to create a dichotomous variable with "high" (scores above the median) and "low" (median score and below) categories [22].

We conceptualized the sexual division of labor as referring to women's ability to make decisions about household purchases and their economic independence from their husband. Women who rely on their husbands as the sole household breadwinner and/or have little say in household purchases may be considered to have low economic agency. The DHS asks respondents a series of questions about the type of household decisions made within their

relationship. The survey asked participants, "Who usually makes the decisions about (healthcare, major household purchases, visits to her family, and money the husband earns), you, your husband/partner, you and your husband/partner jointly, or someone else?" We coded women with high levels of empowerment if they made decisions alone or jointly with their partner [23] with a "1". If the woman responded that the husband/partner or someone else made household decisions, those responses were coded as "low levels of empowerment" or a "0" [23]. We defined female economic independence as whether the woman reported that she had worked in the past 12 months before the survey (coded as a "1") or not (coded as a "0"). This question did not ask about the type of work (formal or informal) or whether the woman had worked inside or outside of the home in the past 12 months.

We conceptualized the sexual division of power along several dimensions, including age and educational differences between men and women in a relationship and attitudes towards violence against women. The wife-beating attitude question asked participants, "Is a man justified beating or hitting his wife in the following situations?" The reasons were if she goes out without telling him, she neglects the children, she argues with him, she refuses to have sex with him, and the food is not properly cooked. We coded "No" responses as "1" for high levels of empowerment and "Yes" and "Don't Know" as "0" for low levels of empowerment, then created a variable comparing respondents who said none of the reasons are justified (empowered) versus those who said one or more reasons are justified (disempowered) [23].

We calculated age difference as the female respondent's age subtracted from the partner's reported age. Then, we created categories to reflect age ranges between partners: (1) partners are the same age or the male partner is younger, and the man is older by (2) one to four years, (3) five years, (4) six to nine years, and (5) 10 years older or more. We created a dichotomous

variable comparing scenarios where partners are the same age, the woman is older, or the partner is up to 9 years older versus the man is 10 or more years older than the woman [17, 24-27].

Finally, we calculated the difference in years of education by subtracting the female's years of education from the male's years of education (the sexual division of power). Subsequently, we created a new variable with four categories [28]: (1) male partner with lower level of education than the female partner, (2) male partner with same level of education as the female partner, (3) male partner with 1-3 years of education more than the female partner, and (4) male partner with 4 or more years of education more than the female partner. In assessing published work on sexual divisions and HIV risk by educational differences [29, 30], we compared scenarios where the man had fewer or the same number of years of education as the woman) versus the woman had fewer years of education.

Sociodemographic Variables (Confounders)

As per Figure 3.1, we adjusted for specific variables associated with HIV risk behaviors or HIV acquisition, including age of the man and woman [17, 31], educational level of both partners [17, 30, 32], household wealth [29, 33], partners' history of an STI [17, 34], place of residence [35, 36] and polygamy (cathexis) [37, 38]. Each variable had a corresponding reference group to depict high versus low levels of empowerment. We measured and categorized women's and men's ages in years according to the DHS: 15-24, 25-29, 30-34, 35-39, 40-44, 45+, and 50+ years. We separated education level for both sexes into four categories: none (reference), some primary, completed primary/some secondary, and completed/more than secondary. We used the DHS wealth index to measure household wealth in five categories, then collapsed categories into tertiles for simpler analysis: poor (reference), middle, and rich. Previous STI infection ("Yes"/" No") consisted of three questions: During the last 12 months,

have you had a disease that you got through sexual contact? Did you have genital sores or ulcers in the last 12 months? Did you have genital discharge in the last 12 months? A person had an STI if he/she responded "Yes" (reference) to all three questions; otherwise, responses were placed in the "No" category. We assumed that women in urban dwellings might experience less harmful traditional norms, and thus, we compared urban dwellers versus rural dwellers. Finally, we separated polygamous unions into two categories: "Yes" (more than one wife) as the reference group and "No" (one wife) to test the assumption that women in polygamous unions may experience lower levels of empowerment than women who are not in polygamous relationships.

Statistical Analysis

Each statistical assessment was perfomed by country. We conducted an assessment for effect modification (association difference by level of a third variable) and mediation (association depends on the presence or absence of a third variable) in the association between levels of empowerment and HIV risk behaviors by wealth tertile *a priori*. The results did not yield any relevant findings (not shown). First, we applied DHS sample weights to all analyses of couples data to account for the random sampling design and lower response rates for men [21]. Then, we described each country with descriptive statistics and univariate analyses for mean age difference and used chi-square analysis to test differences in frequencies of confounders/controls by the level of empowerment. Finally, for multivariable analyses by country, we built a logistic regression model from which odds ratios (OR) and 95% confidence intervals (CIs) were calculated to quantify the association between indicators of women's empowerment and HIV risk behaviors. We used SAS® software, version 9.4, for all analyses [39].

Ethical Considerations

National ethics boards review DHS surveys, and ICF International's institutional review board approves data collection procedures. All respondents gave informed consent for surveys and HIV testing. The study was exempt from full institutional board review by the University of Georgia because of the use of anonymized secondary data.

Results

Table 3.1 presents weighted frequencies of couples by demographics of interest for each country (N=12,670). Overall, self-reports of STIs were much higher for women than men. Zimbabwe had the highest proportion of women involved in decision-making solely or jointly (67%) but had the second-highest percentage (41%) reporting that one or more reasons justified wife-beating. In contrast, most (84%) women in Malawi were not involved in household decisions, but Malawi also had the largest share of women saying that no reasons for wife-beating were justified (88%). The mean age difference between partners was approximately five years, indicating that men were five years older, which is a marker of intergenerational relationships and a risk factor for women's HIV risk. Overall, women's responses in all countries except Zambia (52%) were in the low-level empowerment categories. However, reported monogamy by a man was high in the past 12 months (86-94%), most women said they/a woman can ask a partner to use a condom if he has an STI (83-97%), and over 70% of women said they/a woman can refuse sex.

Non-Marital Multiple Sexual Partnerships (MSP)

In Namibia, women who were involved in household decision-making (OR=0.48, 95% CI: 0.26-0.88) and women who had the same or more education than their partners (OR=0.44, 95% CI: 0.24-0.80) were less likely to experience infidelity in the relationship (Table 3.2). In

Zambia, women who were economically independent were less likely to have a spouse with multiple sexual partners compared to women who were economically dependent (OR=0.69, 95% CI: 0.56-0.85) (Table 3.2). We present findings from the multivariable model of non-marital multiple sexual partnerships among men in Figure 3.2A. High levels of empowerment in women were not associated with the likelihood of infidelity by male partners across all countries.

Self-Efficacy for Safer Sex Negotiation and Sex Refusal

Women with economic independence were more likely to negotiate safer sex with partners compared to those who were economically dependent in Malawi (OR=1.39, 95% CI: 1.05-1.83), Namibia (OR=2.44, 95% CI: 1.04-5.68), and Zimbabwe (OR=2.12, 95% CI: 1.60-2.80). Moreover, Zambian women who had sole/joint involvement versus no involvement in household decisions and rejected versus condoned wife-beating were more likely (36% and 52%) to say they/a woman could negotiate safer sex (Table 3.3). From multivariable models, high levels of empowerment in women were associated with higher odds of safer sex negotiation in Malawi (AOR=1.57, 95% CI: 1.08-2.00) and Zambia (AOR=1.60, 95% CI:1.34-1.91) (Figure 3.2B). Finally, women who had sole/joint involvement in household decisions (Zimbabwe), economic independence (Malawi and Zimbabwe) and a rejection of at least one reason for wife-beating (Namibia, Zambia, and Zimbabwe) were more likely to refuse sex (Table 3.4). Per multivariable models in Figure 3.2C, high women's empowerment was associated with an increase in the likelihood of sex refusal in Malawi (AOR=1.62, 95% CI: 1.29-2.04) and Zimbabwe (AOR=1.29, 95% CI: 1.04-1.59).

Discussion

This investigation evaluated associations between high empowerment and the prevalence of HIV-relevant sexual risk behaviors in married/cohabitating women from four countries in

Sub-Saharan Africa. This study represents a novel assessment of empowerment and HIV risk behaviors in couples using the TGP as a framework for understanding structural determinants of HIV-relevant risk behaviors in African countries. Our hypothesis was confirmed by the association between high levels of women's empowerment and increased odds for indicators of safer sex negotiation and sex refusal, though this finding was not universal.

Women's empowerment in coupled relationships was associated with safer sex negotiation in Malawi and Zambia and sex refusal in Malawi and Zimbabwe. The observations of safer sex negotiation are in line with studies in the United States of America [40, 41], eastern and southern Africa [42-47], and Nepal [48]. Other DHS studies had similar findings regarding decision-making involvement and the increased likelihood of sex refusal in Nepal [48] and Cambodia [49]. Unlike these studies, our research used a multidimensional construct that illustrated which risk factors and exposures lead to gender imbalances (sexual divisions) and HIV risk behaviors. Finally, women's frequency responses for the ability to initiate condom use and refuse sex were high in all countries, which is noteworthy. Initiating condom use and sex refusal indicate that levels of women's empowerment are higher than often portrayed in literature that has examined non-representative samples of women. Accordingly, married/cohabitating women's willingness to practice safer sex or refuse sex with male partners downplays the "female victim, male perpetrator discourse" [11, 12].

The key drivers of empowerment associated with an increased likelihood of safer sex negotiation and sex refusal were economic independence, sole or co-participation in household decision-making, and a negative attitude towards wife-beating for any reason. These results confirm the interconnectedness of gender power relations, control of resources, GBV, and women's HIV risk in African women [50]. These findings also suggest that women with

decision-making involvement, economic independence, and equitable gender-role attitudes have agency and resources [23]. These positive attributes reduce burdens from sexual divisions between partners (e.g., power imbalances) and influence safer sexual practices in relationships [17]. Moreover, the consistent pattern of TGP constructs associated with self-efficacy highlights the notion that unique sets of social and cultural structures shape power dynamics and are crucial to informing future HIV prevention interventions.

Our results differed from research in the US, Cambodia, and South Africa. Researchers found no association between relationship control and condom use initiation in Asian American women [51]. However, that study measured relationship control with the Sexual Relationship Power Scale, which does not include all constructs of the TGP. In Cambodian and South African couples, increases in egalitarian norms decreased the likelihood of condom use due to trust and lowered perception of HIV risk [49, 52]. Instead of these approaches, we incorporated a question about asking a partner to wear a condom given an STI in our study to emphasize self-efficacy in the context of disease risk and prevention.

The fact that our results for associations between women's empowerment and self-efficacy outcomes varied across all countries is also noteworthy. Researchers hypothesize that women in SSA who are involved in household decisions, reject intimate partner violence, and support sexual rights may still have less control over their sexual and reproductive health in a relationship [23]. In addition, reviews and studies around the world assert that condom use involves a complex web of dynamics among men and women: relationship power, perceived advantages/disadvantages of condoms, social norms, structure and culture, and actual intentions in use [45, 53-55]. In countries with generalized HIV epidemics, other interpersonal power

gradients, cultural, social, and gender norms not captured in this analysis may affect safer sex choices [56, 57] by country.

Contrary to our hypothesis, we found no significant associations between high versus low levels of empowerment status in women and a decrease in the likelihood of multiple sexual partnerships by men. This finding is important, as it suggests that that even women with forms of empowerment who practice monogamy are vulnerable to HIV risk [58]. The overall finding is consistent with studies on marital subordination, interpersonal power, female monogamy, infidelity, and HIV risk across SSA [28, 57-59]. This study finding suggests an acceptance of social and cultural norms for masculinity and "acquiesced femininity" (e.g., the dominance of men, control of economic resources, acceptance of multiple partners, etc.) regardless of a woman's empowerment status [12, 60-63]. In this study, multiple sexual partnerships among men were more rare than expected but were nevertheless higher, indicating links to HIV risk.

Our findings differed from those of a multi-country DHS study in Gabon, Mozambique, Sierra Leone, and Zambia, a study in Cameroon, and DHS research in eastern Africa reporting associations between women's empowerment and an increased likelihood of multiple sexual partnerships and HIV risk [56, 64, 65]. Of note, those studies included women regardless of marital status, chose countries with varied HIV prevalence, omitted men's sexual behaviors, and confined empowerment indicators to educational or economic dimensions. Other researchers argue that empowerment indicators such as decision-making involvement may not reflect actual empowerment if women still carry the brunt of home responsibilities, as described in prior investigations [23, 66, 67].

This study has many strengths to consider. First, the large sample size in each country provided enough power to provide more precise estimates in multivariable models. Second, the

application of weights in the analysis made the results generalizable to similar couples in each country, which is crucial for public health interventions. Third, countries with high HIV prevalence provided context for existing and future HIV prevention initiatives. Fourth, each woman's empowerment index originated from equally weighted TGP constructs and illustrated the complexity of the divisions of labor, power, and social norms that Africans face in married life. The consistent pattern of indicators that influenced empowerment by country is noteworthy for future couple-level interventions for HIV prevention. Finally, this is the first known study to apply TGP concepts to assess empowerment and HIV risk behaviors using couples as the unit of analysis in an African context.

We must consider a few limitations in this study that should lead to a cautious interpretation of our results. The cross-sectional nature of this analysis limits causal inference, so we are unable to determine whether empowerment in women led to sexual behaviors or vice versa. Next, social desirability and recall biases could occur, as respondents may underreport pre-marital or extra-marital relationships and may not remember details that occurred in the past year. Although we evaluated polygamy and place of residence as proxies for the impact of traditional norms in the community, other contextual variables could influence sexual divisions, women's empowerment, and HIV risk behaviors. Additionally, all countries had missing data for or lacked variability in responses to empowerment indicators and outcomes, which could have influenced statistical power for finding significant associations in multivariable models. In the future, we recommend couple-level HIV prevention research with longitudinal analyses of data that are nationally representative.

Conclusions

In summary, among women in heterosexual relationships, high empowerment was associated with higher odds of safer sex negotiation in Malawi and Zambia and with sex refusal in Malawi and Zimbabwe. Indicators of household decision-making involvement, female economic independence, and rejecting all reasons for wife-beating contributed strongly to these associations. These findings provide evidence that, per the TGP, constructs of sexual divisions among couples influence HIV risk in eastern and southern Africa. Policy and development officials in SSA should consider indicators such as decision-making involvement, economic independence, and negative attitudes towards wife-beating as targets for future interventions to promote gender equality among couples.

Overall, this study adds to the body of knowledge on the role of gender-based power inequity within heterosexual relationships as interpersonal and structural determinants of HIV-relevant risk behaviors, transmission and prevention among couples in SSA. This understanding of modifiable gender dynamics in SSA couples is vital for reducing the high burden of HIV acquisition and HIV-related disability for women aged 15 to 49 in the region [68]. Furthermore, gaining a nuanced understanding of empowerment indicators improves health messaging in HIV prevention programs aimed at repurposing social and cultural norms in association with risky sexual behaviors [69]. Policymakers should understand and consider economic independence, household decision-making involvement, and attitudes towards wife-beating, and prioritize women and girls in national strategic plans relevant to their country and context. Finally, these results provide important context to evaluate results from ongoing interventions such as Stepping Stones-Creating Futures in South Africa [70], the DREAMS Initiative in young adults and adolescents [71], and the Malawi BRIDGE Project [72].

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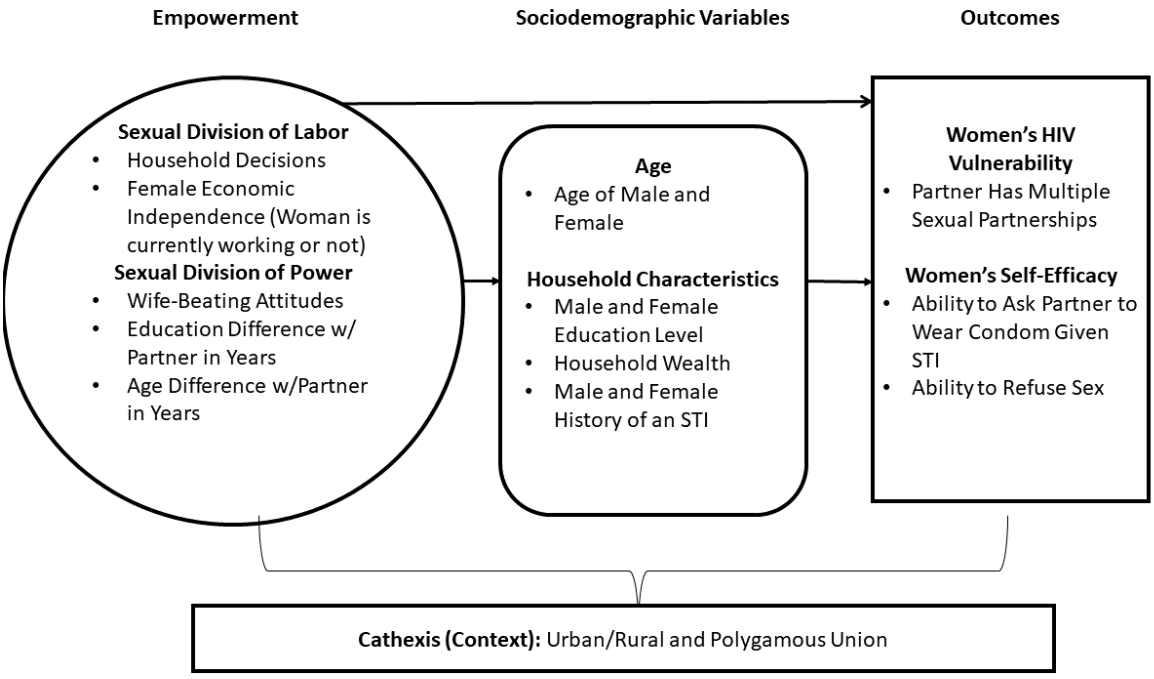

Figure 3.1 Conceptual Framework Using the Theory of Gender and Power: Associations Between Women's Empowerment and HIV-Related Behaviors in African Couples.

Source: Adapted from Connell, 1987: *Gender and Power*, and Wingood and DiClemente, 2000: *Application of the theory of gender and power to examine HIV-related exposures, risk factors, and effective interventions for women.*

Table 3.1 Distribution of socio-demographic characteristics in couples aged 15-64 in four Eastern and Southern African countries, Demographic and Health Surveys

Socio-demographic Characteristics	Malawi 2010 N=2,849	Namibia 2013 N=865	Zambia 2013-14 N=6,039	Zimbabwe 2010-11 N=2,917
	Frequency (Weighted) and Percentage			
Woman's age categories (years)				
15-24	996 (34.9)	133 (15.4)	1,476 (24.4)	938 (32.1)
25-29	817 (28.7)	145 (16.7)	1,388 (23.0)	714 (24.5)
30-34	433 (15.2)	146 (16.9)	1,232 (20.4)	545 (18.7)
35-39	327 (11.5)	148 (17.1)	938 (15.5)	390 (13.4)
40-44	173 (6.1)	104 (12.0)	610 (10.1)	216 (7.4)
45+	103 (3.6)	189 (21.8)	395 (6.5)	114 (3.9)
Man's age categories (years)				
15-24	378 (13.3)	45 (5.2)	434 (7.2)	291 (10.0)
25-29	658 (23.1)	105 (12.1)	991 (16.4)	639 (21.9)
30-34	634 (22.2)	151 (17.5)	1,240 (20.5)	615 (21.1)
35-39	499 (17.5)	140 (16.2)	1,195 (19.8)	560 (19.2)
40-44	292 (10.3)	125 (14.4)	932 (15.4)	389 (13.3)
45-49	237 (8.3)	117 (13.6)	626 (10.4)	240 (8.2)
50+	151 (5.3)	182 (21.0)	621 (10.3)	183 (6.3)
Woman's education level				
Some primary	1,965 (69.0)	154 (17.8)	2,522 (41.8)	393 (13.5)
Completed primary/Some secondary	692 (24.3)	429 (49.6)	2,838 (47.0)	2,395 (82.1)
Completed/More than secondary	192 (6.7)	282 (32.6)	679 (11.2)	129 (4.4)
Man's education level				
Some primary	1,663 (58.4)	169 (19.5)	1,512 (25.0)	286 (9.8)
Completed primary/Some secondary	718 (25.2)	393 (45.4)	3,195 (52.9)	2,323 (79.6)
Completed/More than secondary	468 (16.4)	303 (35.1)	1,332 (22.1)	308 (10.6)
Household wealth index				

Poor	896 (31.4)	288 (33.3)	1,947 (32.2)	898 (30.8)
Middle	895 (31.4)	278 (32.1)	1,790 (29.6)	1,012 (34.7)
Rich	1,058 (37.1)	299 (34.6)	2,303 (38.1)	1,007 (34.5)
Place of residence				
Urban	518 (18.2)	578 (66.9)	2,551 (42.2)	998 (34.2)
Rural	2,331 (81.8)	286 (33.1)	3,488 (57.8)	1,919 (65.8)
History of an STI (Yes)				
STI last 12 months Woman	336 (11.8)	111 (12.8)	253 (4.2)	284 (9.8)
STI last 12 months Man	172 (6.0)	41 (4.8)	318 (5.3)	184 (6.3)
Polygamous union[a]				
Yes	208 (7.3)	19 (2.2)	507 (8.4)	171 (5.9)
No	2,641 (92.7)	846 (97.8)	5,532 (91.6)	2,746 (94.1)
Woman's Empowerment Indicators				
Participation in decision-making				
Involved in all household decisions alone or jointly	449 (15.8)	510 (58.9)	2,909 (48.2)	1,963 (67.3)
Not involved in all household decisions	2,400 (84.2)	355 (41.1)	3,130 (51.8)	954 (32.7)
Female Economic Independence				
Currently working	1,672 (58.7)	457 (52.8)	3,350 (55.5)	1,096 (37.6)
Not currently working	1,177 (41.3)	408 (47.2)	2,689 (44.5)	1,821 (62.4)
Attitudes towards wife-beating				
None of five reasons are justified	2,502 (87.8)	628 (72.6)	3,141 (52.0)	1,706 (58.5)
One or more reasons are justified	347 (12.2)	237 (27.4)	2,898 (48.0)	1,211 (41.5)
Age Difference with Partner in Years (categories)[b]				
Partner same the same age or younger	156 (5.5)	185 (21.4)	362 (6.0)	262 (9.0)
Male partner is 1 to 4 years older	1,242 (43.6)	283 (32.8)	2,105 (34.9)	1,069 (36.6)
Male partner is 5 years older	320 (11.2)	76 (8.7)	675 (11.2)	294 (10.1)
Male partner is 6 to 9 years older	753 (26.4)	176 (20.3)	1,883 (31.2)	817 (28.0)
Male partner is 10 years older or more	378 (13.3)	145 (16.7)	1,014 (16.8)	475 (16.3)

Educational Difference with Partner in Years (categories)[c]				
Male partner has fewer years of education	1,107 (38.9)	305 (35.2)	2,338 (38.7)	932 (31.9)
Partners have the same years of education	462 (16.2)	223 (25.8)	1,206 (20.0)	974 (33.4)
Male partner has 1-3 more years of education	901 (31.6)	281 (32.5)	1,754 (29.0)	810 (27.8)
Male partner has 4 or more years of education	378 (13.3)	56 (6.5)	741 (12.3)	201 (6.9)
High Empowerment Overall	1,398 (49.1)	388 (44.9)	3,160 (52.3)	1,023 (35.1)
Low Empowerment Overall	1,451 (50.9)	477 (55.1)	2,879 (47.7)	1,894 (64.9)
Man has non-marital sexual partners[d]				
Yes	178 (6.3)	74 (8.6)	826 (13.7)	323 (11.1)
No	2,671 (93.8)	791 (91.4)	5,213 (86.3)	2,594 (88.9)
Woman can ask a man to wear a condom given an STI				
Yes	2,444 (85.8)	836 (96.7)	5,098 (84.4)	2,414 (82.8)
No	405 (14.2)	29 (3.3)	941 (15.6)	503 (17.2)
Woman has the ability to refuse sex				
Yes	2,094 (73.5)	804 (93.0)	4,230 (70.1)	2,187 (75.0)
No	755 (26.5)	61 (7.0)	1,809 (29.9)	730 (25.0)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Age difference with partner in years	5.3 (4.1)	4.5 (6.1)	5.9 (4.3)	5.6 (4.7)

[a]Polygamous union refers to whether the man has more than one wife.

[b]The age difference is calculated as the respondent's age subtracted from the male partner's reported age.

[c]The educational difference is calculated as the respondent's years of education subtracted from the male partner's years of education.

[d]Multiple sexual partnerships refer to the man having sex with more than one woman, not including the wife/partner, in the past 12 months.

Table 3.2 Logistic regression assessing the bivariate association (unadjusted odds ratios and 95% confidence intervals) between women's empowerment indicators and non-marital multiple sexual partners in couples aged 15-64[+]

	Malawi 2010 N=2,849	**Namibia 2013 N=865**	**Zambia 2013-14 N=6,039**	**Zimbabwe 2010-11 N=2,917**
Sexual Division of Labor	**OR (95%CI) p-value**	**OR (95%CI) p-value**	**OR (95%CI) p-value**	**OR (95%CI) p-value**
Decision-Making[a]	0.63 (0.36-1.10) p=0.1064	0.48 (0.26-0.88) p=0.0182	0.93 (0.77-1.11) p=0.4104	0.93 (0.69-1.25) p=0.6161
Economic Independence[b]	1.38 (0.97-1.96) p=0.0743	1.22 (0.66-2.26) p=0.5161	0.69 (0.56-0.85) p=0.0004	1.09 (0.82-1.45) p=0.5536
Sexual Division of Power				
Wife-Beating Attitudes[c]	0.98 (0.60-1.59) p=0.9347	0.67 (0.36-1.23) p=0.1928	1.19 (0.98-1.45) p=0.0743	0.85 (0.64-1.13) p=0.2617
Age Difference[d]	1.10 (0.66-1.83) p=0.7256	0.80 (0.37-1.69) p=0.5502	1.93 (1.45-2.57) p<.0001	1.80 (1.17-2.78) p=0.0081
Education Difference[e]	0.96 (0.67-1.39) p=0.8361	0.44 (0.24-0.80) p=0.0078	1.13 (0.94-1.35) p=0.1947	0.84 (0.63-1.12) p=0.2332
Women's Empowerment Index SDL[++] (High vs. Low)	1.00 (0.70-1.41) p=0.9757	0.86 (0.44-1.68) p=0.6599	0.65 (0.52-0.81) p=0.0001	1.05 (0.72-1.52) p=0.8193
Women's Empowerment Index SDP[+++] (High vs. Low)	0.85 (0.60-1.21) p=0.3660	0.32 (0.14-0.70) p=0.0043	1.51 (1.24-1.84) p<.0001	0.89 (0.65-1.22) p=0.4601
Women's Empowerment All Indicators[++++] (High vs. Low)	0.93 (0.65-1.32) p=0.6633	0.49 (0.26-0.93) p=0.0296	1.19 (0.98-1.44) p=0.0824	0.83 (0.60-1.13) p=0.2282

[+]All data is weighted.

[++]This index is the Sexual Division of Labor construct with Decision-Making and Economic Dependence.

[+++]This index is the Sexual Division of Power construct with Wife-Beating Attitudes, Educational Differences, and Age Differences.

++++This index includes all TGP Construct Indicators: Decision-Making, Economic Dependence, Wife-Beating Attitudes, Educational Differences, and Age Differences.
[a]The woman is involved alone or jointly versus uninvolved in decisions.
[b]The woman is currently working versus she did not work in the past 12 months.
[c]The woman agrees with none of the scenarios versus she agrees with at least one wife-beating scenario.
[d]The man is younger or up to 9 years older than the woman versus the man is 10 years older or more.
[e]The man has fewer or the same years of education as the woman versus the man has more years of education.

Table 3.3 Logistic regression assessing the bivariate association (unadjusted odds ratios and 95% confidence intervals) between women's empowerment indicators and the ability for a woman to ask a man to wear a condom given STI in couples aged 15-64[+]

	Malawi 2010 N=2,883	**Namibia 2013 N=865**	**Zambia 2013-14 N=6,039**	**Zimbabwe 2010-11 N=2,917**
Sexual Division of Labor	**OR (95%CI) p-value**	**OR (95%CI) p-value**	**OR (95%CI) p-value**	**OR (95%CI) p-value**
Decision-Making[a]	0.82 (0.53-1.26) p=0.3632	1.32 (0.61-2.86) p=0.4772	1.36 (1.14-1.62) p=0.0005	0.94 (0.74-1.19) p=0.5987
Economic Independence[b]	1.39 (1.05-1.83) p=0.0207	2.44 (1.04-5.68) p=0.0395	1.15 (0.95-1.40) p=0.1631	2.12 (1.60-2.80) p<.0001
Sexual Division of Power				
Wife-Beating Attitudes[c]	1.42 (0.95-2.11) p=0.0905	1.57 (0.65-3.75) p=0.3140	1.52 (1.28-1.81) p<.0001	1.10 (0.88-1.37) p=0.4090
Age Difference[d]	0.53 (0.35-0.80) p=0.0028	2.06 (0.89-4.78) p=0.0932	1.13 (0.89-1.44) p=0.3068	1.06 (0.81-1.40) p=0.6662
Education Difference[e]	1.20 (0.92-1.56) p=0.1857	1.42 (0.67-3.01) p=0.3577	1.07 (0.90-1.28) p=0.4270	0.97 (0.76-1.24) p=0.8165
Women's Empowerment Index SDL[++] (High vs. Low)	1.36 (1.02-1.83) p=0.0398	1.91 (0.67-5.46) p=0.2245	1.34 (1.09-1.66) p=0.0060	1.88 (1.37-2.58) p=0.0001
Women's Empowerment Index SDP[+++] (High vs. Low)	1.14 (0.87-1.50) p=0.3479	1.17 (0.50-2.75) p=0.7111	1.50 (1.26-1.78) p<.0001	1.09 (0.89-1.33) p=0.4222
Women's Empowerment All Indicators[++++] (High vs. Low)	1.53 (1.12-2.07) p=0.0068	2.51 (0.98-6.43) p=0.0542	1.74 (1.47-2.05) p<.0001	1.13 (0.90-1.41) p=0.3041

[+]All data is weighted.

[++]This index is the Sexual Division of Labor construct with Decision-Making and Economic Dependence.

[+++]This index is the Sexual Division of Power construct with Wife-Beating Attitudes, Educational Differences, and Age Differences.

++++This index includes all TGP Construct Indicators: Decision-Making, Economic Dependence, Wife-Beating Attitudes, Educational Differences, and Age Differences.
[a]The woman is involved alone or jointly versus uninvolved in decisions.
[b]The woman is currently working versus she did not work in the past 12 months.
[c]The woman agrees with none of the scenarios versus she agrees with at least one wife-beating scenario.
[d]The man is younger or up to 9 years older than the woman versus the man is 10 years older or more.
[e]The man has fewer or the same years of education as the woman versus the man has more years of education.

Table 3.4 Logistic regression assessing the bivariate association (unadjusted odds ratios and 95% confidence intervals) between women's empowerment indicators and the ability for a woman to refuse sex in couples aged 15-64[+]

	Malawi 2010 N=2,883	**Namibia 2013 N=865**	**Zambia 2013-14 N=6,039**	**Zimbabwe 2010-11 N=2,917**
Sexual Division of Labor	**OR (95%CI) p-value**	**OR (95%CI) p-value**	**OR (95%CI) p-value**	**OR (95%CI) p-value**
Decision-Making[a]	1.32 (0.96-1.82) p=0.0889	1.01 (0.58-1.76) p=0.9866	1.01 (0.87-1.17) p=0.9235	1.25 (1.03-1.53) p=0.0278
Economic Independence[b]	1.59 (1.29-1.96) p<.0001	1.35 (0.78-2.34) p=0.2795	1.04 (0.92-1.22) p=0.4170	1.56 (1.27-1.92) p<.0001
Sexual Division of Power				
Wife-Beating Attitudes[c]	1.23 (0.90-1.69) p=0.2013	1.97 (1.11-3.51) p=0.0216	1.20 (1.03-1.40) p=0.0209	1.25 (1.01-1.55) p=0.0402
Age Difference[d]	1.16 (0.86-1.56) 0.3293	1.18 (0.60-2.31) p=0.6400	1.15 (0.95-1.39) p=0.1417	1.05 (0.81-1.35) p=0.7368
Education Difference[e]	1.11 (0.90-1.37) p=0.3221	1.34 (0.77-2.33) p=0.2986	1.04 (0.90-1.19) p=0.6317	1.00 (0.81-1.22) p=0.9621
Women's Empowerment Index SDL[++] (High vs. Low)	1.46 (1.16-1.85) p=0.0016	1.00 (0.54-1.86) p=1.000	1.08 (0.93-1.26) p=0.3224	1.57 (1.25-1.99) p=0.0002
Women's Empowerment Index SDP[+++] (High vs. Low)	1.34 (1.08-1.66) p=0.0086	1.15 (0.64-2.08) p=0.6437	1.19 (1.02-1.38) p=0.0253	1.20 (0.98-1.48) p=0.0847
Women's Empowerment All Indicators[++++] (High vs. Low)	1.64 (1.31-2.06) p<.0001	0.98 (0.54-1.77) p=0.9401	1.10 (0.95-1.28) p=0.2166	1.39 (1.13-1.71) p=0.0021

[+]All data is weighted.

[++]This index is the Sexual Division of Labor construct with Decision-Making and Economic Dependence.

[+++]This index is the Sexual Division of Power construct with Wife-Beating Attitudes, Educational Differences, and Age Differences.

++++This index includes all TGP Construct Indicators: Decision-Making, Economic Dependence, Wife-Beating Attitudes, Educational Differences, and Age Differences.
[a]The woman is involved alone or jointly versus uninvolved in decisions.
[b]The woman is currently working versus she did not work in the past 12 months.
[c]The woman agrees with none of the scenarios versus she agrees with at least one wife-beating scenario.
[d]The man is younger or up to 9 years older than the woman versus the man is 10 years older or more.
[e]The man has fewer or the same years of education as the woman versus the man has more years of education**.**

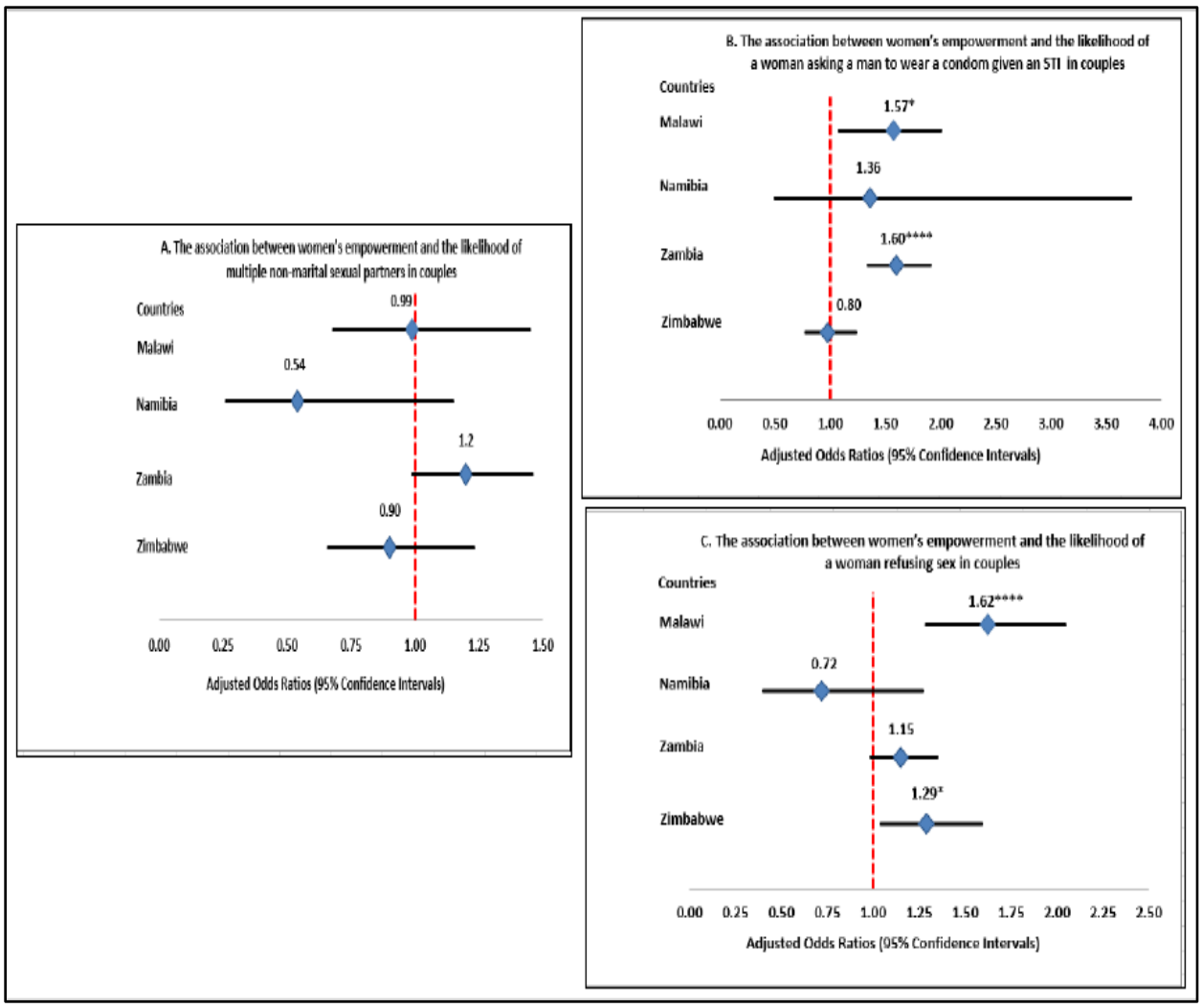

Figure 3.2 Multivariable logistic regression assessing the association (adjusted odds ratios and 95% confidence intervals) between women's empowerment, selected social and demographic characteristics, and the likelihood of outcomes of interest in couples aged 15-64. Adjusted covariates are by country: Malawi (woman's age, wealth index, place of residence, and polygamous union), Namibia (woman's age, wealth index, place of residence, and man's history of an STI), Zambia (man's age, wealth index, place of residence, woman's history of an STI, and polygamous union), and Zimbabwe (woman's age, wealth index, place of residence, and woman's history of an STI).
***p<.05. **p<.01. ***p<.001. ****p <.0001**

CHAPTER 4

THE EXAMINATION OF DISCORDANCE IN ATTITUDES TOWARDS WOMEN'S EMPOWERMENT AND THE EFFECT ON HIV RISK BEHAVIORS AMONG AFRICAN COUPLES[1]

[1]Woolfork M.N., Fox, A., Swartzendruber, A., Rathbun, S., Lee, J., Mutanga, J.N., Ezeamama, A.E. To be submitted to the *Journal of the International AIDS Society (JIAS).*

Abstract

Introduction: Women have higher HIV burdens in regions with generalized heterosexual epidemics, especially in eastern and southern Africa. Of the 19.4 million people in the region living with HIV in 2016, over half were women and girls. The contribution of social factors to gender inequality and elevated risk for HIV in women has been described. Studies have also shown that gender inequality is correlated with HIV risk in heterosexual relationships in SSA; however, few studies have simultaneously examined how discordance (disagreement) in attitudes towards women's empowerment within couples may further exacerbate HIV risk. In addition, few prior investigations use a gender-based framework to illustrate this phenomenon in African couples. The purpose of this study was to assess discordance in attitudes towards women's empowerment and the association with HIV risk behaviors.

Methods: We conducted cross-sectional analyses of couples aged 15-64 in countries with available Demographic and Health Survey data and high HIV prevalence: Malawi, Namibia, Zambia, and Zimbabwe. The analysis defined men's and women's empowerment attitudes as decision-making involvement and attitudes towards wife-beating and HIV risk behaviors as multiple sexual partnerships among men (infidelity), a woman's inability to negotiate condom use given an STI, and a woman's inability to refuse sex. We implemented logistic regression models, from which adjusted odds ratios (AOR) were calculated to quantify associations between empowerment attitude scenarios and HIV risk behaviors. Discordance in gender attitudes was assessed by identifying couples where the man or the woman had low scores on attitudes towards women's empowerment and the other spouse/partner had high scores in empowerment attitudes.

Results and Discussion: Discordant attitudes towards women's empowerment was associated with an increased likelihood of infidelity among men in Zambia (AOR=1.94, 95% CI: 1.39-2.40) and Zimbabwe (AOR=1.88, 95% CI: 1.27-2.77), a decreased likelihood of safer sex negotiation in Zambia (AOR=0.58, 95% CI: 0.42-0.81), and the decreased likelihood of sex refusal in Malawi (AOR=0.66, 95% CI: 0.45-0.97), Zambia (AOR=0.74, 95% CI: 0.58-0.95), and Zimbabwe (AOR=0.72, 95% CI: 0.57-0.91). These effects were particularly strong where women endorsed more empowerment norms compared with their male partner in association with infidelity among men. Effects were also strong where men endorsed more empowerment norms compared to women in association with safer sex negotiation and sex refusal. Although direction and magnitude of associations varied by outcome, they consistently confirm that empowerment indicators drive power dynamics, limit sexual power, and influence sexual behavior. Thus, we provide evidence that limited self-determination and autonomy for women partly maintain the higher HIV burden in women living in SSA settings with largely heterosexual transmission.

Conclusions: The vulnerability of women to HIV can be reduced by policies and practices in support of empowerment. Future HIV prevention interventions must address socio-cultural norms and consider gendered perspectives on empowerment at the couple level to make a sustainable impact on HIV risk in SSA.

Keywords: Empowerment Attitudes, HIV, Sexual Behavior, Couples, Sub-Saharan Africa, Theory of Gender and Power

Introduction

Women have higher HIV burdens in most regions with generalized, predominantly heterosexual HIV epidemics [1]. Of the estimated 19.4 million people living with HIV in eastern and southern Africa, 59% of them were female adults and adolescents in 2016 [2]. The region accounted for over 40% of new HIV infections globally, with young women aged 15-24 years accounting for 25% of those infections and acquiring the disease many years earlier than their male counterparts [2-4]. The generalized nature of the epidemic among young women has drawn attention to how broad social factors related to gender inequality have contributed to the epidemic in the region. The factors that drive power dynamics within heterosexual relationships and that contribute to HIV risk in Sub-Saharan Africa are intergenerational sex, the high prevalence of gender-based violence (GBV) against women, higher male educational attainment, and limited access to health services [3, 5-9]. More specifically, risk behaviors linked to power dynamics and HIV transmission in SSA include multiple sexual partners, low condom use, the inability for a woman to ask a man to wear a condom given a sexually transmitted infection (STI), and lower levels of male circumcision [9, 10]. Current HIV prevention strategies (e.g., female-controlled, pre-exposure prohylaxis or PrEP, microfinance, couples-based counseling and testing, “Treatment as Prevention” and male circumcision) have rarely addressed gender inequity at multiple levels. Consequently, gender inequity may limit the effectiveness of these interventions and has implications for health, economic and social policy agendas.

One important question is the extent to which disempowerment (low levels of empowerment) works across different levels to maintain higher HIV risk for women in African settings. Addressing the multilevel sexual divisions and broader norms in heterosexual relationships, the Theory of Gender and Power (TGP) is an instrumental model for elucidating

HIV prevention strategies in women [11, 12]. The TGP was adapted for HIV prevention to describe how gender inequalities grounded in the sexual division of labor (economy), the sexual division of power (GBV), and cathexis (social norms) create factors that, in turn, influence women's disease risk [12]. Research applying the TGP has found that in some cases, women in heterosexual relationships have less power than men due to gendered roles and norms operating at these different conceptual levels [13]. However, since factors that maintain HIV infection are bidirectional, studies that incorporate men's attitudes are best situated to identify relevant behaviors with potential for effective translational impact on health policy and HIV prevention strategies [14-18]. This study uses TGP constructs to examine the hypothesis that couples with inequitable attitudes (discordance) towards women's empowerment are more likely to engage in riskier sexual behaviors (e.g., multiple sexual partnerships among men, a woman's inability to negotiate condom use given an STI, and a woman's inability to refuse sex) compared to couples with gender-equitable attitudes. This study augments HIV behavioral research that seeks to clarify indicators of empowerment at various levels and to understand sociocultural norms within the African context that may contribute to HIV risk in heterosexual coupled relationships.

Methods

Study Design and Population

This study is a cross-sectional analysis of couples data from the Demographic and Health Survey (DHS) of men and women aged 15-64 in Malawi, Namibia, Zambia, and Zimbabwe. These countries represented nations in which a) respondents had completed empowerment and HIV risk behavior information, b) recent data was available (2010-2014), c) the geographic location was in southern or eastern Africa, and d) HIV prevalence was generalized (prevalence of 1% or more [19]). The DHS is a cross-sectional, nationally representative household survey

implemented in low- to middle-income countries around the world [20]. It features a two-stage sampling of households and includes individuals, mainly children, women (aged 15-49), and men (aged 15-64) [21, 22]. We excluded individuals for whom the primary determinant (attitudes towards women's empowerment) or the outcomes of interest were missing. We created the couple's empowerment attitude index using measures of household decision-making and wife-beating attitudes. The analysis assigned values accordingly: "1" for responses considered as high scores of attitudes towards women's empowerment and "0" for responses designated as lower scores of attitudes towards women's empowerment [23]. Each country's data was analyzed separately for adequate comparison.

Outcomes

Multiple Sexual Partnerships

The number of extra-marital sexual partnerships in the preceding 12 months was self-reported by the male partner and dichotomized for analytic purposes as "yes" if there was one or more occurrences, or "no" if there were zero occurrences in the past year.

Ability to Ask Partner to Wear a Condom Given an STI

This survey question asked participants, "Can you/a woman ask a man to wear a condom if he has an STI?" We designated this question as an indicator of safer sex negotiation. We placed "Yes" answers in a separate category from "No" answers, which included "Don't Know" responses.

Ability to Refuse Sex

The next question asked participants, "Can you/a woman refuse sex?" We placed "Yes" answers in a separate category from "No" answers, which included "Don't Know" responses.

Predictor

Couple's Empowerment Index

We defined couple's empowerment as household decision-making and wife-beating attitudes, using the TGP, adapted from Wingood and DiClemente, and the Survey-based Women's Empowerment Index as a conceptual framework [12, 23]. We weighted each indicator equally, assigned high levels of empowerment attitude scores with "1"s and lower levels of empowerment attitudes with "0"s, and added all components to create final composite empowerment scores by sex and country. Finally, we used the median value of each index to create a variable for attitudes towards women's empowerment: with "high" (values above the median) and "low" (median values and below) scores in attitudes towards women's empowerment by sex [24]. After we created separate empowerment attitude indexes by sex, we created four separate scenarios of attitudes towards women's empowerment in couples (both man and woman had high scores, one partner had high scores and the other had low scores, and both the man and woman had low scores). Discordance was assessed by identifying couples where the man or the woman had low scores on attitudes towards women's empowerment and the other spouse/partner had high scores. The details of each survey question and coding scheme is described below.

We included a decision-making question to assess the control of resources in the home (the sexual division of labor). The survey asked participants, "Who usually makes the decisions about (healthcare, major household purchases, visits to her family, and money the husband earns), you, your husband/partner, you and your husband/partner jointly, or someone else?" We coded respondents with high levels of empowerment if they said that decision-making involved

the woman alone or was a joint involvement [25] with a "1". If the respondents said that the husband or someone else made household decisions, those responses were coded as a "0" [25].

Next, the study included a question about wife-beating to capture domestic violence attitudes by sex (the sexual division of power). The wife-beating attitude question asked participants, "Is a man justified beating or hitting his wife in the following situations?" The reasons are if she goes out without telling him, she neglects the children, she argues with him, she refuses to have sex with him, and the food is not properly cooked. First, we coded men's and women's "No" responses as a "1," and "Yes" and "Don't Know" as a "0." Then, we created a variable comparing respondents who said none of the reasons are justified (positive attitudes towards women's empowerment) versus those who said one or more reasons are justified (negative attitudes towards women's empowerment) [25].

Sociodemographic Variables (Confounders)

We adjusted for specific variables associated with HIV risk behaviors or HIV acquisition: age of the man and woman [12, 26], educational level of both partners [12, 27, 28], household wealth [29, 30], partners' history of an STI [12, 31], and cathexis variables (social norms), namely, place of residence [32, 33] and polygamy [34, 35].

Statistical Analysis

We performed all analyses by country. We conducted an assessment for effect modification (association difference by level of a third variable) and mediation (association depends on the presence or absence of a third variable) in the association between levels of empowerment and HIV risk behaviors by wealth tertile *a priori*. The results did not yield any relevant findings (not shown). We applied DHS sample weights to account for the random sampling design and lower response rates for men from the individual files [22]. Factors

associated with the primary determinant and outcome variables were identified via chi-square analysis of the difference in proportions and further considered as confounders in multivariable analyses. Finally, we built multivariable logistic regression models from which odds ratios (OR) and 95% confidence intervals (CIs) were calculated to quantify the association between indicators of empowerment attitude scenarios and HIV risk behaviors by country. We used SAS® software, version 9.4, for all analyses [36].

Ethical Considerations

National ethics boards review DHS surveys, and ICF International's institutional review board approves data collection procedures. All respondents gave informed consent for surveys and HIV testing. The study was exempt from full institutional board review by the University of Georgia because of the use of anonymized secondary data.

Results and Discussion

Overall, discordance in empowerment attitudes was highest in Zambia (43%) and Zimbabwe (46%) and lowest in Malawi and Namibia (Table 4.1). Among Zambian and Zimbabwean couples, the odds of infidelity by a male partner in the past 12 months were nearly twice as high for couples with discordant versus gender-equitable attitudes (AOR=1.94, 95% CI: 1.39-2.40; AOR=1.88, 95% CI: 1.27-2.77) (Figure 4.1). Similarly, the odds of infidelity increased in Zambia (AOR=1.41, 95% CI: 1.05-1.89) and Zimbabwe (AOR=1.81, 95% CI: 1.17-2.80) (Figure 4.1) for couples with shared disempowered versus equitable attitudes. Further, Zambian couples with discordant empowerment attitudes, and those with shared disempowered attitudes were less likely to have women respond that they/a woman can initiate safer sex compared to couples with gender-equitable attitudes (AOR=0.58, 95% CI: 0.42-0.81; AOR=0.51, 95%CI: 0.38-0.69) (Figure 4.2). Couples with discordant empowerment attitudes

were less likely to have sex refusal among women compared to couples with shared equitable attitudes in Malawi (AOR=0.66, 95% CI: 0.45-0.97), Zambia (AOR=0.74, 95% CI: 0.58-0.95), and Zimbabwe (AOR=0.72, 95% CI: 0.57-0.91) (Figure 4.3). Mutually disempowered attitudes towards female empowerment were associated with lower likelihood of sex refusal by the woman among couples in Malawi and Zambia, compared to equitable attitudes (AOR=0.62, 95% CI: 0.42-0.89; AOR=0.76, 95% CI: 0.60-0.96) (Figure 4.3).

Our findings provide evidence at the household level that predominantly heterosexually driven epidemics correlate with gender inequality [1]. In line with our hypothesis, discordant (or jointly disempowered) attitudes, compared to mutually empowered attitudes, were associated with an increased likelihood of multiple sexual partners by a man in Zambia and Zimbabwe, a decreased likelihood of a woman's ability to initiate safer sex in Zambia, and the decreased likelihood of sex refusal in Malawi, Zambia, and Zimbabwe. Prior research corroborates our results by suggesting associations between relationship imbalance, infidelity, and reduced self-efficacy in the United States [37-40] and southern Africa [41-49]. Our data confirm the thesis that a woman's autonomy, defined by her level of participation in household expenses, for example, impacts her ability to negotiate safer sex [50]. Further, the findings confirm that per the TGP, women in relationships with gender inequity exhibit less power than men due to interpersonal and societal norms which in turn, limits sexual power and influences sexual behavior [12, 13]. Other research suggests that a woman with less power in the relationship is more likely to incorporate the dominant partner's intentions for safer sex into her intentions [40], which impacts her self-efficacy in condom use and sex refusal. Our results also confirm findings from a gender equality survey that attitudes, intentions, and practices among men are linked [17,

51]. Finally, constructs from the TGP apply to understanding gendered perspectives for future couple-level interventions that address HIV behaviors and transmission.

Of note, our findings varied by national context and outcome. Scenarios in which at least one spouse lacked gender-equitable attitudes were associated with the outcomes of interest in the expected direction and magnitude of our hypothesis. However, this pattern was inconsistent across outcomes. These effects were particularly strong where women endorsed more empowerment norms for infidelity compared with their male partner. Attitude discordance was also strong where men endorsed more empowerment norms compared to women for safer sex negotiation and sex refusal. Moreover, we found consistent associations between discordance in attitudes towards women's empowerment and specific outcomes in Malawi (infidelity and safer sex negotiation). However, our adjustment for confounders removed significant associations between our predictors and HIV risk behaviors in that country. This variation in our findings indicates the complexity of sociodemographics, gender dynamics, and sexual relationships in the context of HIV risk in Africa [37, 46-48] and a need for further study.

Conclusions

This study represents a novel assessment of discordance in attitudes towards women's empowerment and the association with HIV risk behaviors, using the TGP as a framework in an African context. The association between couple's discordance in empowerment attitudes and all outcomes of interest confirmed our hypothesis, though this finding varied by outcome and country (an increased likelihood of multiple sexual partners in Zambia and Zimbabwe, a decreased likelihood of a woman's ability to initiate safer sex in Zambia, and the decreased likelihood of sex refusal in Malawi, Zambia, and Zimbabwe). These results provide insight for HIV prevention in countries with generalized heterosexual epidemics (prevalence of 1% or more

[19]) where gender inequality maintains the epidemic via transactional sex, rape and GBV, intergenerational sex, inability to negotiate safer sex, decreased access to care, and lowered educational attainment [1].

Studies of couples in Sub-Saharan Africa point to the salutary impacts of egalitarian gender dynamics on HIV risk behaviors such as condom use, communication, and multiple sexual partners [44, 45, 52-54]. Recent research on gender inequality and heterosexual epidemics emphasizes structural interventions (e.g., access to education, enforcement of laws, increased labor force participation) that improve conditions for women and girls [1]. As HIV transmission is bidirectional, new approaches should provide opportunities for men and women to engage as active participants in behavioral interventions [18, 55, 56] along with biomedical initiatives (primarily antiretroviral medications) [57]. Our results fill a gap in approaches that aim to modify attitudes and understand norms that shape the lives of both women and men [17]. Moreover, our findings have implications for behavioral interventions and social programs that promote empowerment via education, economic livelihood training, anti-GBV curricula, skills-building in sexual communication and behavior, and repurposing social norms at the couple level [44, 45, 54, 58-60]. Overall, we argue that HIV prevention interventions must occur at the couple level and beyond, address socio-cultural norms (e.g., control of financial resources, acceptance of multiple partners and GBV), and consider gendered perspectives on empowerment to achieve true success in the population at large [15, 16].

Limitations

We consider a few limitations in this study that should lead to a cautious interpretation of our results. The cross-sectional nature of this analysis limits causal inference such that we are unable to determine whether empowerment attitude discordance in couples led to sexual

behaviors or vice versa. Additionally, social desirability and recall biases could occur, as respondents may underreport or overreport pre-marital or extra-marital relationships and may not remember details that occurred in the past year. Although we evaluated polygamy and place of residence as proxies for the impact of traditional norms, other contextual variables could influence sexual divisions, empowerment attitudes, and HIV risk behaviors.

Nevertheless, this study demonstrates a strong association between empowerment attitude discordance and HIV risk behaviors. The analysis uses a nationally-representative sample of couples in African countries with high HIV prevalence for the context of policy and behavioral research. The large sample size allowed for a robust analysis of empowerment attitudes with HIV risk behaviors, along with many sociodemographic variables. The TGP framework also serves to illustrate the complexity of the divisions of labor, power, and social norms that Africans face in married life. Finally, this is the first known study to apply TGP concepts to assess attitudes towards women's empowerment and HIV risk behaviors using couples as the unit of analysis in an African context.

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Table 4.1 Distribution of couple's empowerment attitude levels, aged 15-64, in four Southern African countries, Demographic and Health Surveys[+]

Socio-demographic Characteristics	Malawi 2010 N=2,870	Namibia 2013 N=894	Zambia 2013-14 N=6,120	Zimbabwe 2010-11 N=3,003
	Frequency (Weighted) and Percentage			
Couple's Empowerment Attitude categories[++]				
Man and woman are empowered in attitudes	299 (10.4)	409 (45.8)	1,448 (23.7)	1,134 (37.8)
Man is empowered in attitudes, woman is disempowered in attitudes	731 (25.5)	227 (25.4)	1,660 (27.1)	898 (29.9)
Woman is empowered in attitudes, man is disempowered in attitudes	478 (16.6)	147 (16.4)	956 (15.6)	440 (14.6)
Man and woman are disempowered in attitudes	1,362 (47.5)	111 (12.4)	2,056 (33.6)	531 (17.7)

[+]All data is weighted.

[++]The couple's empowerment index based on questions asked of the man and woman regarding decision-making (the sexual division of labor) and wife-beating attitudes (the sexual division of power).

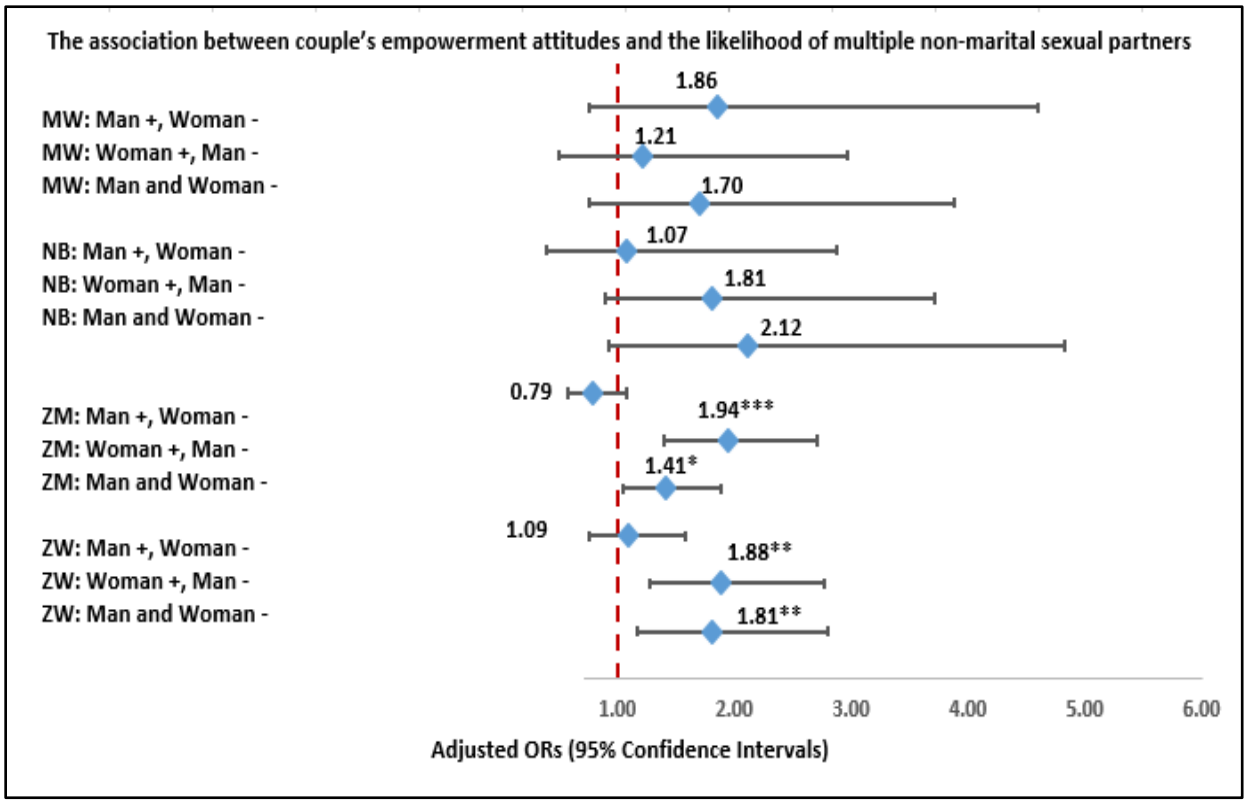

Figure 4.1 Multivariable logistic regression assessing the association (adjusted odds ratios and 95% confidence intervals) between discordant couple's empowerment attitudes, selected social and demographic characteristics, and the likelihood of non-marital sexual partnerships in couples aged 15-64. Adjusted covariates are by country: Malawi (woman's age, wealth index, place of residence, and polygamous union), Namibia (man's age, wealth index, and place of residence), Zambia (woman's age, wealth index, place of residence, man's history of an STI, and polygamous union), and Zimbabwe (woman's age, wealth index, place of residence, woman's history of an STI, and polygamous union). *p<.05. **p<.01. ***p<.001. ****p <.0001

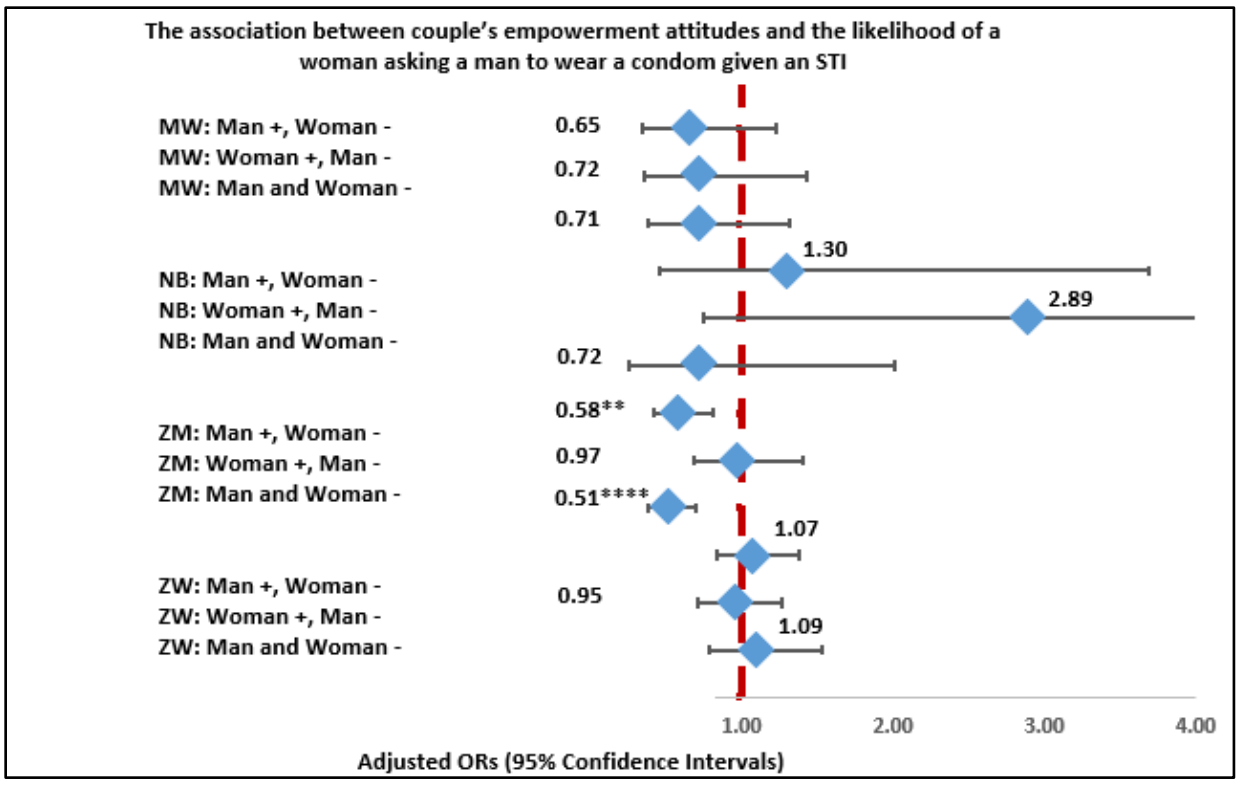

Figure 4.2 Multivariable logistic regression assessing the association (adjusted odds ratios and 95% confidence intervals) between discordant couple's empowerment attitudes, selected social and demographic characteristics, and the likelihood of a woman asking a man to wear a condom given an STI in couples aged 15-64. Adjusted covariates are by country: Malawi (woman's age, wealth index, place of residence, and polygamous union), Namibia (man's age, wealth index, and place of residence), Zambia (woman's age, wealth index, place of residence, man's history of an STI, and polygamous union), and Zimbabwe (woman's age, wealth index, place of residence, woman's history of an STI, and polygamous union).
***p<.05. **p<.01. ***p<.001. ****p <.0001**

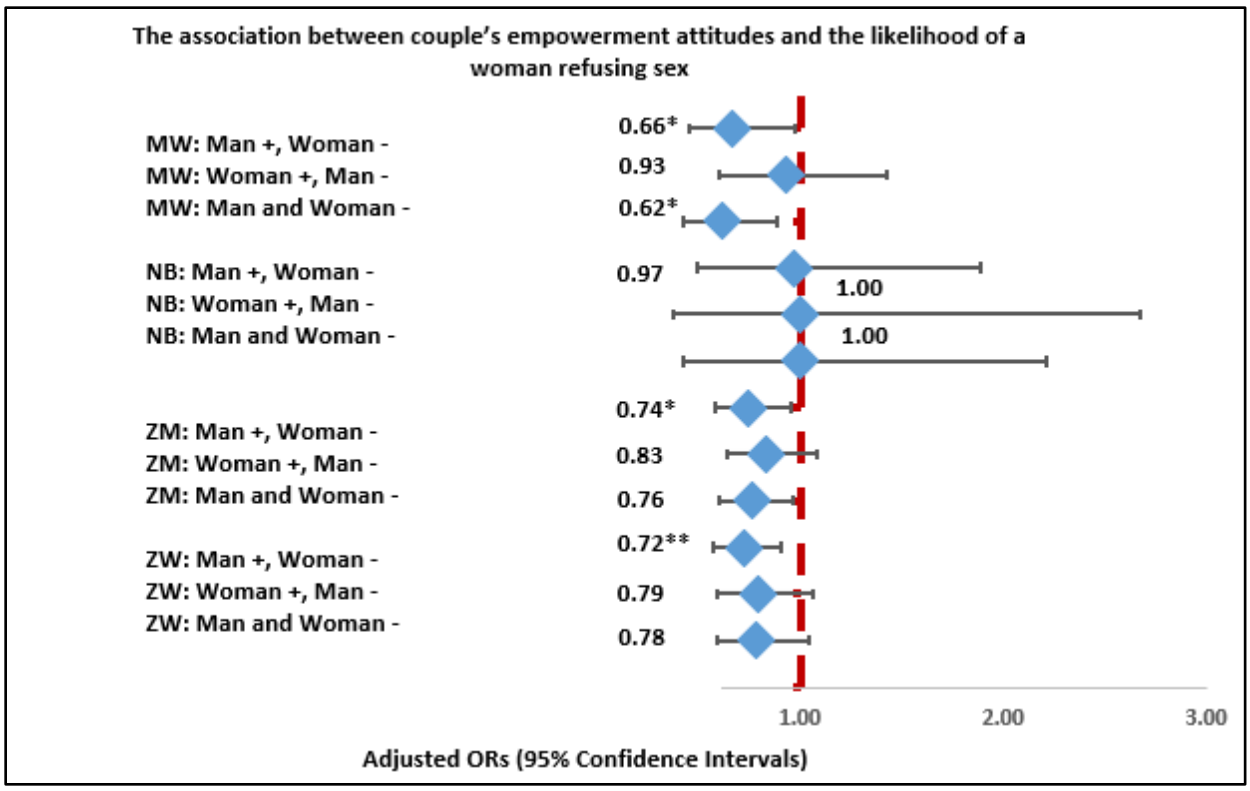

Figure 4.3 Multivariable logistic regression assessing the association (adjusted odds ratios and 95% confidence intervals) between discordant couple's empowerment attitudes, selected social and demographic characteristics, and the likelihood of a woman refusing sex in couples aged 15-64. Adjusted covariates are by country: Malawi (woman's age, wealth index, place of residence, and polygamous union), Namibia (man's age, wealth index, and place of residence), Zambia (woman's age, wealth index, place of residence, man's history of an STI, and polygamous union), and Zimbabwe (woman's age, wealth index, place of residence, woman's history of an STI, and polygamous union).
***p<.05. **p<.01. ***p<.001. ****p <.0001**

CHAPTER 5

SYNTHESIS OF RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

Overview

This chapter provides a summary overview of the research, important findings, and recommendations for future directions in public health. The emphasis of this dissertation addressed the linkages between gender equality/inequality (empowerment constructs), heterosexual relationship dynamics, and HIV risk behaviors in African couples. These topics touch on three United Nations Sustainable Development Goals for 2030: Three (sub-goal: end the AIDS epidemic by 2030), Five (address gender inequality), and Ten (reduce inequality) [1, 2]. This research is a novel assessment of the drivers of gender dynamics, empowerment, and HIV risk behaviors at interpersonal and structural levels using the Theory of Gender and Power (TGP) as a conceptual framework in examining African couples.

The overall goal of this dissertation research was to assess the association between constructs of empowerment from the TGP (the sexual division of labor, the sexual division of power) and HIV risk behaviors, along with socio-demographics including contextual variables (social norms) by country. The TGP is a multidimensional conceptual framework that illustrates gender power dynamics operating at different levels in heterosexual relationships and is applicable for HIV prevention in women [3, 4]. This research also sought to understand what factors drive gender dynamics and sexual behavior in heterosexual couples. In turn, the results can inform key stakeholders for further investigation in policy and research. We achieved our goal with two cross-sectional analyses of secondary data from the Demographic and Health

Survey (DHS) in four countries with generalized HIV epidemics (10% prevalence or higher): Malawi, Namibia, Zambia, and Zimbabwe.

Study One

In the first manuscript, we analyzed couples data from the DHS to assess an association between women's empowerment indicators defined by the TGP and HIV-related behaviors. Our predictor corresponded to DHS questions on household decision-making and female economic independence (the sexual division of labor), attitudes towards wife-beating (the sexual division of power), and age and education differences between partners (the sexual division of power). The outcomes of interest included multiple sexual partnerships among men, the ability for a woman to ask a man to wear a condom given an STI (self-efficacy), and the ability for a woman to refuse sex (self-efficacy). Our study incorporated control variables associated with empowerment and HIV risk behaviors, including contextual factors (place of residence and polygamous union) in multivariable models.

In summary, we found associations between high empowerment and self-efficacy in behaviors (safer sex negotiation in Malawi and Zambia and sex refusal in Malawi and Zimbabwe). These findings provide evidence from the TGP that conditions of high empowerment reduce burdens placed on women from power imbalances (sexual divisions), which in turn influences safer sexual practices. It is noteworthy that associations between women's empowerment and self-efficacy varied across all countries. Researchers hypothesize that women in SSA who are involved in household decisions, reject intimate partner violence, and support sexual rights may still have less control over their sexual and reproductive health in a relationship [5]. Furthermore, condom use and even sex refusal are complex and involve a host of factors that shape dynamics in heterosexual relationships (e.g., relationship power, perceptions

and intentions of condom use, social norms, etc.) and actual intentions in use [6-9]. Another noteworthy finding was that three particular indicators drove high empowerment's association with an increased likelihood of women's self-efficacy: economic independence, involvement in household decision-making (the sexual division of labor), and negative attitudes towards wife-beating (the sexual division of power). The consistent pattern of empowerment indicators across countries highlights the notion that unique sets of social and cultural structures shape power dynamics and can inform initiatives for HIV prevention.

Surprisingly, we found no association between high empowerment in women and infidelity across all countries. This finding has implications for countries with generalized HIV epidemics and households where self-reported monogamy among men is high. However, our findings are consistent with other research in Sub-Saharan Africa (SSA) that has found links between marital subordination in power dynamics, female monogamy, infidelity among men and HIV risk [10-13]. Moreover, the findings suggest an acceptance of social and cultural norms such as male dominance in the home and multiple sexual partners despite the empowered status of a woman [14-18].

Study Two

The second study utilized the same population and implemented a similar approach to analysis (e.g., cross-sectional data analysis, use of same control variables, etc.) as the first study. However, the predictor incorporated men's and women's attitudes towards women's empowerment with two indicators: household decision-making (the sexual division of labor) and attitudes towards wife-beating (the sexual division of power). We examined whether empowerment attitude discordance in couples (one spouse had high empowerment attitude scores and the other had low empowerment attitude scores) was associated with HIV risk

behaviors (multiple sexual partnerships among men, the ability for a woman to ask a man to wear a condom given an STI, and the ability for a woman to refuse sex).

Overall, we observed associations between empowerment attitude discordance (and shared disempowered attitudes) versus equitable attitudes in couples and all HIV risk behaviors of interest, though this finding varied by outcome. As expected, discordance in attitudes towards women's empowerment was associated with an increased likelihood of infidelity among men in Zambia and Zimbabwe, a decreased likelihood of a woman's ability to initiate safer sex in Zambia, and the decreased likelihood of sex refusal in Malawi, Zambia, and Zimbabwe. Prior research corroborates our results by suggesting associations between relationship imbalance, infidelity, and reduced self-efficacy in the United States [8, 19-21] and southern Africa [6, 7, 9, 13, 22-26]. These findings also confirm the TGP hypothesis that women in relationships with gender imbalances exhibit less power than men due to interpersonal and societal norms, which in turn limits sexual power and influences sexual behavior [4, 27]. Our results confirm findings from a gender equality survey that attitudes, intentions, and practices among men are linked [28, 29]. Finally, constructs from the TGP apply to understanding gendered perspectives for future couple-level interventions that address HIV behaviors and heterosexual transmission.

Comparison of Both Studies

Although the approach of both studies differed slightly, we found certain similarities between study one and study two. First, we created empowerment indexes (women's empowerment and empowerment attitudes) to analyze associations with HIV risk behaviors in couples. Next, we found significant associations between empowerment indicators and HIV risk behaviors in the magnitude and direction expected in Malawi, Zambia, and Zimbabwe. Although we did not find significant associations between empowerment in women and

infidelity among male partners in the first study, the second study may shed light on this finding. The second study inquired to what extent attitudes towards women's empowerment work across different levels to maintain higher HIV risk for women in African settings. The association between empowerment attitude discordance in couples and infidelity was noteworthy, as it supports the premise of men's influence on sexual behavior and stresses the necessary engagement of men in future empowerment and HIV prevention initiatives [18].

Recommendations

Policymakers

We recommend numerous policy initiatives at multiple levels of society for increased impact in the HIV prevention space. First, Malawi, Namibia, Zambia, and Zimbabwe have enacted the National Gender Policy, among other initiatives, to promote economic empowerment, rural development, education, health, and equality while enforcing laws against discrimination and gender-based violence in men and women [30-38]. However, governments must use frameworks such as the TGP at local and interpersonal levels to prioritize discrimination against women and girls, downplay the "female victim, male perpetrator" discourse, address harmful norms, and reduce HIV risk behaviors [18, 39, 40]. We also recommend that governments boost spending for behavioral interventions to understand power dynamics and facilitate empowerment with investments from the private sector and non-governmental organizations while local capacity building increases and external public funds fluctuate or decrease [41].

Next, new programs in local communities should implement policy and structural approaches that shape attitudes and consider the lived experiences of men as well as women (e.g., feeling threatened by the shift in economic power from men to women) [15, 29]. We

advocate the use of DHS stakeholder engagement to understand the contextual nuances of how traditional norms shape power dynamics to improve health messaging for HIV prevention. Recently, development and population health staff recommended revisions to DHS women's empowerment indicators such as economic empowerment (land and credit), knowledge of legal rights and recourse, participation in decision-making, attitudes and social norms [42]. The stakeholders discussed the measurement of empowerment in the context of the respondents and community at large (e.g., including men and women, considering cultural interpretations of questions, and incorporating community influencers) [42].

Public Health Researchers

Based on our findings, we propose additional HIV prevention research in SSA with an emphasis on gender dynamics at multiple societal levels (interpersonal, household, and community). Longitudinal studies in epidemiology and behavioral science should complement existing HIV prevention interventions that promote gender equality via education, economic livelihood, decision-making, anti-GBV curricula, and sexual skills-building in couples [43, 44]. An international survey similar to the DHS called the "International Men and Gender Equality Survey" found that men with equitable attitudes were more likely to practice equitable behaviors in the home, leading to increased household participation, reduced GBV, and higher sexual satisfaction [29]. Thus, future studies must consider gendered perspectives and design approaches to facilitate gender equality in couples [29].

Traditional norms in a community are difficult to change. However, as a first step, culturally indigenous researchers can use the TGP coupled with local expertise to understand how contextual variables (e.g., sexual initiation ceremonies, wife inheritance from one man to another, young brides, etc.) shape power dynamics and influence sexual behaviors. Moreover,

studies must incorporate perspectives and buy-in from key stakeholders (clergy, local political leaders, and tribal chiefs). These collaborations at a local level can can complement existing community-based activities and mass media messaging that repurpose these norms and influence behavior change (e.g., using symbols to replace sexual initiation) [45].

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APPENDICES

APPENDIX A

INSTITUTIONAL REVIEW BOARD DECISION

Phone 706-542-3199

Office of the Vice President for Research
Human Subjects Office

NOT HUMAN RESEARCH DETERMINATION

February 4, 2016

Dear Dr. Orpinas:

The University of Georgia Institutional Review Board (IRB) reviewed the following protocol on 2/4/2016:

Type of Review:	Initial Study
Title of Study:	Assessing the impact of women's empowerment and comprehensive HIV/AIDS knowledge on HIV outcomes in young southern African adults
Investigators:	Pamela Orpinas, Makhabele Woolfork
IRB ID:	STUDY00003091

The IRB determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations. The proposed activity does not meet the regulatory

definition of “human subjects” because it is limited to the analysis of existing information that is not individually identifiable and were not collected specifically for this project.

University of Georgia (UGA) IRB review and approval is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are research involving human subjects, please submit a new request to the IRB for a determination.

Sincerely,

Dr. Gerald E. Crites, MD, MEd

University of Georgia

Institutional Review Board Chairperson

310 East Campus Rd, Tucker Hall Room 212 ◆ Athens, Georgia 30602
An Equal Opportunity/Affirmative Action Institution

APPENDIX B

METHODS SECTION

Research Purpose and Overview

Due to the ongoing needs of adults and adolescents at risk for HIV infection in SSA, continued research regarding gender dynamics is necessary. The purpose of the present research was to (1) utilize secondary data analysis to assess women's empowerment per the Theory of Gender and Power (TGP) in coupled relationships as a proxy for gender dynamics in association with HIV risk behaviors and (2) analyze secondary data to examine discordance in empowerment perspectives per the TGP among couples in association with HIV risk behaviors by country. The risk behaviors of interest included multiple non-marital sexual partnerships, the ability for a woman to ask for condom use if the man has a sexually transmitted infection (STI), and the ability for a woman to refuse sex. Both studies used cross-sectional couples data from the Demographic and Health Survey (DHS) in Malawi, Namibia, Zambia, and Zimbabwe that includes questions asked of men and women aged 15-64. We used specific inclusion criteria to choose these countries: geographically located in southern and eastern Africa, had an HIV prevalence of 10% or more during the time of the survey, completed the most recent DHS cycle (2010-2014), and had DHS couples data that was complete with corresponding empowerment variables.

The Demographic and Health Survey

The DHS is a cross-sectional, nationally representative household survey implemented in low to middle-income countries around the world [1]. Interview questions ask about topics

including maternal and child health, family planning, nutrition, and AIDS, with clinical data on blood glucose, anemia, and HIV prevalence. DHS uses a two-stage sample of households and individuals, mainly children, women (aged 15-49), and men (aged 15-64) [2, 3]. Samples are designed to be representative of households at a national and sub-national level. Thus, the DHS randomly selects households at district or province levels with probability proportionate to size, and individuals are picked at random within selected households for interviews and clinical tests (e.g., a subsample of one-third of the households selected for HIV testing for eligible women and men) [2].

Since no single gold-standard measure exists for assessing empowerment sources, settings, and norms among men and women, researchers recommend that studies combine several items like the DHS to produce a more valid measure [4]. This research chose the DHS to measure empowerment in men and women due to its unique features: it is validated in several countries, nationally representative, incorporates random design, and provides data on health behaviors and diseases [3]. Since 1999, the DHS has collected empowerment data from women and men, adapting questions for households around the world; moreover, its corresponding Survey-based Women's Empowerment Index was recently validated with the United Nations Development Program's (UNDP) Gender Development Index in 34 African countries [5-9].

The main survey questions used to assess empowerment include topics on household decision-making, attitudes towards wife-beating, and negotiating sexual relationships [7]. Moreover, these data link to health outcomes of interest such as HIV and malaria [5]. In addition to these questions, researchers utilize other DHS demographics to assess empowerment: ownership of land or house, membership in a community group, proportion of earned cash, and women's education [10]. The DHS includes questions that match specific TGP constructs: the

sexual division of labor (household decision-making and economic independence), the sexual division of power (attitudes towards wife-beating and differences in age and education), and contextual variables (polygamous union and type of residence) [3].

Research Questions and Study Designs

The first study examined women's empowerment indicators as defined by the DHS in association with the outcomes of interest. The DHS women's empowerment index was based on the sexual division of labor (decision-making (4 questions) and female economic independence (one question)) and the sexual division of power (attitudes towards wife-beating (5 questions), education difference with partner (one variable), and age difference with partner (one variable)). The outcomes consisted of specific indicators: whether the man and whether the woman had had sex with two or more partners in the prior year, whether a woman can ask a man to wear a condom if he has an STI, and whether a woman has the ability to refuse sex. The study asked two specific questions:

1. Are African married/cohabitating women with high levels of empowerment less likely to be involved in relationships with risky sexual behaviors (multiple sexual partnerships, woman's inability to ask a partner to wear a condom given an STI, and woman's inability to refuse sex) than women with lower levels of empowerment?
2. Does the association between women's empowerment level and HIV risk behaviors in relationships differ by age, educational level, a history of STIs, household wealth, polygamous union, and type of residence?

The second study was a dyadic analysis of the association between discordance in men's and women's perspectives on women's empowerment (i.e., a scenario where one person had high scores on empowerment attitudes while the other had low scores) and the outcomes

mentioned above. The corresponding DHS empowerment attitudes index referred to household decision-making (the sexual division of labor) and wife-beating attitudes (the sexual division of power). The study asked two specific questions:

1. Is discordance in attitudes towards women's empowerment within African couples associated with an increased likelihood of risky sexual behaviors compared to couples with gender-equitable attitudes?
2. Does discordance in attitudes towards women's empowerment in African couples in association with HIV risk behaviors in the relationship differ by man's and woman's age and educational level, a history of STIs, household wealth, polygamous union, and type of residence?

DHS Couples Data Description and Rates

We analyzed predictors, sociodemographics, and outcomes of interest by country using the most recent couples data from the DHS. The overall unweighted sample was 15,216, with each country contributing over 1,000 couples (Table B1). HIV testing rates for respondents were high (over 80%) in all countries.

Table B1 DHS Sample Sizes and HIV Testing Rates by Country

Country	Couples DHS Sample Sizes	Couples DHS HIV Testing Rates+ %
Malawi^{++}	3,764	92.0
Namibia	1,249	80.6
Zambia	7,198	94.3
Zimbabwe^{++}	3,005	89.0

Total	15,216

DHS = Demographic and Health Survey.
+Rates are for those interviewed and consented to HIV testing.
++The DHS tests men up to age 54.

Ethical Considerations

National ethics boards review DHS surveys, and ICF International's institutional review board approves data collection procedures. This study was approved by the University of Georgia and ICF International. We conducted a secondary analysis of existing anonymous data, and thus full Institutional Review Board review and approval was not required.

Conceptual Framework

Figure B1 shows the conceptual framework with TGP using DHS variables to illustrate how sexual divisions among men and women are associated with HIV-related behaviors (multiple sexual partnerships, safer sex negotiation, and sex refusal) and, ultimately, HIV vulnerability in women per Wingood and DiClemente [11]. In defining empowerment, the sexual division of labor construct includes socioeconomic exposures/risk factors (household decision-making and female economic independence), while the sexual division of power construct refers to age and educational differences (linked to control of finances, decision-making authority, safer sex practices, etc.) between partners and attitudes towards wife-beating as a proxy for sexual or physical abuse. We hypothesized that the influence of empowerment on multiple sexual partnerships and self-efficacy might vary depending on the level of other sociodemographic characteristics (control variables), including the couple's place of residence and polygamy, which are contextual variables. Per the literature, each sociodemographic variable is linked to HIV risk behaviors and HIV risk. Thus, these variables may behave as

confounders (distort associations) in the association between empowerment and outcomes of interest (HIV risk behaviors). The analysis designated potential control variables as age of the man and woman [6, 11-35], educational level of both partners [6, 7, 11, 13, 23, 35-48], household wealth (or income inequality) [6, 18, 49-57], both partners' history of an STI [11, 58-64], place of residence [6, 65-69] and polygamy (a man having multiple wives) [19, 70-72]. Thus, we wanted to assess associations with empowerment and the outcomes of interest independent of those variables [8, 73].

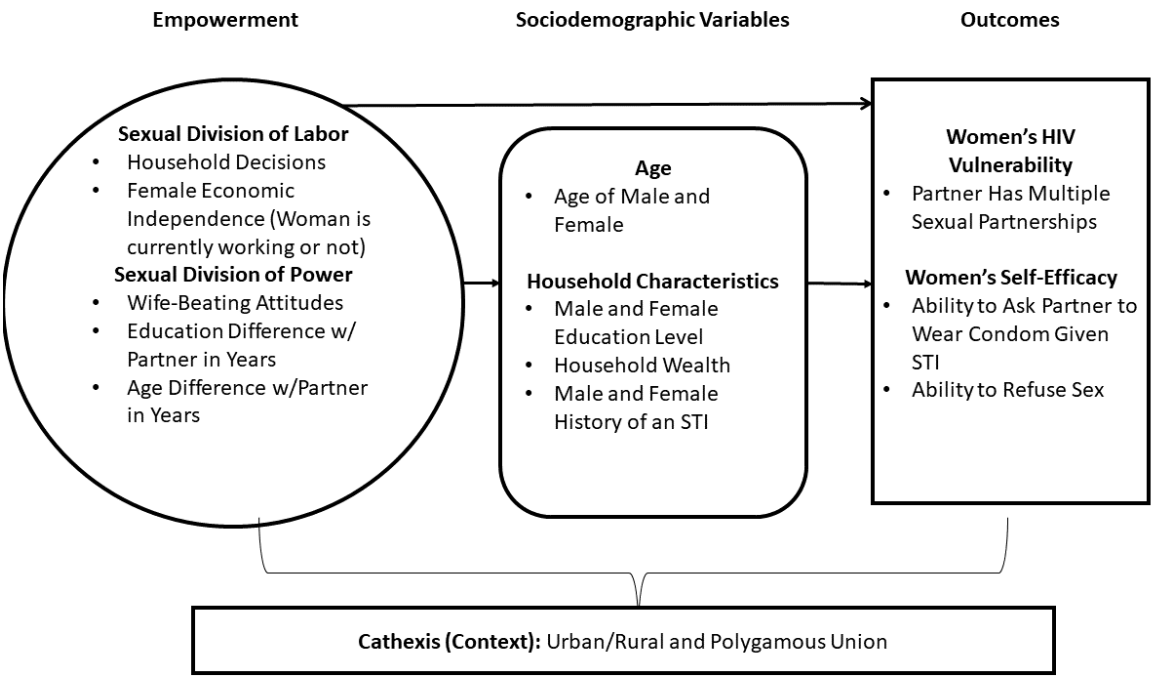

Figure B1 Conceptual Framework Using the Theory of Gender and Power: Associations Between Women's Empowerment and HIV-Related Behaviors (Multiple Non-Marital Sexual Partnerships and Self-Efficacy in Condom Use) in African Couples.

Source: Adapted from Connell, 1987: *Gender and Power* and Wingood and DiClemente, 2000: *Application of the theory of gender and power to examine HIV-related exposures, risk factors, and effective interventions for women.*

DHS Outcomes of Interest

Multiple Sexual Partnerships

We measured the first indicator for risky sexual behavior by the number of multiple sexual partnerships, not including the spouse/partner, reported by the man in the past 12 months before the survey. Preliminary frequency analyses showed low sample sizes for the proportion of women reporting sex with one or more non-marital partners in the prior year. Thus, we only calculated frequencies for men's non-marital multiple sexual partnerships and dichotomized men's responses indicating multiple sexual partnerships as a "Yes" or "No" answer. We removed missing data from this question before multivariable analyses.

Woman Asking a Man to Wear a Condom Given a Sexually Transmitted Infection

The second indicator measured women's self-efficacy in negotiating safer sex. The question asked participants, "Can you/a woman ask a man to wear a condom if he has an STI?" The answers were "Yes," "No," and "Don't Know." We placed all answers into two separate categories: "Yes" and "No" (including "Don't Know") categories and eliminated missing data for this question.

Woman Can Refuse Sex

The third indicator measured women's self-efficacy in refusing sex from her partner. The question asked women, "Can you/a woman refuse sex?" We also placed answers "Yes," "No," and "Don't Know" into two categories ("Yes" and "No" (including "Don't Know")) and removed missing response data for this question.

DHS Main Predictors

Women's Empowerment Index

This analysis used a women's empowerment index to operationalize constructs from the TGP and DHS and predict HIV risk behaviors in couples. First, we defined empowerment with questions involving household decision-making, wife-beating attitudes, age and educational differences between partners, and female economic dependence, per the conceptual framework in Figure B1. Our use of these questions was similar to the development of the Survey-based Women's Empowerment Index (SWPER) derived from the DHS (e.g., questions on decision-making, wife-beating, current employment, age and educational differences) [8]. Next, we removed missing data before the creation of the index. Answers to questions of interest were coded to assign values of "1" to categories of high levels of empowerment and values of "0" to categories of lower levels of empowerment [8]. Finally, we created dichotomous categories for each indicator to compare "high" versus "low" levels of empowerment and combined all components to create a final composite women's empowerment index.

Sexual Division of Labor

Each decision-making question described the type of decisions married women make in their lives and society (the sexual division of labor). The survey question asked participants, "Who usually makes the decisions about (healthcare, major household purchases, visits to her family, and money the husband earns), you, your husband/partner, you and your husband/partner jointly, or someone else?" We considered women as empowered if they made decisions alone or jointly with their partner [74]. We also coded response categories using a technique from a DHS study on empowerment and ideal family size: respondent and the respondent and husband/partner jointly with a "1" and the husband/partner, someone else, and other with a "0"

[74]. We defined female economic independence as whether the woman worked in the past 12 months before the survey (coded as a "1") or not ("coded as a "0"). This question did not ask about the type of work (formal or informal) or whether the woman worked inside or outside of the home in the past 12 months.

Sexual Division of Power

Next, the study included a question about wife-beating to capture married women's attitudes towards domestic violence (the sexual division of power). The question asked participants, "Is a man justified beating or hitting his wife in the following situations?" The reasons were given as follows: if she goes out without telling him, she neglects the children, she argues with him, she refuses to have sex with him, and the food is not properly cooked. We coded "No" responses with a "1" and "Yes" and "Don't Know" received a "0". Then, we coded response categories using the same DHS study on empowerment and ideal family size, creating a variable comparing respondents who said none of the reasons were justified versus those who said one or more reasons were justified [74].

We calculated age difference as the female respondent's age subtracted from the partner's reported age. Then, we created corresponding categories: (1) female partner is the same age or older than the male partner, (2) male partner is 1 to 4 years older, (3) male partners is 5 years older, (4) the male partner is 6 to 9 years older, and (5) the male partner is 10 years older or more. The final age difference category was created from published literature to illustrate that lower levels of empowerment in a relationship were associated with HIV/STI risk [6, 11-27, 30-34, 75, 76]. Next, we created a dichotomous variable for couples with small (partners are the same age, the woman is older, or the partner is up to 9 years older) versus large age gaps (the man is 10 or more years older than the woman). Then, we calculated the difference in years of

education by subtracting the female's years of education from the male's years of education. Subsequently, a new variable included four new educational difference levels. We based our categories on a previous study of gender dynamics in Kenya [77]: (1) male partner with lower level of education than the female partner, (2) male partner with the same level of education as the female partner, (3) male partner with 1-3 years of education more than the female partner, and (4) male partner with 4 or more years of education higher than the female partner. After assessing published work on sexual divisions and HIV risk by educational differences [48, 50], we compared scenarios where the man had fewer or the same years of education as the woman versus those where the woman had fewer years of education.

Finally, we weighted each empowerment indicator equally and combined them to create a composite score of women's empowerment. In statistics, the median (middle value) is not affected by the distribution of empowerment for high empowerment or outliers (extreme observations) in the data [78]. Thus, for analytic purposes, we created a binary variable representing high versus low levels of empowerment based on median empowerment scores by country. We grouped scores that included the median and below into a "low" category and scores above the median in a "high" category.

Couple's Empowerment Attitude Index

Across all four countries, the common survey question asked of men and women was, "Who usually makes the decisions about major household purchases, you, your wife/partner, you and your wife/partner jointly, or someone else?" Next, we used the same questions about wife-beating between men and women to capture domestic violence attitudes (the sexual division of power). The question asked, "Is a man justified beating or hitting his wife in the following situations?" The given reasons were: she goes out without telling him, she neglects the children,

she argues with him, she refuses to have sex with him, and the food is not properly cooked. Next, we cleaned (eliminated missing data) and coded decision-making and wife-beating attitude data in the same manner as the women's empowerment index [74].

We assigned high levels of empowerment attitude scores with "1"s and lower levels of empowerment attitudes with "0"s, then added all components to create final composite attitudes toward women's empowerment scores by sex and country. We added each group of questions to create an initially linear composite variable that was dichotomized corresponding to scores above the median, i.e., "high scores in attitudes towards women's empowerment" versus scores less than or equal to the median, i.e., "low scores in attitudes towards women's empowerment" responses by sex. Finally, a new couple's empowerment in attitude variable was created with four levels:

I. Both man and woman have high scores in attitudes towards women's empowerment. (Empowerment concordance/Equitable gender attitudes)
II. The man has high empowerment attitude scores, and the woman has low empowerment attitudes scores. (Empowerment discordance)
III. The woman has high empowerment attitude scores, and the man has low empowerment attitude scores. (Empowerment discordance)
IV. Both the man and woman have low empowerment attitude scores. (Empowerment concordance)

In this analysis, the reference group was the first scenario indicating the highest level of empowerment attitude concordance. We hypothesized that couples with discordant attitudes towards women's empowerment were more likely to engage in riskier sexual behaviors (e.g., multiple sexual partnerships among men, a woman's inability to negotiate condom use given an STI, and a woman's inability to refuse sex) compared to couples with gender-equitable attitudes.

Sociodemographic Variables

We conducted an assessment for effect modification (association difference by level of a third variable) and mediation (association depends on the presence or absence of a third variable) in the association between levels of empowerment/scenarios of attitudes towards women's empowerment and HIV risk behaviors by wealth tertile *a priori*. However, the results did not yield any relevant findings. In epidemiology, the term confounding refers to a situation in which an observed association between an exposure and an outcome differs (strengthened, weakened, or eliminated) by a third variable [73]. The criteria for a confounder includes three situations:

1) The confounder is causally associated with the outcome and

2) The confounder is non-causally or causally associated with the exposure but

3) Is not an intermediate variable in the causal pathway between exposure and outcome [73].

Per the literature review, the sociodemographics of interest are associated with HIV risk behaviors but are not variables in the causal pathway between empowerment and HIV risk behaviors. Thus, we assessed whether those variables were causally or non-causally associated with the predictor to determine potential confounders (control variables) for multivariable models.

Cathexis or Social Norms

Place of residence reflects whether place matters in how a person experiences gender dynamics and, ultimately, HIV risk behaviors. In these countries, harmful traditional practices impact couples living in a rural setting leading to potential sexual divisions and possibly HIV risk behaviors [79-82]. Alternatively, urban living may facilitate the cultural acceptance and increased financial resources by men to seek more sexual partners in the city [80, 83-86]. The DHS does not consistently capture traditional practices in all countries of interest. Thus, urban/rural living was treated as a proxy for traditional/non-traditional cultural norms. The DHS defined a respondent's place of residence as the type of the location where the interview occurred and whether the cluster or sample is defined as urban or rural [3]. We compared urban dwellers to rural residents to test the assumption that people in rural settings were more likely to experience negative gender dynamics compared to urban dwellers. Polygamy is a situation in which multiple wives marry one man. Polygamy was the only available cultural practice captured consistently in questionnaires across all countries of interest [87-90]. Because HIV risk for a woman in a polygamous union differs by country and the type of wife she is [19, 70-72], we separated polygamous unions into two categories: "Yes" (more than one wife) and "No" (one wife). We assumed that women in polygamous unions might experience lower levels of empowerment compared to women in monogamous situations and created a dichotomous variable comparing non-polygamous to polygamous unions.

Other Sociodemographic Variables

We measured and categorized women's and men's ages in years according to the DHS: 15-24, 25-29, 30-34, 35-39, 40-44, 45+, and 50+ years. We separated education level for both sexes into four categories: none, some primary, completed primary/some secondary, and

completed/more than secondary. We used the DHS wealth index to measure household wealth (owning or not owning a radio, television, fridge, bicycle, toilet (and type), floor material (type), and type of water source) in five categories: lowest, second, middle, fourth, and highest. Then, we collapsed wealth categories into tertiles for simpler analysis: poor, middle, and rich. Three questions investigated previous STI infection ("Yes"/" No"): During the last 12 months, have you had a disease that you got through sexual contact? Did you have genital sore or ulcers in the last 12 months? Did you have genital discharge in the last 12 months? A person had an STI if he/she responded "Yes" to all three questions and "No" if all answers were not in the affirmative.

Statistical Analysis

We performed all analyses by country. The analysis applied DHS sample weights to all analyses of couples data to account for the random sampling design and lower response rates for men from the individual files [3]. Next, we described the entire study sample by country with descriptive and univariate analyses. Then, we estimated differences in the frequency distribution of confounders by levels of empowerment using chi-square analysis. Sociodemographic variables associated with the primary determinant – i.e., empowerment at a p-value less than 0.2 in bivariate analyses – were considered potential confounders (controls) and thus retained in multivariable analyses. During this bivariate assessment, we identified control variables that were strongly associated with empowerment level, which provided redundant information (e.g., collinearity: one variable correlated with another in a model [73]). For example, since education level and wealth were both proxies for socioeconomic status but had strong ($p<.001$) associations with empowerment, we chose one of the two confounders for further assessments. In the first study, we assessed bivariate associations between indicators of the women's empowerment index and outcomes of interest. Next, we compared model fit, statistical precision, and effect sizes for

each indicator in association with respective outcomes in bivariate logistic regression models. Thus, we could determine which TGP components and constructs explained the greatest variation in respective outcomes. For multivariable analyses, we built logistic regression models as specified below, from which odds ratios (OR) and 95% confidence intervals (CIs) were calculated to quantify the association between indicators of women's empowerment and couple's attitudes towards women's empowerment and HIV risk behaviors.

Multivariable Logistic Regression Model:

$\Pr(Y=1) = logit(\pi) = \beta_0 + \beta_1 EI/\ \beta_1 CEI + \beta_2 Man's\ Age + \beta_3 Woman's\ Age + \beta_4 Man's\ Education + \beta_5 Woman's\ Education + \beta_6 Man's\ History\ of\ an\ STI + \beta_7 Woman's\ History\ of\ an\ STI + \beta_8 Wealth\ Index + \beta_9 Urban/Rural\ Residence + \beta_{10} Polygamous\ Union$

Where: Y = Partner Engagement in Multiple Concurrent Sexual Relationships or a Woman Asks for Condom Use Given an STI, or a Woman Can Refuse Sex

$\pi = Pr\ (Y = 1|X = x)$; X = covariates: empowerment index (EI) and couple's empowerment attitudes index (CEI), man's and woman's age, man's and woman's education level, man's and woman's history of STIs, household wealth, urban/rural residence, and polygamous union.

All analyses were performed with SAS® software, version 9.4 [91].

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