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Association between Intimate Partner Violence and HIV Infection among
Married Indian Women in Theni District, Tamil Nadu, India

A dissertation submitted in partial satisfaction of the
requirements for the degree of Doctor of Philosophy
in Epidemiology

by

Dhanalakshmi Thirumalai

2017

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ABSTRACT OF THE DISSERTATION

Association between Intimate Partner Violence and HIV Infection among
Married Indian Women in Theni District, Tamil Nadu, India

by

Dhanalakshmi Thirumalai

Doctor of Philosophy in Epidemiology

University of California, Los Angeles, 2017

Professor Roger Detels, Chair

The prevalence of HIV infection among women in India is on the rise accounting for nearly 40% of all HIV infections in the country. This calls for further investigation since the majority of women at risk for HIV live in a monogamous marital relationship with no risk factors of their own. Intimate partner violence against women not only increases their risk of acquiring HIV infection, it also diminishes their ability to protect from HIV, and thwarts their access to care. Hence, we investigated the association between HIV and IPV among married Indian women who were currently living with their husbands.

We conducted a case control cross-sectional study in Theni district of Tamil Nadu in South India. A total of 763 women participated in the study consisting 256 HIV+ve

women and 507 HIV-ve women. We used two type of interviews, face to face interviews (FTFI) and Audio Computer Assisted Self Interviews (ACASI) to collect both sensitive information as well as non-sensitive information from each participant.

Our results showed that it is common for women to experience violence in the hands of intimate partners. HIV positive women were more likely to report lifetime sexual abuse (FTFI: AOR – 2.54, 95% CI: 1.11-5.82; ACASI: AOR – 3.31, 95% CI: 1.91-5.75) than HIV negative women. We found a positive association between HIV infection and the combined experience of physical and sexual abuse compared to no abuse (FTFI: RRR – 2.44, 95% CI 1.06-5.62; ACASI: RRR – 3.03, 95% CI: 1.76-5.21). Husband’s alcohol use, husband’s controlling behaviors, previous abuse by non-partners and IPV among parents were associated with women’s experience of intimate partner abuse. Women who were HIV positive (ACASI: AOR – 2.02, 95% CI 1.08-3.74) and victims of previous IPV (FTFI: AOR – 9.88, 95% CI 5.37-18.18; ACASI: AOR – 7.26, 95% CI 3.70-14.21) were very likely to engage in violence against their husbands. HIV positive women with a previous history of partner abuse were also very likely to experience adverse reactions from their husbands following HIV disclosure (FTFI: AOR – 3.51, 95% CI: 1.66-7.42; ACASI: AOR – 2.74, 95% CI: 1.31-5.70). We found more number of women irrespective of their HIV status reporting positively for sensitive behaviors in ACASI than FTFI indicating that ACASI can be an efficient tool for collecting sensitive information.

The dissertation of Dhanalakshmi Thirumalai is approved.

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2017

Dedicated

To my husband

Shankar

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LIST OF ABBREVIATIONS

ACASI	Audio Computer Assisted Self Interview
AIDS	Acquired Immunodeficiency Syndrome
AOR	Adjusted Odds Ratio
ART	Anti-Retroviral Therapy
BI	Bias Index
CASI	Computer Assisted Self Interview
CAPI	Computer Assisted Personal Interview
CI	Confidence Interval
CTS	Conflict Tactics Scale
DHS	Demographic and Health Surveys
FTFI	Face to face interview
HIV	Human Immunodeficiency Virus
ICTC	Integrated Counseling and Testing Center
IDU	Injection Drug Use
IPV	Intimate Partner Violence
MCTS	Modified Conflict Tactics Scale
NACO	National AIDS Control Society
NFHS	National Family Health Survey
NGO	Non-Government Organization
OR	Odds Ratio

PABAK	Prevalence and Bias Adjusted Kappa
PCA	Principal Component Analysis
PI	Prevalence Index
RRR	Relative Risk Ratio
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infections
UCLA	University of California Los Angeles
UNAIDS	Joint United Nations Program on HIV/AIDS
VCASI	Video Computer Assisted Self Interview
VCT	Voluntary Counseling and Testing
WHO	World Health Organization

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CHAPTER 1

INTRODUCTION

Background

Even after three decades of diagnosis of the first AIDS case, HIV infection still continues to affect millions of people around the globe every year.¹ Heterosexual transmission is the main mode of transmission in the world accounting to 85% of all HIV infection. This places an emphasis in the understanding of the factors that affect the sexual transmission of HIV especially when one of the partners has no risk behaviors of his/her own. In recent years, the prevalence of HIV among women in the general population is on the rise in many countries which necessitates a better understanding of this problem. Evidences from America, Africa, and South East Asia have highlighted the problem of intimate partner violence (IPV) in the transmission of HIV and other sexually transmitted infections (STI) as well as the effect of IPV in the lives of people with HIV infection.²⁻⁹

The context of intimate partner abuse in HIV transmission poses a serious problem in countries like India, where the majority of married women have no risk factors of their own.¹⁰ Social, cultural norms and expectations for women are important in comprehending this problem. Even though, Indian men worship many goddesses who are considered as the symbol of power and strength, the status of women in India is still contentious. Most Indian women face gender discrimination and cannot stand up for their rights due to cultural norms and economic dependency on their husbands or family members. If any bad occurrences happen in the family, women are usually blamed for

causing it. ¹¹ This is true even in case of deadly diseases like HIV/AIDS. Although, the majority of Indian women are infected by their partners owing to their promiscuous behaviors or injection drug use (IDU), usually the wives are blamed for bringing bad luck and thereby the infection even if they are not HIV positive. Issues relating to poverty, gender inequality, cultural norms and behaviors still pose a major challenge on the road to prevent transmission of HIV infection across the world.

Across the world, many countries have made progress in improving their HIV/AIDS situation. However, the impact of HIV/AIDS across the globe is still staggering. According to the 2016 UNAIDS global report on HIV/AIDS, there were 36.7 million (34 million – 39.8 million) people living with HIV/AIDS in the world, 2.1 million (1.8 million – 2.4 million) new HIV cases, and 1.1 million (940,000 – 1.3 million) deaths due to HIV/AIDS. ¹ There is steady increase in the global prevalence of HIV infection among women in the general population over the past several years accounting for about 50% of all HIV infections in adults. ^{1,12} In 2015, adolescent girls and young women aged 15-24 years accounted for nearly 20% of total new HIV infections among adults across the globe. This is concerning as women in this group only account for 11% of the total adult population. This disparity is even more striking in areas where the HIV prevalence is high such as Sub-Saharan Africa adolescent girls and young women of ages 15-24 years accounted for 25% and women greater than 15 years of age accounted for 56% of new HIV infections among all adults. ¹

In India when the first AIDS case was diagnosed in 1986, it was mainly a disease of high risk groups like commercial sex workers, injection drug users and men who have

sex with men. The first case was diagnosed in Chennai, Tamil Nadu among commercial sex workers.¹³ Ever since the first case, AIDS cases have been reported in all of the Indian states and union territories. Extreme spread of the disease is found to be in the southern half of the country and in the far northeastern part with entirely different modes of transmission in those two areas. Heterosexual transmission is the major mode of transmission among the southern states whereas IDU is the main cause in the northeastern part of the country.^{13,14} Overall, 85% of all HIV infections in India are attributed to heterosexual contact and over 2% of the infections are attributed to injection drug use (Manipur and Nagaland).¹⁵

According to the 2011 census data, India is home for over 1.21 billion people, more than half (62.5%) of whom are 15-59 years old.¹⁶ With a population that large, even a small percent of people affected with HIV/AIDS will contribute to a greater burden to the society. Estimates from 2015 HIV/AIDS sentinel surveillance data indicated that the national adult (15-49 years of age) HIV prevalence in India is approximately 0.26% (0.22% - 0.32%) accounting to about 2.1 million people with the disease.¹⁷ The prevalence is higher among males with 0.30% whilst for females it is 0.22%. Currently, women (>15 years) account to nearly 40% of total HIV infections in India. In Tamil Nadu, the prevalence of HIV is slighter higher than the national prevalence with 0.28% (0.23%-0.34%), higher in males (0.39%) than females (0.18%).

The main source of infection among Indian females in the general population is their partners through heterosexual contact.¹⁰ Indian women live in a male dominant society with wide gender gaps deep-rooted in the society. While women are expected to

be in a monogamous relationship, men usually have the freedom to have multiple sexual partners. Ninety percent of the Indian women live in a monogamous relationship with their married partners. It's the men's extramarital sexual behaviors that introduce HIV and STI to women in their marital lives.^{10,15,18-20} Further, biological makeup of women's genital system also places them in a disadvantageous position by increasing their risk of acquiring HIV higher than that of males. Among sero-discordant couples, male to female transmission is significantly more likely than female to male transmission in any single act of unprotected sex.^{21,22} Transmission of the virus is 10 times higher among females with sexually transmitted infection.³ Further, STDs complicate the situation by delaying the detection of infection due to its asymptomatic nature.²⁰

Evidence from studies conducted across various parts of the world has shown that intimate partner violence (IPV) as one of the major factors that affect the HIV/STI status in women.⁴⁻⁸ HIV positive women attending health centers and VCT centers reported more lifetime partner violence compared to HIV negative women.^{4,6,7} Increasing evidence from qualitative and quantitative studies conducted in Asia also supports the association of IPV and HIV among women.^{8,9,23-28} IPV is critical in understanding the dynamics of HIV transmission among married women in India because of the lack of other risk factors other than being married in a monogamous relationship.²⁹ HIV infection might also likely to increase women's risk for intimate partner violence. HIV positive women in Africa reported higher rates of victimization compared to HIV negative women.^{6,7,30,31} While studies conducted in the US showed no difference in victimization with respect to HIV, the frequency and severity of IPV was greater among

women with HIV. ³² IPV can also act as a barrier to HIV positive women's access to health care and treatment. ³³⁻³⁵

Intimate partner violence and HIV infection

The United Nations defines IPV as “any act of gender-based violence that results in, or is likely to result in, physical, sexual or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or private life” in its Declaration on the Elimination of Violence against Women (1993). ³⁶ The Federal ministry of women and child development of India defines domestic violence as an “actual abuse or the threat of abuse whether physical, sexual, emotional or economic”. ³⁷

Domestic violence exists in almost all of the countries in the world. From the analysis of data from 35 countries before 1999, it was found that nearly 10-52% of women were physically abused by their partners and 10-30% were sexually abused by their intimate partners during their lifetime. ^{38,39} Due to differences in study methodologies and measures, it is challenging to compare the results between countries. Varying estimates were also obtained within countries due to differences in the study population, socio-cultural factors, and bias due to non-response. To address this problem, WHO conducted a multi country study to determine the prevalence and types of violence among women in 10 countries from different continents of the world. ⁴⁰ Findings from this multi country study showed that the lifetime prevalence of physical violence by partners ranged from 13% -61%, the lowest value was observed in Japan city and the highest in Peru province. The lifetime prevalence of sexual violence by partners was 6%

among women in Japan city, Serbia and Montenegro to 59% among women in the Ethiopian province. The lifetime prevalence of either sexual or physical violence by intimate partners ranged from 15% in Japan city to 71% in the Ethiopian province. Women from Japan city reported low prevalence of all forms of violence compared to the rest of the countries that participated in the study. Women from Bangladesh, Ethiopia, Peru and the United Republic of Tanzania reported higher prevalence of partner violence. Findings from this study suggest that intimate partner abuse is less prevalent among industrialized countries where women are independent in making decisions for themselves with regards to their intimate relationships.

In the US nearly 1.3 million women and 835,000 men undergo physical abuse by their intimate partners every year. ⁴¹ Findings from the National Violence against Women survey showed that 17.6 percent of the women surveyed were victims of sexual violence or rape during their lifetime. Among these women, 50% were raped before they turned 18 years of age. Women who belong to certain ethnic groups such as Hispanic women were less likely to report rape than other groups. Also, women who reported rape before 18 years of age were two times more likely to report rape as an adult. Women also experienced more intimate partner violence than men (22.1% vs 7.4%). More than 64% of women who reported any form of violence (rape, physical assault, stalking) since 18 years of age reported intimate partner abuse by their current or former husbands, boyfriends, cohabiting partners or dates. Women who were victims of abuse were also less likely to seek help for their suffering. Only a third of the abused women undergo treatment for their recent physical assaults and rape.

Previous studies in the US among women seeking care from public hospitals, primary health care settings, and emergency departments have shown a significant percent of women (15%-30%) as victims of intimate partner abuse in the past 12 months.^{42,43} However, nearly 50% of women reported lifetime violence in these settings. In addition, higher rates of violence were found among African American couples compared to Whites and Latinos from the National Survey on Families and Households.⁴⁴ Even though both men and women reported that they were victims of violence, women were more likely to report injuries associated with violence. Other findings from this survey indicated that people who were young with low educational status, poor economic status, and living in urban areas were more likely to report physical violence in their families. From the Behavioral Risk Factor Surveillance System survey in 2005, it was evident that women who experienced lifetime IPV were more likely to report adverse health conditions (high blood pressure, diabetes, joint diseases, cardiovascular diseases, etc.) and high risk behaviors (IDU, treatment for STD, smoking, alcohol use, no condom use etc.).⁴⁵

Most of the early evidence for intimate partner abuse in the transmission of HIV comes from studies conducted in the US. Due to the low prevalence of HIV infection among the general population, special populations from women attending emergency departments, men & women from methadone clinics, antenatal clinics, and primary health care settings were studied.⁴⁶⁻⁵⁵ Most of the studies confirmed a positive relationship between partner abuse and HIV infection with different risk factors.

Research conducted in Africa and Asia also showed evidence for the impact of intimate partner violence on HIV infection. The risk of HIV among women who experienced violence is 3 times higher than women who did not experience any violence in many African countries.⁴⁻⁶ In a study of women attending health centers in South Africa, abused women had higher odds of getting infected with HIV than women who were not abused; and those who were controlled emotionally and financially by their partners were 52% more likely to be infected compared to women who were not controlled by their partners.⁴ A small study of 245 women attending a VCT center in Bangalore reported a high percentage of women (49%) experiencing partner abuse.⁷ From the National Family Health Survey 3 (2005-2006) it was apparent that women who experienced physical abuse in the presence of sexual abuse from their husbands were more likely to be infected with HIV than who were not abused. Physical abuse in the absence of sexual abuse as well as women's own risk behaviors did not have an effect on HIV infection.⁵⁷

Understanding of violence against women in India is very complex. Women experience violence both from their natal family members and marital family members.⁵⁸ Female children are usually not treated in par with male children in the family. Female children are often denied education and access to materials as opposed to male children. Marriage is considered essential in every girl's life as a safe transfer to husband's hands who is then under the control of her husband for the remaining part of her life. Violence against women is also normalized when women do not adhere to their perceived gender

roles in a marital relationship. Some of the gender roles include being faithful and obedient to their husbands, performing household chores and bearing children, etc.⁵⁹

According to the Indian National Crime Records Bureau, for every three minutes there is one case of violence against women and for every nine minutes there is one case of violence perpetrated by husband or close family members.⁶⁰ Previous estimates of IPV prevalence ranged from 40% - 70% across the country.^{59,61,62} From the National Family Health Survey 3 (2005-2006), it was evident that more than one third of the married women experienced either physical or sexual violence.⁶³ One in 10 experienced sexual violence by their husbands in the past 12 months before the survey. IPV was also found disproportionately among poorer households (49%) compared to wealthier households (18%). In India, Bihar state ranked high with 59% of spousal abuse among ever married women. From the survey it was apparent that only 25% of the abused Indian women sought out for help and the majority of the women who did not seek out for help never disclosed to anyone about their abusive experiences. Women were at risk of physical abuse not only by their partners but also by their in-laws and relatives.

In a study of health records for domestic violence in Thane district, Maharashtra state, only 13.8 of the hospital medico legal cases reported domestic violence as the cause of injury.⁶⁴ Further investigations of the records revealed an additional 38.8% of women who were diagnosed as probable cases of domestic violence based on the mode of injury and diagnosis. This uncovered that more than half of the medical legal cases reported in the hospitals were domestic violence cases. A vast majority of the hospital reports lack detailed information on the perpetrators, referrals, etc. Lack of information or incomplete

data makes it difficult to assess the prevalence of domestic violence among women attending health care facilities. Of all the violence reported, sexual abuse was the least reported in hospital records. This study also administered self-reported questionnaires that revealed more than 60% of the women were suffering from psychosocial stress and 39% with suicidal ideation due to domestic violence. More than half of the women experiencing domestic violence who sought help from the hospitals were between the ages of 18 and 30.

Indian women usually undergo severe forms of abuse before they seek out for help. One study that examined records from domestic violence service providers in the South Indian city of Bangalore, found that women often suffer from a combination of different forms of violence (physical abuse, psychological abuse, mental abuse, abuse of loved ones, cruelty & torture) from their partners & in-laws.⁶¹ Most women tend to rely on their birth families for help before they seek out for services from hospitals, police & other service organizations. Physical and verbal abuses were the most common form of abuses among all. Sexual abuse was reported only in 4% of the cases who sought out these service centers. This implies that they might feel discomfort in disclosing sexual violence to others. Also, women might not perceive nonconsensual sex as inappropriate between lawfully wedded partners due to their cultural and social customs.

Reporting of partner abuse varies within different states in India. South Indian women report less wife beating incidents than women in the north.⁵⁹ Only women who were beaten severely report abuse and the others accept abuse as a common occurrence in their marital lives. Deep ingrained gender norms and inequalities in society prevent

Indian women from protecting themselves against domestic violence and HIV/STD. Most women are unaware of their risk factors and do not have any social and cultural support to practice safe sex behaviors with their husbands.²⁹ Sexual behaviors and condom use are mostly initiated and controlled by their husbands. Women are often afraid to talk about their husband's extramarital sex and initiate any safe sex behaviors because of the fear of violence.^{28,65} Economic dependency of women also leaves them with low autonomy in their marital relationship. With increasing feminization of the HIV epidemic in India, it is important to understand and address the intimate partner violence that puts women at risk for HIV infection especially when they do not have any risk factors of their own. A previous study among north Indian men reported that men who engage in extramarital sex and suffer from sexually transmitted diseases were more likely to perpetrate violence against wife.⁶⁶ Given this situation IPV can also be considered as a risk marker in having a higher probability of an infected partner. Fear of IPV also affects women's health seeking behavior resulting in the delayed diagnosis of HIV infection and treatment.^{56,67,68}

Determinants, correlates and covariates of intimate partner abuse and HIV

Determinants of partner abuse vary with regards to socio-cultural context and economic differences between men and women.⁶⁷ Previous studies on domestic violence and HIV also showed evidence for different risk factors based on study populations. These studies documented varying effects of these covariates with respect to the characteristics of the population under study. This effect was seen within India due to varied cultural differences within different states of the country. In South India, risk

factors for partner abuse include husband's alcohol use, smaller dowry payments from wife's family, husband's sero-status for HIV, financial burden, living in a nuclear family, no male children, etc.^{7,59,69} However, living in a nuclear family was not associated with partner abuse in the study of Uttar Pradesh men.^{66,70}

Socio-demographic characteristics

Age of ever married women is considered to have a direct effect on domestic violence experiences. With the increase in the age of women, the time period to exposure of domestic violence also increases resulting in the higher prevalence of domestic violence. However, this relationship is not linear as found from previous research.⁶⁸ This can be attributed to older women getting used to domestic violence in their long duration of marriage and treating it as a normal occurrence in the relationship or developing a tolerance for abuse. From the Indian National Family Health Survey, it was evident that sexual violence was more prevalent among younger women compared to older women.⁶⁵ Only 14% of older women of age 35 and above reported that they had ever been coerced into sex by their husbands compared to 28% of younger women reporting the same behavior. An African study among women seeking services from a VCT center, showed that younger HIV positive women (<30years of age) reported domestic violence 10 times more than that of HIV negative women. However, there was no difference among older women in their likelihood to report violence with respect to their HIV status.⁶ Age of the husbands also plays a significant role in the reporting of intimate partner violence.^{6,70} Women whose partners were much older than them were less likely to report violence

compared to women with younger partners even after controlling for women's age and the difference in age between partners.

Women's age at marriage also affects the reporting of domestic violence experiences. Age at marriage may be reflective of the status of women in the society as well as the maturity of women at the time of marriage. Women are married young in communities where women are not treated equal to their men counterparts.⁷¹ From a DHS multi country study, all of the 10 countries in which IPV was measured showed that women who married young were reported to be victims of violence compared to women who married at 25 years or older.⁶⁸ On the contrary, young men were more likely to report perpetrating domestic violence.^{66,67}

In a large study among men conducted as a part of the male reproductive health survey in Uttar Pradesh state in India, married men who physically abused their wives were more likely to have nonconsensual sex with their wives.⁷⁰ Also, wife abuse was positively associated with husband's low educational level, poverty, young age of husbands at marriage, and symptoms of STD. Being married for more than 5 years influenced men's perpetration of abuse against their wives.

Poverty is one of the major contributing factors for wife abuse.^{66,72} Although IPV is seen among all socio-economic classes, it is a common occurrence among poor households. Poverty leads to economic burden which causes stress among couples resulting in IPV.⁷³ Women's higher financial status was found to be protective against partner abuse in some cases. However, in India, it produces a negative effect when men

are not working in a household.⁷² Hence, the economic inequality among man and woman in a relationship should be taken in to account.

In a multi-city study conducted in India, similar effect was observed with respect to women's educational status.⁶² Disparity in educational level was significantly related to psychological abuse and not to physical abuse. Women whose husbands had secondary school or higher levels of education reported less violence compared to women whose husbands had less than secondary school education.⁶⁸ Women with higher educational level may have the resources to depend on in times of need during violence attacks. IPV was also found to be higher among women living in rural and urban slum areas than urban non-slum areas. This may be due to the poor economic status and low educational level among women living in these areas. In South India, smaller dowry payments at the time of marriage results in wife abuse in an attempt to get more money from the woman's birth family.⁵⁹

The risk of experiencing domestic violence for a woman increases with the increase in the number of children.^{62,63,70} The direction of this relationship remains very ambiguous as to whether violence led to greater number of children or more children led to violence due to economic burden. Increased fertility among women is also considered to be a marker for women's lack of control over the use of contraceptives or the lack of power to negotiate condom use.⁷¹ In the multi country DHS study, eight out of nine participating countries showed this positive relationship between the number of children and the women's experience of partner abuse.⁶⁸ On the other hand, having no children

also results in wife abuse.²⁵ In this case, women are blamed for not having the ability to bear children.

Younger women at marriage are also at increased risk for contracting HIV infection due to their biological makeup and gender norms. In rural India, nearly 60% of the girls are married before they turn 18 years of age and among those nearly 60% bear their first child before they turn 19.⁷⁴ Young women's genital tracts are biologically not prepared for sexual interactions which causes lacerations and tears directly increasing their risk for infection. Due to fixed gender norms they are also expected to abide to their husband's sexual demands. At a younger age, they do not have the knowledge about HIV and protective behaviors to prevent the transmission of HIV. For women, young age combined with low education and low socio-economic status increases their vulnerability for HIV infection.^{4,10,20}

Sexual behaviors & sexual control

Extra-marital relationship is very commonly seen among Indian men whereas only few percent of Indian women have sex outside of their marriage.¹⁸⁻²⁰ This is in contrast to women in South Africa where nearly 44% of women visiting antenatal clinics reported having more than 5 sexual partners.⁴ In the Indian National Family Health Survey III, only a very small percent (2%) of women reported having had multiple sexual partners. These women reported higher prevalence of IPV compared to those with only one lifetime sexual partner.^{57,64} However, the risk of HIV was higher among women who experienced IPV even after accounting for their own high risk behaviors. Sexual dissatisfaction in men with their partners is usually attributed to their increased

masculinity.⁷⁵⁻⁷⁸ Curiosity about sex and increased sexual desire results in seeking out for extra marital sex in these men. In the Indian multi-site household survey, 17% of women accused men for having extramarital sex and attributed it for causing conflicts in their relationship. On the other hand, 14% of women reported that they were blamed for their husband's infidelity.⁶²

Men also control the use of condoms and other contraceptive methods in the marital relationship. Apart from gender norms and social values that hinder women from practicing safe sexual behaviors, they are unaware of such safe sex practices that may prevent the transmission of HIV infection.²⁹ Women who show interest in the use of condoms are often blamed for lack of sexual desire or lack of trust in their husbands.⁵ Even if women are aware of their husbands' extramarital relationship and their perceived risk for HIV infection, they do not want to risk their current lives by negotiating safe sex behaviors.

Previous domestic violence experience

Women who experience violence in their families or in their neighborhood can normalize violence in an intimate relationship, thereby falling as a victim of partner abuse.⁷⁸ Their previous encounters with intimate partner violence were also found to be associated with their current experiences of domestic violence^{62,79} Women who witnessed their fathers engaging in violence against their mothers reported more violence than women who did not witness any violence in their family.⁶² Moreover, a higher proportion of women living in slums from both rural and urban areas reported witnessing

parental violence compared to women living in urban non-slum areas. This also highlights the high prevalence of domestic violence among poorer households.

Partner's alcohol use

Besides from the above-mentioned factors, there is strong evidence for association between partner's alcohol consumption and domestic violence, especially prior to having sex.^{25,62,63,79} Men under the influence of alcohol are more likely to commit partner violence compared men who are sober.^{62,79} In a study conducted in a South Indian city of Bangalore, 40% of women reported experiencing violence from their alcohol abusing spouses compared to only 11% of women who reported violence from their non-alcoholic spouses.⁶³ Men who consume alcohol resorted to violence to resolve any conflicts arising in the relationship results in increased violence among partners.⁷⁹

Alcohol use is also a known risk factor for acquiring sexually transmitted infection through many ways. It can influence a person to engage in high risk activities such as having multiple sexual partners, forgetting to use condoms or using condoms improperly.^{73,81} Studies conducted in Africa and elsewhere in the world have found an association between alcohol use and high risk sexual behaviors.^{73,80-84} A cross sectional study conducted among high risk men in Mumbai who were visiting female sex workers, showed that men who were under the influence of alcohol were more likely to have HIV or STI compared to men who did not drink.⁸⁴ Alcoholic men were also 3 times more likely to engage in unprotected sex with female sex workers than non-alcoholic men. They were also more likely to engage in other high risk behaviors such as anal sex with female sex workers, and having more than 10 sexual partners. While there is evidence to

show the impact of alcohol use on unsafe sexual activity in India, the exact mechanism is still being studied.

In Tamil Nadu, a qualitative study of clients of community based alcohol outlets or wine shops showed that men under the influence have increased boldness and no inhibition in seeking sex from sex workers.^{73,80} Men from lower socio-economic groups spend most of their daily wages indulging in alcohol as a way of enjoying their life.

Disclosure of HIV infection

HIV infected people often undergo abandonment and fear of rejection after the disclosure of their status to their partners and family.^{85,86} In some instances, women fear of violence if they disclosed their HIV sero-status.⁸⁵⁻⁸⁸ However, there is also evidence of high percent of HIV positive women disclosing their status to multiple people. Even though a majority of the women reported only positive consequences and supportive behaviors after disclosure, a significant number of women faced negative consequences that includes physical violence and verbal abuse. Delay in disclosure is also associated with having unprotected sex, thereby increasing the risks of the partner. Most studies investigating the relationship of HIV disclosure and abuse have not looked at the time of occurrence of abuse. In many instances, violence occurs as a consequence of disclosure of HIV status rather than a precursor for HIV infection. Women with a history of physical or sexual violence were also more likely to experience negative consequences from disclosing their HIV infection.^{89,90}

Use of interview methods

Research involving sexual behaviors and high risk behaviors are traditionally collected through interviewer administered questionnaires. However, there is always room for reporting bias due to under reporting of stigmatized behaviors and over reporting of socially desirable behaviors in interviewer administered surveys.^{91,92} Face to face interviews (FTFI) require interaction between interviewers and respondents which in turn influences participants' responses. On the other hand, self-administered questionnaires can be very useful in collecting sensitive information from the participants by providing a confidential mode of data collection. Nonetheless, self-administered questionnaires cannot be administered in developing countries owing to the high illiteracy rate. With advancement in computer technologies, newer methods of interviewing using computers and handheld devices such as tablets and mobile phones are developed to overcome this problem.

Increasing evidence from the US and across the world have shown that alternative modes of interviews than traditional face to face interview method are valuable in increasing the reporting of sexual behaviors, domestic violence, and other high risk behaviors like drug use.⁹³⁻¹⁰¹ Some of the methods include Computer Assisted Personal Interview (CAPI), Audio-Computer Assisted Self Interview (ACASI), Video-Computer Assisted Self Interview (VCASI), use of handheld devices, use of websites, etc. Using these methods, participants can follow the instructions from audio or video prompts without the help of interviewers and record their answers in complete privacy. This helps in maintaining anonymity which results in better reporting of stigmatized behaviors.

ACASI has not been widely tested in India due to problems that may arise from high illiteracy rate. However, the feasibility of using ACASI is tested in several instances in African countries with similar settings like India where the literacy rate is very low.^{99,100,102} In these studies, most women preferred ACASI over traditional interview methods. However, the usability of these surveys increased with increasing levels of education. In a multi-country cross-over study conducted to check the feasibility of ACASI for HIV prevention behaviors in China, Peru, Russia, India, and Zimbabwe showed that most participants were comfortable using computers. They found it easy to follow the instructions in the computer to complete the surveys. However, participants from India did not show any preference for interview methods and tend to answer similarly between interview modes.¹⁰³

Use of ACASI not only improves reporting of sensitive behaviors but also indicates the underlying motivations of the respondents. One study assessing the difference between ACASI and face to face interviews reported that subjects were more likely to report stigmatized behaviors in ACASI and psychological suffering in face to face interviews.⁹⁹ Similar differential reporting was noticed in a study of African young boys and girls in which boys reported more sexual partners in face to face interviews compared to ACASI whereas girls reported more high risk behaviors in ACASI than face to face interviews.⁸¹ Social desirability and fear of stigmatization that influenced differential reporting between interview methods can be attributed to the specific culture of the participants being studied.

Questionnaires involving sensitive information like sexual behaviors and domestic violence usually involve very complex and numerous skip patterns. With the use of computers, it can be automatically programmed to include skip patterns based on the responses. Also, it can be programmed to not allow any missing or invalid entries. Further, the use of ACASI standardizes the administration of questions across all participants thereby reducing interviewer bias.

Study objectives

A majority of existing research on partner abuse was conducted through traditional face to face interviews and focus group discussions. In face to face interviews, the quality of the data predominantly relies on the interviewer's skills in establishing a good relationship with the participants and gaining their trust to report sensitive behaviors. In focus group discussions, the participants may underreport violence due to fear, shame and embarrassment in public to disclose stigmatized behaviors. Use of modern techniques like tape recorders, CDs, and computer based methods like CASI, CAPI, ACASI other than the traditional interview methods has resulted in better reporting of sensitive behaviors in many parts of the world [95-102]. Hence, we investigated different types of IPV and its association with HIV infection in women from a semi-rural district in South Tamil Nadu, India using two different modes of interviews such as face to face interviews (FTFI) and Audio Computer Assisted Self Interviews (ACASI). This will aid in the understanding of the relationship between HIV and IPV especially in women from rural areas with low literacy and economic conditions where traditional self-administered questionnaires cannot be used effectively to collect sensitive information.

The specific objectives of this study were: 1. to compare the differences in the reporting of IPV and sexual behaviors among women using both face to face interviews and ACASI; 2. to determine the association of intimate partner violence and its types with HIV infection; 3. to determine the association between intimate partner violence and the adverse reactions after disclosure of HIV infection to intimate partners.

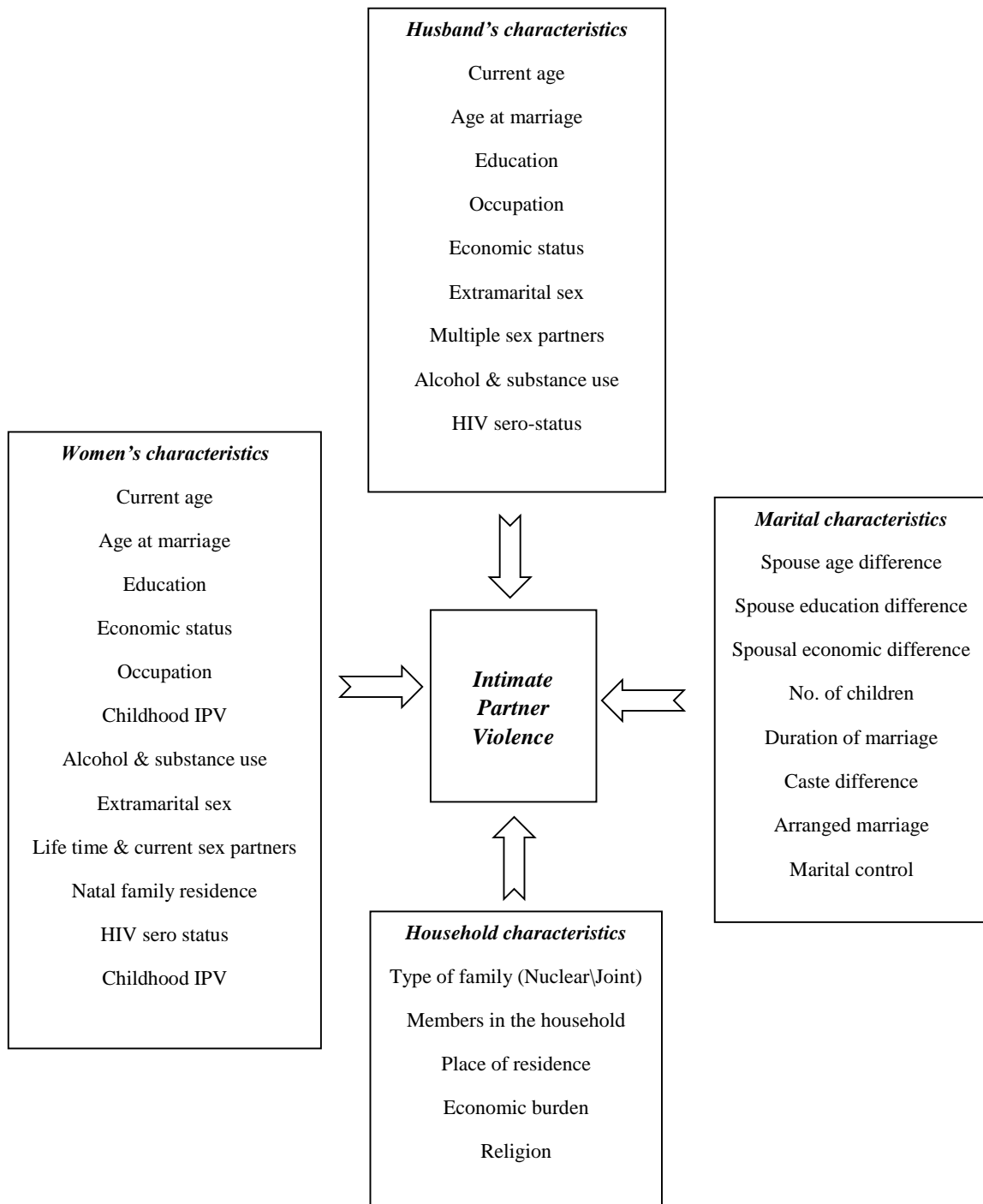


Figure 1.1: Factors affecting intimate partner violence in married Indian women

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CHAPTER 2

METHODS

Study design

We used quantitative method of data collection with a cross-sectional case control approach. Two groups of women were recruited, a case group with HIV positive women and a control group with presumably HIV negative women. All women participated in both face to face interviews as well as Audio Computer Assisted Self Interviews at one specific point in time.

Study area

Our study area, Theni district is known for its green vegetation and luscious mountains. It is located in the southern part of Tamil Nadu state directly under the foothills of Western Ghats mountains which runs along the western coast of Indian peninsula. Theni district was formerly combined with Madurai district until it bifurcated to form a new district in July, 1996. ¹ It covers a total of 2868 square kilometers of land and located between 9' 39' and 10' 30' North latitude and between 77' 00' and 78' 30' of East Longitude. ² In 2011, the population of Theni was 1,245,899 out of which 625,683 were males and 620,216 were females. Theni district accounts for 1.73% of the total population in Tamil Nadu state. Average literacy of people in Theni is 77.26%; males with a higher literacy of 85.03% compared to females with 69.46%. Nearly half the population (46.18%) lives in rural regions of the district. Agriculture is the main economic source of this district. Major crop productions include cotton, sugarcane, rice, cereals, millets, coffee, tea, cardamom and grapes. ³ Theni district lies en route from

Madurai to Munnar or Madurai to Thekkadi which are two major tourist destinations in the South.

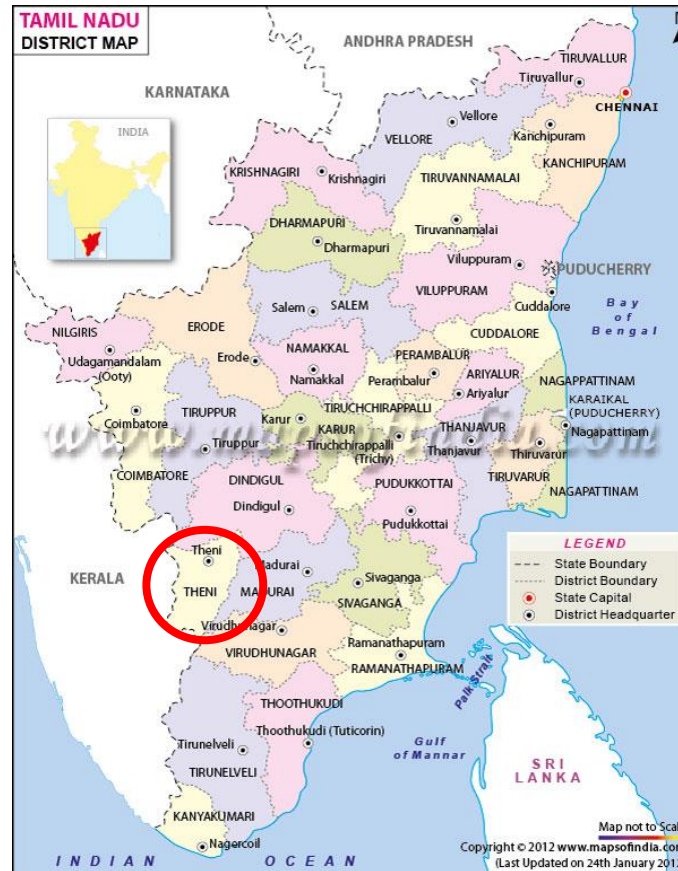


Figure 2.1: District map of Tamil Nadu state, highlighting the district of Theni
Source: www.mapsofindia.com

Eligibility criteria

Eligibility criteria included women between the ages of 18 to 50 years, who were married and living with their husbands at the time of interview.

Sample size

A total of 796 women were recruited of whom 33 women dropped out for various reasons (Figure 2.2). Out of all women recruited, 763 women were included in the final

analyses who had completed both types of interviews. The final sample consisted of 256 HIV positive and 507 presumed to be HIV negative women.

Recruitment of the subjects

HIV positive women were enrolled through the help of two Non- Governmental Organizations (NGO) in Theni district. The duration of data collection lasted from June 2014 to September 2014. Staff working at the NGOs contacted HIV positive women who received services from their office and obtained their consent to participate in the study. The study required women to participate in two different types of interviews in succession. Interviewers contacted those who consented to participate and conducted interviews at the NGO's office. All participants were assigned unique identification numbers and none of their personal information was recorded. To recruit controls, interviewers noted down the addresses of the cases without registering any of their personal identifiers. The addresses were not linked to their identification numbers. For each case recruited in the study, two neighborhood controls presumed to be HIV negative were recruited in a random manner. First, interviewers mapped all the houses in the same neighborhood as that of the cases. Next, they used a random number table generated for sampling purposes to approach households and recruit controls. Only one control was selected from a household if there were more than one eligible participants. After recruitment of controls, the addresses of the cases were permanently deleted from our research records. Controls were not tested for HIV infection. During the interview, controls were asked for their HIV status if they had been previously tested for HIV.

Interviews were conducted in the privacy of the participants' home for HIV negative women.

All participation in this research was purely voluntary and anonymous. An oral informed consent was obtained from all of the participants after explaining the study procedure, risks and benefits. Privacy of the participants was maintained at all times as per protocol. Ethical board approval was obtained from the ethical committee of YRG CARE center, Chennai, Tamil Nadu and the Institutional Review Board of University of California, Los Angeles. All participants received INR 100 (approximately 2 USD) to compensate for their lost time.

Data collection

Each participant completed two types of interviews, i) a traditional Face to Face Interview (FTFI) and ii) an Audio Computer Assisted Self Interview (ACASI) using tablet computers. Participants randomly picked the order the interviews before the beginning of the interview. The order of interviews was picked randomly by the participants before the beginning of the interview. Qualified female interviewers who have had previous experience in interviewing women in that region were hired and trained to administer both face to face interviews and to facilitate ACASI. All interviews started with the traditional face to face interviews collecting non-sensitive data such as social and demographic data. Depending on what the participants chose through random selection, interviews were continued either in FTFI or ACASI method to collect sensitive data. When participants complete their first interview, the other one was administered immediately following it. Interviewers guided the participants in answering a set of

sample questions with varying response types in ACASI to familiarize the participants with ACASI interface in inputting the data.

Further description of the methods and data analyses are included in the appropriate results sections with subject specific manuscripts.

Results

The results of this study are presented in the next three chapters as interrelated manuscripts. Each of the manuscript is organized to include introduction, methods, results and discussions sections that is relevant to the topic of the manuscript. The chapters are listed below.

1. Consistency in the reporting of sensitive and non-sensitive behaviors between Audio Computer Assisted Self Interviews (ACASI) and Face to Face Interviews (FTFI) - Results from a case cross over study of HIV positive and HIV negative women in a semi-rural South Indian district
2. Association between HIV and intimate partner violence – A study of married women in a semi-rural district in Tamil Nadu, India using ACASI and face to face interviews
3. Intimate partner violence and disclosure of HIV among HIV positive women in a semi-rural setting in South India

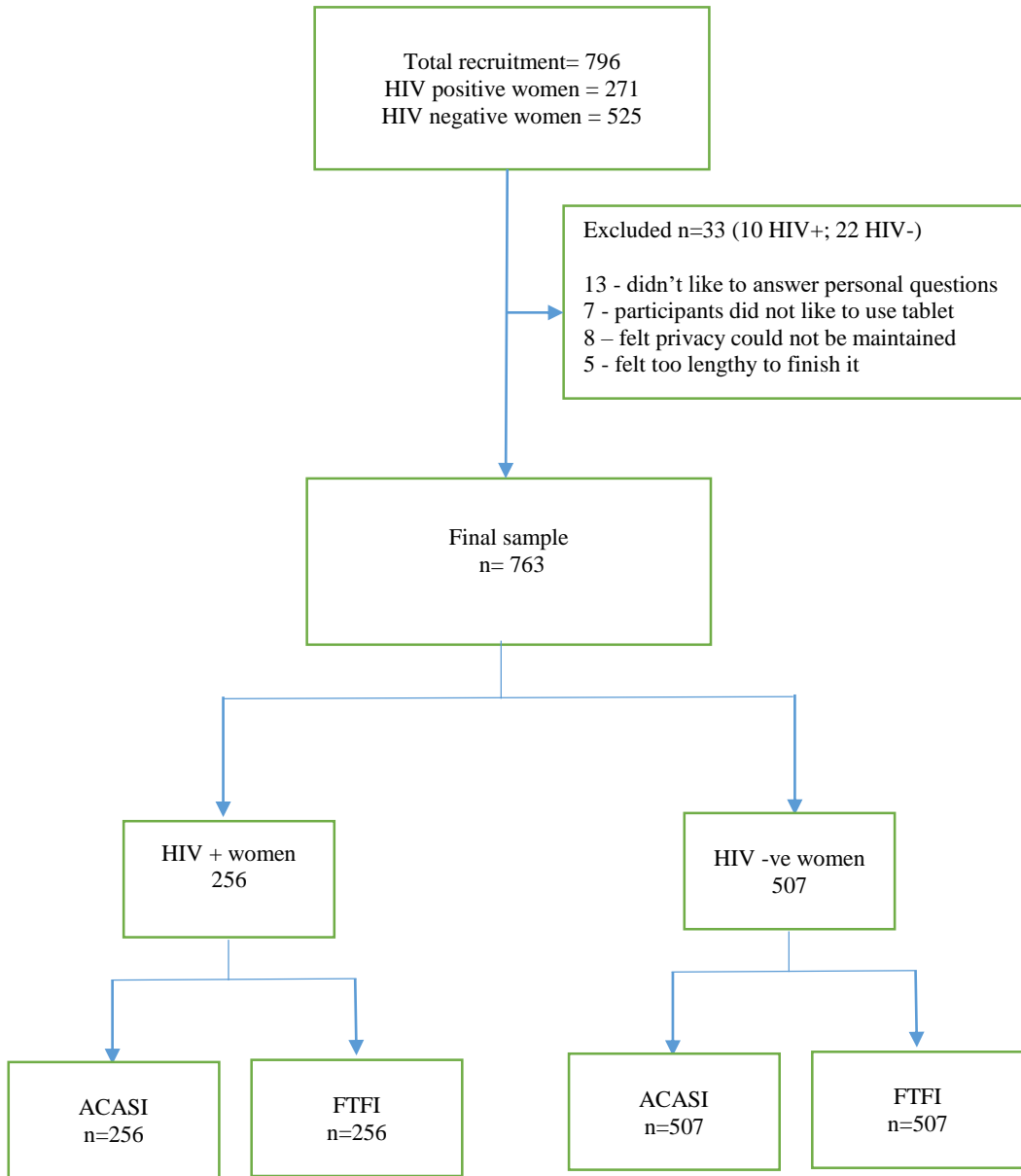


Figure 2.2: Enrollment of study participants

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CHAPTER 3

CONSISTENCY IN THE REPORTING OF SENSITIVE AND NON-SENSITIVE BEHAVIORS BETWEEN AUDIO COMPUTER ASSISTED SELF INTERVIEWS (ACASI) AND FACE TO FACE INTERVIEWS (FTFI) - RESULTS FROM A CASE CROSS OVER STUDY OF HIV POSITIVE AND HIV NEGATIVE WOMEN IN A SEMI-RURAL DISTRICT IN TAMIL NADU, INDIA

Introduction

In the present technological world, Audio Computer Assisted Self Interviews (ACASI) are increasingly popular in the field of data collection, whether it is market research or health related research. There is numerous evidence that support ACASI as an important tool in the assessment of sensitive behaviors, especially sexual behaviors¹⁻⁷ and drug use.² ACASI is also found to be effective in the reduction of social desirability bias. This bias exists in instances where participants over report socially desirable behaviors to interviewers and underreport socially non-desirable behaviors because of stigmatization.^{3,8} In addition to reducing social desirability bias and providing a confidential mode of data collection, computer assisted surveys can reduce interviewer bias by providing a standardized format^{9,10} of the interview to all of the participants. Self-administered questionnaires can impose cognitive burden on participants, especially to those from developing and underdeveloped areas where literacy is low.¹¹ Even though self-administered, ACASI can be designed to suit the population under study in their specific cultural context in a manner that is easily understood even by people with low literacy level. ACASI method uses an audio track which can be utilized effectively to reduce the participants' cognitive burden compared to self-administered paper surveys or self-administered computer surveys without audio.⁶ Participants need not read to

understand the questions. Instead, an audio track will read out the questions and answers to participants instructing them to touch or press certain keys on the computer or the touch screen. The computer can also be programmed to check for inconsistencies or incompleteness of the answers and alert the respondents to fix the errors before moving on to the next question. Studies that utilized the ACASI tend to have a higher completion rate with few missing values compared to the interviewer administered questionnaires in which data is input manually.⁵

Existing literature has shown that Computer Assisted Self Interviews have resulted in increased reporting of sensitive behaviors^{1,2, 4,17–23,41} and have greater acceptability among diverse populations.¹²⁻¹⁶ However, various research data collected from low income settings and populations resulted showed inconsistent findings.²⁴⁻²⁸ Further, research assessing intimate partner violence using ACASI in low income settings is very limited and inconsistent.²⁹⁻³³ Presence of domestic violence or intimate partner abuse in women can be considered as a risk marker for STDs, unwanted pregnancies, HIV transmission, low health care seeking behaviors and a higher probability of having an infected partner.^{36, 42-45}

There were only four studies that utilized ACASI among the Indian population to examine sexual behaviors^{27,28,34,35} and one that examined partner violence.³¹ All of these studies focused predominantly on younger populations from low income urban areas except for one study that used a Color coded CASI (C-CASI) to assess HIV/STI risk behaviors among couples in a semi-rural setting.³⁵ These studies had already demonstrated the feasibility and acceptability of ACASI in the Indian population.

Nevertheless, one study questioned the ability of ACASI to elicit reliable responses among adolescent women when compared to adolescent men²⁸ and another questioned poorly educated young men's ability compared to learned young men.³⁴ This study examined intimate partner violence data collected using both ACASI and face to face interviews. It showed that young women from low income urban areas preferred FTFI to disclose intimate behaviors irrespective of the sensitivity of questions³¹ in contrary to the majority of the existing body of evidence that supports ACASI for disclosing sensitive information. Further, only physical abuse was assessed in this study by asking whether the "Participant's husband hit, kicked, or beat her for any reason in the past 6 months". To our knowledge, no studies have been published that compared ACASI and some other modes of interviews for different types of partner abuse among semi-rural Indian women. This paper tests the reliability of data between ACASI and FTFI for sensitive and non-sensitive behaviors which includes types of partner abuse, high risk sexual behaviors, marital control behaviors, various decision making authority of women in household and violence against husbands. Instead of using a single item to measure domestic violence, multiple items were asked to determine the presence of different types of interpersonal violence based on the Modified Conflict Tactics Scale. This is a sub study of a case control cross-sectional study that examined the association of HIV and domestic violence among married Indian women from a southern Indian district. For the purpose of this research a matched pair approach was carried out comparing each participant's response in ACASI to their own response in FTFI for both HIV+ and HIV- women. With the current knowledge of evidence, we hypothesize that the participants will be more likely

to report sensitive behaviors in ACASI than FTFI regardless of their HIV status. We also propose that reporting of non-sensitive behaviors will likely to remain the same irrespective of interview methods and that these items will have greater agreement scores between the two.

Methods

All participants were recruited from Theni district in south Tamil Nadu. Eligibility criteria included women to be between the ages of 18 to 50 years, currently married and living with their husband at the time of the interview. Figure 3.1 shows the total number of women recruited for this study. A total of 796 women were recruited of whom 33 women dropped out for various reasons. Out of all women recruited, 763 women were included in the final analyses who had completed both types of interviews. There were 256 HIV positive and 507 presumed to be HIV negative women. HIV positive women were enrolled through the help of two NGOs in Theni district. Two neighborhood controls for each case were recruited in a random manner. Interviews were conducted in the privacy of the participants' home for HIV negative women and at the NGO centers for HIV positive women.

There were two components to the interview process for each participant, i) a traditional Face to Face Interview (FTFI) and ii) an Audio Computer Assisted Self Interview (ACASI) using tablet computers. The order of interviews was picked randomly by the participants before the beginning of the interview. All interviews started with FTFI mode with interviewers collecting social and demographic data. Depending on what the participants chose through random selection, interviews were continued either in FTFI or

ACASI method to collect the remainder of the data. When participants complete their first interview, the other one was administered immediately.

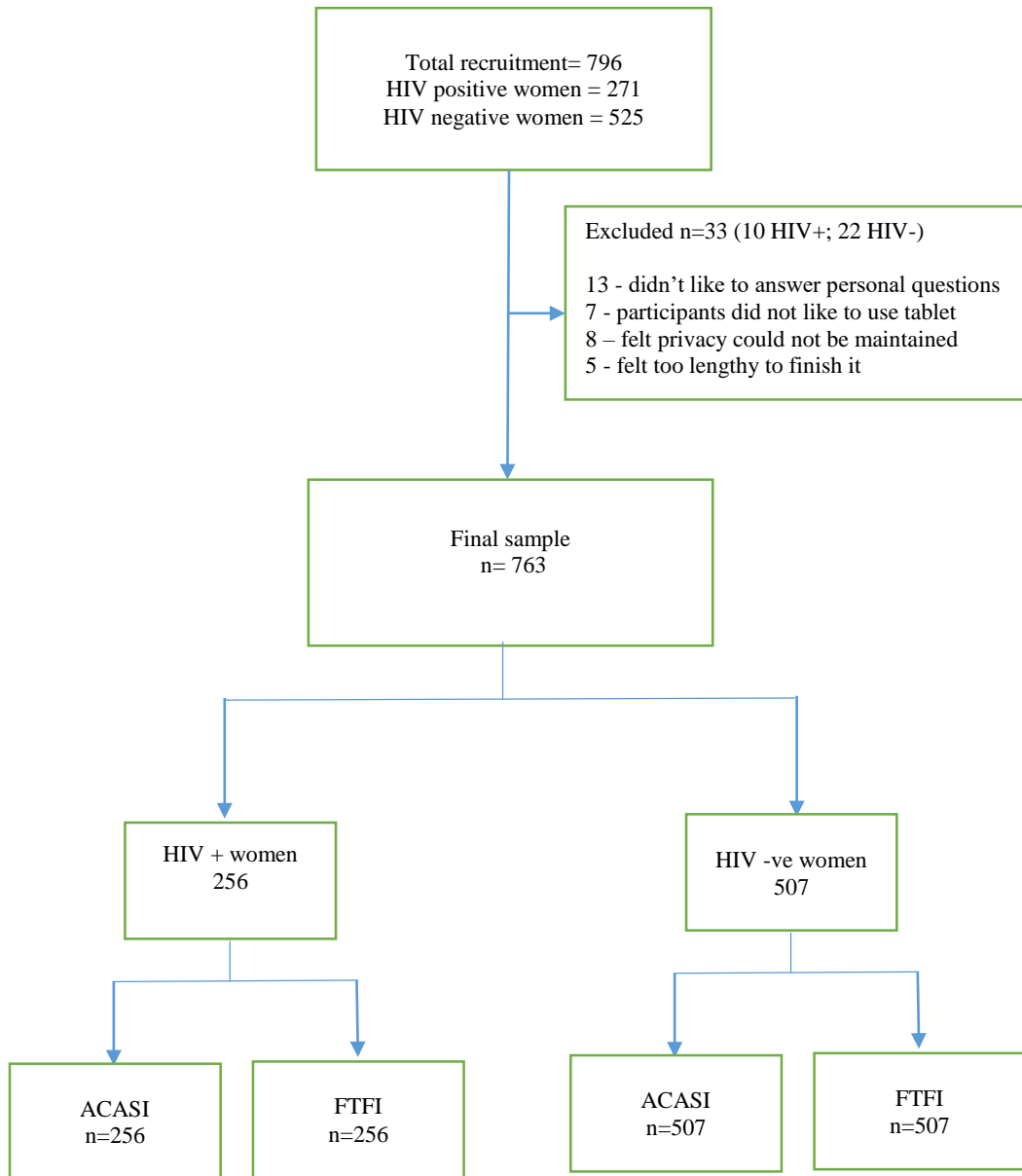


Figure 3.1: Enrollment of study participants

Each participant received a unique identification number. No personal identifying information was collected or attached to the survey at the time of interview. Interviewers guided the participants in answering a set of sample questions with varying response types before leaving them alone with ACASI. Participation in this research was completely voluntary and anonymous. An oral consent was obtained from each participant before beginning the interview process. This study was approved by the UCLA Institutional Review Board and the YRG CARE ethical board committee for ethical considerations and procedures. Qualified female interviewers who have had previous experience in interviewing women in that region were hired and trained to administer both face to face interviews and to facilitate ACASI.

The ACASI instrument was created using Adobe PhoneGap tool. It was developed to work on an android platform. iBall 7-inch touch screen tablets with headphones were used to administer the instrument. All questions were worded similarly in both FTF and ACASI interviews. However, the format in which they were administered were different between the two modes of interviews. In FTFI, interviewers read out the questions to participants and noted down their responses on the paper questionnaire. However, there was an audio and visual component to ACASI interviews. Participants were able to hear the questions & answers in an audio track with a female native speaker's voice instructing them to touch the correct response on the tablet screen. Questions were only heard through audio and do not appear in text on the screen. Answer choices appeared either in text form or as pictures on the tablet screen along with audio. Questions that had answers YES/NO/DON'T KNOW (Figure. 3.3) were displayed as

green/red/orange boxes with respective texts for respondents to choose. This color coding of responses was followed throughout the whole instrument. Similarly, drawings of a woman representing the respondent, a man representing her husband, a couple representing both of them, and an additional orange colored text box with “Others” were displayed for all questions assessing decision making authority in the household. If the participants wanted to hear the questions or answers again, they can touch the speaker icon next to question symbol or on the answer boxes to play it when needed. If they did not wish to answer any question, they can press an arrow on the screen to navigate to the next question. They also had an option of navigating back to the previous questions if they wanted to change their response.

Sensitive behaviors such as intimate partner violence, high risk sexual behaviors, marital control experiences, discussion about condom use with husband, and violence against husband were included in the analyses. Less stigmatized or non-sensitive behaviors such as items measuring various decision making authority of women in the household were included in the analyses.

Intimate partner violence questions were adopted from the Modified Conflict Tactics Scale (MCTS) used by Demographic and Health Surveys to collect data on the prevalence of domestic and intimate partner violence within the context of household in developing countries.³⁶ This version of CTS asks multiple questions to determine intimate partner violence experiences of women instead of a single question. This provides respondents with more chances to disclose any IPV experience, and also facilitates better understanding of the questions by asking about specific acts of violence.

People across cultures may have different meaning as to what constitutes as domestic violence. By asking specific acts of violence, participants will be able to disclose accurate information. They also have more chances to disclose sensitive information with this approach. DHS had used this modified CTS for assessing IPV in the Indian National Family Healthy Survey since NFHS-3 in 2005-2006.

For the purpose of this research, IPV was defined as violence perpetrated by current husband who was currently living together with the participant. IPV is used interchangeably with domestic violence, partner abuse and domestic abuse. Three types of abuse were measured, emotional, physical and sexual abuse. Physical violence was measured using a 7 items scale that includes measurement of physical violence perpetrated by current husband such as did your husband ever 1. “push, shake or throw something at you?”, 2. “slap you?”, 3. “twist your arm or pull your hair?”, 4. “punch you?”, 5. “kick, drag or beat you?”, 6. “try to choke or burn you?”, 7. “threaten or attack with a knife, gun or any weapon?”. A positive response to any one of the items indicates the presence of physical violence. Sexual abuse was measured using two items husband ever “physically force you to have sexual intercourse even when you did not want to” and “force you to perform any sexual acts that you did not want to”. A positive response to any of these two items indicates the presence of sexual IPV. Emotional abuse was described as a positive response to any of the following, did your husband “say or do something to humiliate you in front of others”, “threaten to hurt or harm you or someone close to you”, “insult you or make you feel bad about yourself”. A positive response to any of these three items indicates the presence of emotional IPV. All of these questions

measure the participants' lifetime experience of abuse by their husband. Marital controlling behaviors were previously found to be associated with a higher risk of violence for wives.³⁷ Hence, husband's controlling actions were included in this study. It was measured by using 6 items that included "he is jealous or angry if you talk to other men", "he accuses you of being unfaithful", "he does not permit you to meet your female friends", "he tries to limit your contact with your family", "he insists on knowing where you are at all times", and "he does not trust you with any money". Presence of these controlling behaviors shows that women may be at risk for intimate partner abuse.

Ever had anal sex and having had sex with someone other than their husband were the two high risk behaviors that were included in this analyses. Spousal communication about use of condoms was also included. This study is the first of its kind to collect data on intimate partner abuse of husbands by Indian women using two modes of interviews. Violence against men was implied if women answered positively to either "Have you ever hit, slapped, kicked, or done anything else to physically hurt your husband at times when he was not already beating or physically hurting you?" or "Have you ever said or done something to humiliate your husband in front of others when he was not arguing with you or humiliating you?".

Finally, women's empowerment was determined by a series of questions that determined women's decision making power for decisions concerning her own health care, her children's health care, everyday household purchases, major household purchases, visiting her friends and family, having control over the number of children she may have and buying sarees and small jewelry for herself. We marked women who made

decisions by themselves or along with their husbands as having decision making authority or power in the household.

Statistical analysis

Data analyses was performed using Stata 13 (StataCorp, College Station, TX). First, frequencies were calculated for basic demographic information for both HIV+ve and HIV-ve women with Pearson's chi-square test for categorical variables and t-tests for continuous variables. Mc Nemar's test for matched pair analysis was employed in which participants' responses from ACASI were compared to their own responses in FTFI for HIV positive and HIV negative women separately. There were 763 matched pairs of data included in this analysis out of which 256 pairs of data were from HIV positive women and 507 pairs of data were from HIV negative women. Percentage of affirmative responses to risk behaviors were calculated for the two interview methods. For each individual behavior that was included in the analysis, we only used records with data available from both interview modes. McNemar's odds ratios along with confidence intervals were calculated using McNemar's chi-squared test and significance levels noted. Next, Cohen's kappa coefficients were calculated to measure response agreement between the two interview modes. When the reported prevalence in the population under study is very high or very low, the value of kappa will show a poor reliability score even with a high overall agreement percent.⁴⁶ Such a situation can arise when there is a difference in the proportion of agreement on positive and negative responses. Prevalence index (PI) measures such prevalence effect and is calculated using

$$\text{PI} = \frac{|a-d|}{n}$$

ACASI

Yes No

FTFI	Yes	a	b	a+b
	No	c	d	c+d
		a+c	b+d	n

Table 3.1: 2X2 table showing agreement between ACASI and FTFI

Similar to prevalence effect on the kappa, difference in disagreement in positive or negative responses between interview modes can also affect the value of kappa. When bias is present, kappa value is higher compared to when there is no bias. Bias Index (BI) is calculated using

$$\text{BI} = \frac{|b-c|}{n}$$

In order to address this kappa paradox further, few other measures of intra-rater agreement such as prevalence and bias adjusted kappa (PABAK), percent positive and percent negative agreement were calculated to facilitate further understanding of

reliability between the two interview modes. Kappa & PABAK values that range from 0.01-0.2 indicate poor agreement, 0.2-0.4 = fair agreement, 0.4-0.6 = moderate agreement, 0.6-0.8 = good agreement and 0.8-1.0 = very good agreement. PABAK is calculated using

$$\text{PABAK} = \frac{(a+d) - (b+c)}{n} = 2p_o - 1$$

where p_o is the observed proportion of agreement

Results

A total of 796 women consented to participate in this research (Figure 3.1). Out of this, a total of 33 participants (<0.05% of the total) withdrew in the middle of the interview process of whom 10 were HIV positive and 22 were HIV negative. Among all of those who withdrew, 13 participants did not feel comfortable answering sensitive questions, 7 participants did not like to use a tablet computer, 8 women did not finish the survey because they were interrupted by family members and privacy could not be maintained, and 5 participants did not finish the interview due to time constraints. The final analysis was limited to 763 women who had completed both ACASI and FTFI interviews. All responses that were classified as don't know/refused/don't remember were included as missing information. FTFI interviews had lower missing values compared to ACASI. Among all items with missing values, least amount of missing information was observed for an item measuring marital control in ACASI (0.8%), decisions about own health care and major household purchases in FTFI (0.3%) and high risk sexual behaviors (0.1%) in both. Most missing values were observed for the item

measuring spousal communication for condom use in ACASI (12%) and FTFI (5.9%), and overall decision making authority (2.5%) in both.

Socio demographic characteristics of women by HIV status

All enrolled women were between the ages of 18 and 50 years old (Table 3.2). On an average, woman in the HIV negative group were three years younger than women in the HIV positive group. The median age of HIV positive women (35 yrs) was about two years higher than the median age of HIV negative women (33 yrs). Only a few HIV positive women (2.7%) were in the youngest age group 18-24 years compared to HIV negative women (14.6%). More women in both groups were between 35-39 years in both HIV positive (30.9%) and HIV negative (22.5%) groups. Majority of the HIV positive women (53.6%) had no education or only elementary education, whereas 69.6% of HIV negative women had some middle school education or more. Women with some college education were combined with High school or more category since they only constitute less than 1% of HIV positive women and 5% of HIV negative women with a college education. An overwhelming vast majority of the participants (97%) belonged to Hindu religion in both groups. Women in both groups were not different with respect to caste class. Less than 20% of women from both groups belonged to Scheduled Caste (SC) or Scheduled Tribe (ST) groups which are classified as disadvantaged indigenous groups in India. Nearly thirty percent of all participants belonged to the Most Backward Castes (MBC) which includes castes that make up socially and educationally disadvantaged groups after SC/ST groups. About half of the women from both groups belong to Backward Class (BC) that have reduced benefits socially and educationally compared to

SC/ST and MBC. This group also included 1% of women who belong to Forward Castes (FC) and do not qualify for many reservation benefits set by the Government. More HIV positive women (69%) were employed and had a job that paid them in cash or kind compared to HIV negative women (46%). A vast majority of the women (>90%) in both groups had been married only once. However, the HIV positive group had almost 8% of women who had had more than one marriage compared to HIV negative group that had <2% of women who had been married more than once.

To calculate the economic status of the participants, a wealth quintile was calculated using Principal Component Analysis (PCA). Variables used in the calculation of wealth quintile included home ownership, drinking water source, no. of bedrooms in the house, type of toilet facility, type of cooking fuel used in the household, house floor type, type of wall, agricultural land ownership and possession of utensils like pressure cooker, mobile, watch, table, chair, bed, mattress, bicycle, fridge, DVD, car, and motorbike. A wealth quintile was computed based on the scores from PCA. A greater proportion of HIV positive women belonged to the two lowest wealth quintile groups. On the contrary, more than 60% of HIV negative women belonged to middle and higher wealth groups. Women in both groups were similar in regards to their participation in social activities like women's religious groups, political, religious, social work groups, or arts/crafts.

Comparison of interview modes

Tables 3.3 & 3.4 compare the two interview modes among HIV positive women and HIV negative women respectively for both sensitive and non-sensitive behaviors

including violence against husband. An overwhelming majority of women reported positively for non-sensitive items that measured decision making power in their households in both modes of interviews. Among HIV positive women, no significant difference was noted between the two interview modes for individual items measuring decision making power using McNemar's matched pair analysis. However, the odds of reporting any one decision making power was higher in ACASI compared to FTFI in HIV positive women [OR: 5.0, CI: 1.07-46.93]. HIV negative women reported significantly different responses with more positive responses in FTFI for all items measuring decision making power except for decision about children's health care. Nonetheless, reporting of any one decision making power was not significantly different between interview modes in HIV negative women.

In general, more women reported positively for having had spousal communication about condom use during sex in FTFI than ACASI [HIV+ve: ACASI 48.1% vs FTFI 61.4%; HIV-ve: ACASI 36.8% vs FTFI 57.2%]. The odds of reporting spousal communication about condom use in ACASI was 50% lower than FTFI [OR: 0.50, CI: 0.30-0.82] for HIV positive women and 75% [OR: 0.25, CI: 0.16-0.39] lower than FTFI for HIV negative women. A greater proportion of women in both groups reported positively for experiencing any one of marital control behaviors by husband in ACASI compared to FTFI. The odds of reporting any one marital control behavior in ACASI among HIV positive women was 3.17 [CI: 1.84-5.72] times higher than FTFI, and HIV negative women had 1.87 [CI: 1.34-2.65] times higher odds in ACASI than FTFI. However, reporting of individual items measuring marital control behaviors did not

differ significantly between interviews in the HIV positive group of women. Among HIV negative women, significantly fewer women reported positively for husband being jealous, limits contact with family and friends, and insists on knowing her whereabouts in ACASI than FTFI.

More HIV positive women reported positively in ACASI than FTFI for items measuring emotional violence with overall emotional violence experience of OR 2.22 [CI: 1.24-4.11]. There was no significant difference between FTFI and ACASI for reporting of emotional violence in HIV negative women.

A greater proportion of women in both groups reported experiencing any one physical abuse in ACASI than in FTFI [OR 3.77, CI: 2.01-7.57 for HIV+ve, OR 1.53, CI: 1.05-2.26 for HIV-ve]. Among all the items measuring physical violence, more women reported getting slapped by their husbands than any other acts of physical violence in both modes of interviews. HIV positive women had significantly higher odds of reporting all physical violence acts in ACASI than FTFI. HIV negative women had significantly higher odds of reporting pushed, kicked, choked and attacked by husband in ACASI than FTFI and reporting any one of physical abuse by husband.

More women reported sexual violence in ACASI than FTFI in both HIV+ and HIV- groups. Twenty-five percent of HIV positive women reported sexual violence in ACASI compared to 7.6% in FTFI and 9.6% of HIV negative women reported sexual violence in ACASI compared to 4.0% in FTFI. HIV positive women had 9.0 times [CI: 3.58-29.05] higher odds of reporting sexual violence in ACASI than FTFI and HIV negative women had 4.87 [CI: 2,12-12.98] times higher odds of reporting the same. A

similar pattern was observed for reporting of high risk sexual behaviors such anal sex or extra-marital sex in ACASI than FTFI in both HIV+ and HIV- women. A greater proportion of women in the HIV positive group reported positively in ACASI for engaging in abusive behaviors against their husbands with OR 3.3 [CI: 1.59-7.51] than in FTFI. The reverse was seen in HIV negative women with a higher reporting of husband abuse in FTFI than in ACASI [OR 0.59, CI: 0.35-0.98].

Among HIV + women who reported differentially between interview modes, there were more women reporting positively in ACASI and reporting negatively in FTFI compared to women reporting positively in FTFI and negatively in ACASI for all of the reported behaviors except for condom use communication with spouse. Similar pattern was also seen in HIV negative women who reported differentially between interview modes for all behaviors except for condom use communication, emotional abuse, and violence against husband. Differential reporting was more pronounced for stigmatized behaviors than non-stigmatized behaviors.

Table 3.5 reports agreement in test scores between the two modes of interviews for HIV positive women. Kappa scores ranged from poor agreement for sex with someone other than husband [κ 0.05] to moderate agreement on getting pushed by husband [κ 0.51] in the HIV positive group. The observed overall agreement percentages between the two modes of interviews for individual items ranged from about 60% agreement on having had a discussion with husband about use of condoms to 95.2% agreement on reporting at least one decision making power in the household. Table 3.6 lists agreement test scores between ACASI and FTFI for HIV negative women. Kappa

scores ranged from poor agreement [κ 0.02] for reporting high risk sexual behaviors to moderate agreement [κ 0.49] for reporting at least one decision making authority, and for three items of physical violence. Observed agreement percentage between interview modes for HIV negative women ranged from 66% for discussions about condom use to 98% agreement for reporting at least one decision making authority in the household.

Based on kappa scores there was only very low to moderate reliability beyond chance between interview modes for all reported behaviors. Prevalence Index (PI) shows that prevalence effect (affected by the difference in proportion of positive agreements and negative agreements) of reported behaviors was high for all reported sensitive behaviors and non-sensitive behaviors in the study sample. Bias Index (affected by the disagreement on the proportion of positive or negative responses) remained close to zero indicating bias was not a factor in influencing kappa scores. We adjusted kappa for any prevalence and bias effects. Prevalence and Bias Adjusted Kappa coefficients (PABAK) were higher than kappa scores across all of the reported behaviors except for spousal communication about condom use in both groups of women. In general, women had almost perfect agreement in reporting at least one decision making authority and only fair agreement to condom use discussion with husband after adjusting for prevalence and bias effects.

The proportion of positive and negative agreements showed almost perfect agreement on positive responses for non-sensitive decision making powers and low agreement on negative responses for such behaviors. On the contrary, there was high proportion of negative agreement and low proportion of positive agreement for items

measuring sensitive behaviors. Both proportions of positive and negative agreements were low for spousal communication about condom use in both groups of women. HIV negative women showed higher agreement scores than HIV positive women for majority of reported behaviors.

Finally, an exit survey at the end of the interview showed that out of 760 women, most of them [84% HIV+ve; 92% HIV-ve] felt it was easy to use ACASI to answer the questions. About 58% of all women preferred to use the tablets, 13% preferred FTFI and 30% liked both modes of interviews. The same pattern of response was observed for the participants' preference for future interviews.

Discussion

Although many studies have compared ACASI and FTFI across multiple countries and cultural settings,^{20,22,23,26,28,29} this paper is one of its kind to study sensitive behaviors particularly intimate partner violence and non-sensitive behaviors among married women in a predominantly rural area in southern India. In concordance with the majority of available literature,^{1,2,4,17-23,41} more women answered positively in Audio Computer Assisted Self interviews compared to traditional Face to Face Interviews for reporting sensitive behaviors like physical abuse, sexual abuse, marital control by husband and high risk sexual behaviors in both HIV positive and negative group. Since, there is no available gold standard to validate responses from both types of interviews, we cannot be certain as to which method of interview resulted in the most accurate reporting of such behaviors. Trained women from the same region conducted FTFI. Hence, the participants may have felt more comfortable and confidential in answering

positively to socially non-desirable questions in ACASI than FTFI. More HIV positive women reported positively in ACASI for all measured sensitive behaviors, HIV negative women exhibited a mixed pattern of reporting for different sensitive behaviors.

Violence against men is usually ignored in Indian society. Men experiencing intimate partner abuse are not even entitled to legal protection. A study of a random sample of husbands age 15-49 years in India showed that there was almost 30% economic violence, 20% emotional violence, 25% physical violence, and 18% sexual violence among men perpetrated by their wives.³⁸ Since Indian men live in a highly patriarchal society, they do not disclose intimate partner violence openly for fear of shame & disgrace in the society and to protect their family.³⁹ Hence intimate partner abuse for men was assessed through their perpetrators. We expected women to underreport violence against men to interviewers. However, the reporting of violence against men among HIV negative women was contradicting to typical social desirability bias. We cannot identify any inherent properties of the interview methods which may be responsible for this observed inconsistency and further investigation is needed to explain this pattern.

Both interviews were conducted in succession one after another on the same day. Hence, answering questions in one interview could've influenced participants' answers in the interview that followed. Nonetheless, this will not favor any one type of interview format because we randomized the order in which the interviews were administered. Previous studies have shown that the order of interview methods do not influence participants' responses in any particular way^{21,28}

We found a mixed pattern of reporting for decision making authority among the participants. High affirmative answers for some of these non-sensitive behaviors in FTFI indicates that these questions may be prone to social desirability bias as well. We don't clearly understand what makes these two groups of women report differently between interview modes. The difference in HIV disease status could be a possible explanation for this conflicting pattern of reporting for non-sensitive behaviors. HIV positive women may have already faced shame and embarrassment likely due to their disease status and hence they may not feel compelled to keep up with the idealized household decision making expectations to interviewers. The same pattern was seen for experiences of marital control behaviors. Marital control behaviors were found to be measures of risk factors for experiencing intimate partner violence.³⁷ However, the likely explanation of over reporting in FTFI for some items due to social desirability does not fit well to this scenario. In spite of not having a clear pattern of reporting for all the items in the scale, we found that the overall assessment of women's decision making power and marital control experiences resulted in more women reporting positively in ACASI than FTFI in both groups.

Spousal communication of condom use followed the pattern of social desirability bias in which more women answered positively to interviewers. Condom use has been widely campaigned by the government for family planning and for STD/HIV disease prevention in the state of Tamil Nadu. To disclose the interviewers that they never had discussion about condom use would not be considered desirable by these participants. Also, high percent of women who reported positively in FTFI reported negatively in

ACASI confirming that this measure was susceptible to social desirability bias. The most missing responses were found for condom use discussion with husband. Among those who had missing responses, a vast majority were missing responses for only one interview mode. When the missing data was examined, we found a similar pattern of reporting for condom use discussion with more reporting positively in FTFI. Out of 12% missing responses in ACASI, 7.6% reported positively for condom use discussion in FTFI and 4.5% reported negatively. Among those missing condom use in FTFI (5.9%), 1.4% reported positively and 4.5% reported negatively in ACASI. Another reason for high differential reporting and missing responses could be due to recall bias. When a lifetime occurrence of certain behavior is measured and especially if it is not considered significant by the participants, it may be prone to errors due to recall bias. More missing responses in ACASI suggests that participants may have felt more confidential and comfortable in acknowledging that they didn't know the answer in ACASI compared to FTFI where they must have felt pressured to provide a response to the interviewers.

In conclusion, when comparing ACASI and FTFI we found higher proportions of positive agreement and lower proportions of negative agreement for non-sensitive behaviors. We observed the contrary for sensitive behaviors, in which there were higher proportions of negative agreements and lower proportions of positive agreements. This effect is due to very high or low distribution of the attributes in the population under study. More women who reported positively in ACASI reported negatively in FTFI, clearly indicating that these women preferred to disclose sensitive behaviors in ACASI. Mc Nemar's odds ratio also indicated that more women reported positively for most of

the sensitive behaviors in ACASI compared to FTFI. When prevalence and bias effects were eliminated, we found perfect agreement for non-sensitive behaviors and fair to moderate agreement on sensitive behaviors. This shows that we can expect some amount of disagreement in the reporting of sensitive behaviors between interview modes even when prevalence and bias effects are adjusted. Given the population of women under study with high PI for all the behaviors, we found inconsistent reporting between the two interview modes particularly for sensitive behaviors. Hence studies using these measures may show different results based on the interview modes. Overall, we also found that agreement between interview modes was higher for HIV negative women than HIV positive women after adjusting for prevalence and bias. For the most part, Mc Nemar's odds ratios for differential reporting was also high among HIV positive women compared to HIV negative women. Further, we do to stratify agreement values by socio-demographic variables to determine whether the differential reporting is driven by these factors or the disease status itself. Finally, though we cannot determine the validity of the responses using a gold standard data, increased reporting of censored behaviors is considered truthful and indicates more accurate reporting.^{20,40} Our study suggests that ACASI can be a more reliable method for collecting data on sensitive behaviors, especially for partner violence, high risk sexual behaviors, and violence against men in India.

Limitations

The major limitations of any study comparing behaviors in different interview modes is the lack of objective evidence or the lack of a gold standard method. It's impossible to ascertain which interview method produced more valid results. We also cannot generalize the findings of this study to other populations since it was a convenience selection of HIV positive women and their neighborhood controls. Measures of agreement depends on the assumption that the responses in the two interview modes were independent of each other. However, in this study, the participants had to complete two interviews in sequence and there was no waiting time between interviews. Participants' responses in the first interview may have influenced their responses in the one that followed. It may also have resulted in fatigue and boredom. This may have introduced some errors and bias. To reduce these errors, the order of the interview was randomly selected by the participants. Another limitation of the study may have resulted from the interviewers being familiar with the life of the participants in the study area which may have resulted in social desirability bias. This may have caused a disclosure of more socially desirable behaviors such as decision making power and non-disclosure of sensitive behaviors in FTFI. Even though all questions were worded the same in both interview modes, questions in ACASI had a different format than in FTFI. There were also a lot of missing values in ACASI compared to FTFI. ACASI can be designed to minimize missing values. Nonetheless, we found that the participants should be given the autonomy to choose whether or not they want to answer certain questions given the sensitive nature of this research. This may be a reason for more missing values in

ACASI compared to FTFI. Confidence intervals were wide for some estimates, indicating lack of precision. Even though precision was low, from the confident intervals we can infer that the estimates were consistent with more positive reporting in ACASI. However, research utilizing a large sample is essential to obtain precise estimates.

Table 3.2: Socio demographic characteristics of currently married women by HIV status in Theni district, Tamil Nadu, India

Characteristics	HIV +ve women [n=256] n [%]	HIV -ve women [n=507] n [%]	χ^2 [p-value] [‡]
Age [years]			50.56 [< .001] *
≤24	7 [2.7]	74 [14.6]	
25-29	26 [10.2]	105 [20.7]	
30-34	73 [28.5]	88 [17.4]	
35-39	79 [30.9]	114 [22.5]	
40-44	36 [14.1]	73 [14.4]	
≥45	35 [13.7]	52 [10.3]	
Mean	36	33	p < .001 (t-test) *
Median	35	33	
Education			52.67 [<.001] *
None	69 [27.0]	70 [13.8]	
Elementary	68 [26.6]	84 [16.6]	
Middle School	71 [27.7]	137 [27.0]	
High School or more	48 [18.8]	216 [42.6]	
Religion			0.0005 [0.983]
Hindu	249 [97.3]	493 [97.2]	
Others	7 [2.7]	14 [2.8]	
Caste class (n=759)	(n=254)	(n=505)	2.67 [0.263]
Scheduled Caste / Scheduled Tribe	43 [16.9]	101 [20.0]	
Most Backward Caste	83 [32.7]	138 [27.3]	
Others [Forward and Backward Caste]	128 [50.4]	266 [52.7]	
Employed [paid work]	177 [69.1]	234 [46.2]	36.17 [<.001] *
Wealth status (n=728)			70.77 [<.001] *
Lowest	89 [36.0]	65 [13.5]	
Second	55 [22.3]	85 [17.7]	
Middle	45 [18.2]	106 [22.0]	
Fourth	39 [15.8]	104 [21.6]	
Highest	19 [7.7]	121 [25.2]	
No. of marriages			18.70 [<.001] *
Once	236 [92.2]	499 [98.4]	
More than one	20 [7.8]	8 [1.6]	
Participates in Social activities			3.78 [0.052]
Women's group, political, religious, social work group, arts/crafts	126 [49.2]	212 [41.8]	

[‡] χ^2 - Pearson chi-square test of significance

* p - value significant at ≤.001 level

Table 3.3: Comparison of ACASI* and FTFI[‡] in the reporting of sensitive and non-sensitive behaviors by HIV positive women in Theni district, Tamil Nadu, India

	% Affirmative		Odds Ratio	CI for Odds Ratio	% Yes on ACASI and No on FTFI	% Yes on FTFI and No on ACASI
	ACASI	FTFI				
Decision making power (n=252)	98.0%	94.8%	5.00[§]	1.07-46.93	4.0%	0.8%
Own health care (n=242)	88.0%	90.9%	0.56	0.22-1.35	3.7%	6.6%
Children's health care (n=237)	91.1%	89.9%	1.20	0.57-2.56	7.6%	6.3%
Everyday household purchases (n=231)	88.3%	88.3%	1.00	0.48-2.08	7.4%	7.4%
Major household purchase (n=231)	87.9%	87.9%	1.00	0.48-2.09	7.4%	7.4%
Visiting relatives or family (n=242)	86.8%	90.5%	0.64	0.32-1.24	6.6%	10.3%
No. of children (n=235)	87.7%	92.3%	0.52	0.24-1.09	5.1%	9.8%
Buying sarees or small jewelry (n=233)	85.0%	90.1%	0.52	0.24-1.06	5.6%	10.7%
Discussed about condoms (n=189)	48.1%	61.4%	0.50[§]	0.30-0.82	13.2%	26.5%
Marital Control (n=250)	47.2%	31.6%	3.17[§]	1.84-5.72	22.8%	7.2%
jealous (n=246)	19.1%	22.8%	0.67	0.35-1.26	7.3%	11.0%
accuse (n=249)	13.7%	15.7%	0.72	0.33-1.56	5.2%	7.2%
no meeting female friends (n=250)	10.0%	10.8%	0.88	0.40-1.91	5.6%	6.4%
limit contact with family (n=250)	15.6%	12.4%	1.53	0.77-3.16	9.2%	6.0%
know whereabouts (n=250)	16.0%	16.0%	1.00	0.50-2.00	7.6%	7.6%
won't trust with money (n=248)	12.9%	10.9%	1.42	0.64-3.25	6.9%	4.8%
Emotional violence (n=244)	28.7%	19.7%	2.22[§]	1.24-4.11	16.4%	7.4%
Humiliate (n=222)	19.8%	13.5%	2.00 [§]	1.02-4.11	12.6%	6.3%
Threaten (n=231)	16.5%	11.7%	1.73	0.88-3.52	11.3%	6.5%
Insult	21.6%	15.0%	1.94 [§]	1.03-3.79	13.7%	7.0%
Physical Violence (n=248)	41.5%	27.0%	3.77[±]	2.01-7.57	19.8%	5.2%
Push (n=231)	24.2%	16.0%	3.11 [§]	1.43-7.49	12.1%	3.9%
Slap (n=234)	32.1%	22.2%	2.53 [§]	1.36-4.96	16.2%	6.4%
Twist (n=223)	23.3%	16.1%	2.45 [§]	1.18-5.48	12.1%	4.9%
Punch (n=222)	17.6%	7.7%	5.40 [±]	2.05-17.96	12.2%	2.3%
Kick (n=220)	24.5%	12.7%	3.60 [±]	1.75-8.13	16.4%	4.5%
Choke (n=223)	10.3%	5.4%	3.75 [§]	1.19-15.52	6.7%	1.8%
Attack (n=218)	9.6%	3.2%	5.67 [§]	1.64-30.18	7.8%	1.4%
Sexual violence (n=236)	24.6%	7.6%	9.00[±]	3.58-29.05	19.1%	2.1%
Hus forced sex (n=227)	24.2%	7.0%	14.00 [±]	4.47-70.61	18.5%	1.3%
unwanted Sex acts (n=226)	15.0%	5.3%	5.40 [†]	2.05-17.96	11.9%	2.2%
High Risk Sex Behaviors (n=217)	15.6%	9.1%	2.00[§]	1.07-3.90	13.2%	6.6%
Anal sex (n=229)	12.2%	7.4%	1.85	0.90-3.95	10.5%	5.7%
Sex with someone other than husband (n=217)	10.1%	5.5%	2.00	0.89-4.78	9.2%	4.6%
Violence against Men (n=244)	15.6%	6.1%	3.30[±]	1.59-7.51	13.5%	4.1%
Hurt him (n=243)	12.8%	4.9%	3.11 [§]	1.43-7.49	11.5%	3.7%
Humiliate him (n=239)	6.7%	3.8%	2.00	0.76-5.86	5.9%	2.9%

* Audio Computer Assisted Self Interview

‡ Face to face interview

§ Significant at p<0.05 from McNemar's Chi-square test

± Significant at p<0.001 from McNemar's Chi-square test

Table 3.4: Comparison of ACASI* and FTFI[†] in the reporting of sensitive and non-sensitive behaviors by HIV negative women in Theni district, Tamil Nadu, India

	% Affirmative		Odds Ratio	CI for Odds Ratio	% Yes on ACASI and No on FTFI	% Yes on FTFI and No on ACASI
	ACASI	FTFI				
Decision making power (n=500)	98.2%	97.8%	1.50	0.36-7.22	1.2%	0.8%
Own health care (n=477)	85.3%	89.3%	0.53 [§]	0.29-0.91	4.4%	8.4%
Children's health care (n=471)	88.3%	90.4%	0.67	0.36-1.21	4.2%	6.4%
Everyday household purchases (n=474)	84.6%	89.9%	0.51 [§]	0.31-0.83	5.5%	10.8%
Major household purchases (n=474)	75.9%	84.8%	0.42 [±]	0.26-0.65	6.3%	15.2%
Visiting relatives or family (n=474)	78.7%	84.6%	0.52 [§]	0.32-0.82	6.3%	12.2%
No. of children (n=476)	88.7%	92.9%	0.47 [§]	0.25-0.85	3.8%	8.0%
Buying sarees or small jewelry (=468)	83.5%	91.0%	0.33 [±]	0.18-0.57	3.6%	11.1%
Discussed about condoms (n=418)	36.8%	57.2%	0.25[±]	0.16-0.39	6.9%	27.3%
Marital Control (n=493)	45.8%	36.1%	1.87[±]	1.34-2.65	20.9%	11.2%
jealous (n=489)	11.9%	17.4%	0.51 [§]	0.31-0.82	5.7%	11.2%
accuse (n= 490)	3.7%	4.1%	0.85	0.34-2.05	2.2%	2.7%
no meeting female friends (n=491)	5.9%	5.9%	1.00	0.44-2.26	2.9%	2.9%
limit contact with family (n=493)	4.7%	7.7%	0.52 [§]	0.26-0.97	3.2%	6.3%
know whereabouts (n=491)	19.3%	24.0%	0.63 [§]	0.41-0.95	7.9%	12.6%
won't trust with money (n=491)	12.2%	11.4%	1.14	0.67-1.97	6.5%	5.7%
Emotional violence (n=487)	14.0%	16.6%	0.73	0.46-1.15	7.2%	9.9%
Humiliate (n=464)	8.4%	5.6%	2.00	0.99-4.24	5.6%	2.8%
Threaten (n=409)	8.1%	8.1%	1.00	0.54-1.87	4.9%	4.9%
Insult (n=463)	8.2%	11.9%	0.55 [§]	0.31-0.97	4.5%	8.2%
Physical Violence (n=498)	35.3%	30.3%	1.53[§]	1.05-2.26	14.5%	9.4%
Push (n=474)	12.4%	8.6%	2.29 [§]	1.19-4.64	6.8%	3.0%
Slap (n=476)	29.2%	28.8%	1.04	0.69-1.56	11.1%	10.7%
Twist (n=455)	13.2%	10.8%	1.58	0.86-2.97	6.6%	4.2%
Punch (n=459)	8.3%	6.1%	1.67	0.85-3.40	5.4%	3.3%
Kick (n=455)	14.7%	9.5%	2.85 [±]	1.48-5.84	8.1%	2.9%
Choke (n=450)	3.6%	1.6%	5.50 [§]	1.20-51.07	2.4%	0.4%
Attack (n=459)	2.8%	1.1%	5.00 [§]	1.07-46.93	2.2%	0.4%
Sexual violence (n=478)	9.6%	4.0%	4.86[±]	2.12-12.98	7.1%	1.5%
Hus forced sex (n=455)	8.6%	4.0%	4.00 [±]	1.71-10.85	6.2%	1.5%
unwanted Sex acts (n=444)	6.1%	2.7%	6.00 [§]	1.75-31.80	4.1%	0.7%
High Risk Sex Behaviors (n=489)	10.2%	3.1%	3.69[±]	1.97-7.43	9.8%	2.7%
Anal sex (n=464)	9.7%	2.8%	3.91 [±]	1.98-8.41	9.3%	2.4%
Sex with someone other than husband (n=464)	2.6%	0.6%	5.50 [§]	1.20-51.07	2.4%	0.4%
Violence against Men (n=492)	7.5%	11.2%	0.59[§]	0.35-0.98	5.3%	8.9%
Hurt him (n=484)	4.3%	5.4%	0.74	0.34-1.55	2.9%	3.9%
Humiliate him (n=485)	4.1%	8.7%	0.41 [§]	0.21-0.76	3.1%	7.6%

*Audio Computer Assisted Self Interview

[†] Face to face interview

[§] Significant at p≤0.05 from McNemar's Chi-square test

[±] Significant at p≤0.001 from McNemar's Chi-square test

Table 3.5: Agreement in test results for ACASI* and FTFI† in the reporting of sensitive and non-sensitive behaviors for HIV positive women in Theni district, Tamil Nadu, India

	Kappa	% observed agreement	PABAK§	Proportion of +ve agreement	Proportion of -ve agreement	PI±	BI^
Decision making power (n=252)	0.31	95.2%	0.90	0.98	0.33	0.93	0.03
Own health care (n=242)	0.45	89.7%	0.79	0.94	0.51	0.79	0.03
Children's health care (n=239)	0.18	85.4%	0.72	0.92	0.27	0.81	0.01
Everyday household purchases (n=231)	0.29	85.3%	0.71	0.92	0.37	0.77	0.00
Major household purchase (n=231)	0.31	85.3%	0.71	0.92	0.39	0.76	0.00
Visiting relatives or family (n=242)	0.16	83.1%	0.66	0.90	0.25	0.77	0.04
No. of children (n=235)	0.18	85.1%	0.70	0.92	0.26	0.80	0.05
Buying sarees or small jewelry (n=233)	0.26	83.6%	0.67	0.91	0.34	0.75	0.05
Discussed about condoms (n=189)	0.21	60.3%	0.21	0.64	0.56	0.10	0.13
Marital Control (n=250)	0.39	70.0%	0.40	0.62	0.75	0.21	0.16
jealous (n=246)	0.45	81.7%	0.63	0.56	0.88	0.58	0.04
accuse (n=249)	0.50	87.6%	0.75	0.58	0.93	0.71	0.02
no meeting female friends (n=250)	0.36	88.0%	0.76	0.42	0.93	0.79	0.01
limit contact with family (n=250)	0.37	84.8%	0.70	0.46	0.91	0.72	0.03
know whereabouts (n=250)	0.43	84.8%	0.70	0.53	0.91	0.68	0.00
won't trust with money (n=248)	0.44	88.3%	0.77	0.51	0.93	0.76	0.02
Emotional violence (n=244)	0.36	76.2%	0.52	0.51	0.84	0.52	0.09
Humiliate (n=222)	0.32	81.1%	0.62	0.43	0.89	0.67	0.06
Threaten (n=231)	0.27	82.3%	0.65	0.37	0.90	0.72	0.05
Insult	0.31	79.3%	0.59	0.43	0.87	0.63	0.07
Physical Violence (n=248)	0.46	75.0%	0.50	0.64	0.81	0.31	0.15
Push (n=231)	0.51	84.0%	0.68	0.60	0.90	0.60	0.08
Slap (n=234)	0.43	77.4%	0.55	0.58	0.84	0.46	0.10
Twist (n=223)	0.47	83.0%	0.66	0.57	0.89	0.61	0.07
Punch (n=222)	0.36	85.6%	0.71	0.43	0.92	0.75	0.10
Kick (n=220)	0.33	79.1%	0.58	0.44	0.87	0.63	0.12
Choke (n=223)	0.42	91.5%	0.83	0.46	0.95	0.84	0.05
Attack	0.25	90.8%	0.82	0.29	0.95	0.87	0.06
Sexual violence (n=236)	0.26	78.8%	0.58	0.34	0.87	0.68	0.17
Hus forced sex (n=227)	0.29	80.2%	0.60	0.37	0.88	0.69	0.17
unwanted Sex acts (n=226)	0.25	85.8%	0.72	0.30	0.92	0.80	0.10
High Risk Sex Behaviors (n=217)	0.10	80.3%	0.60	0.20	0.89	0.75	0.07
Anal sex (n=229)	0.09	83.8%	0.68	0.18	0.91	0.80	0.05
Sex with someone other than husband (n=217)	0.05	86.2%	0.72	0.12	0.93	0.84	0.05
Violence against Men (n=244)	0.11	82.4%	0.65	0.19	0.90	0.78	0.09
Hurt him (n=243)	0.07	84.8%	0.70	0.14	0.92	0.82	0.08
Humiliate him (n=239)	0.12	91.2%	0.82	0.16	0.95	0.90	0.03

* Audio Computer Assisted Self Interview

† Face to face interview

§ PABAK – Prevalence Adjusted Bias Adjusted Kappa

± PI – Prevalence Index

^ BI – Bias Index

Table 3.6: Agreement in test results for ACASI* and FTFI† in the reporting of sensitive and non-sensitive behaviors for HIV negative women in Theni district, Tamil Nadu, India

	Kappa	% observed agreement	PABAK [§]	Proportion of +ve agreement	Proportion of -ve agreement	PI [±]	BI [^]
Decision making power (n=501)	0.49	98.0%	0.96	0.99	0.50	0.96	0.00
Own health care (n=477)	0.42	87.2%	0.74	0.93	0.50	0.75	0.04
Children's health care (n=476)	0.44	89.4%	0.79	0.94	0.50	0.79	0.02
Everyday household purchases (n=474)	0.28	83.8%	0.68	0.91	0.36	0.74	0.05
Major household purchases (n=474)	0.33	78.5%	0.57	0.87	0.45	0.61	0.09
Visiting relatives or family (n=474)	0.38	81.4%	0.63	0.89	0.49	0.63	0.06
No. of children (n=476)	0.30	88.2%	0.76	0.94	0.36	0.82	0.04
Buying sarees or small jewelry (=468)	0.34	85.3%	0.71	0.92	0.42	0.75	0.07
Discussed about condoms (n=418)	0.34	65.8%	0.32	0.64	0.68	0.06	0.20
Marital Control (n=493)	0.34	68.0%	0.36	0.61	0.73	0.18	0.10
jealous (n=489)	0.32	83.0%	0.66	0.42	0.90	0.71	0.06
accuse (n= 490)	0.34	95.1%	0.90	0.37	0.97	0.92	0.00
no meeting female friends (n=491)	0.49	94.3%	0.89	0.52	0.97	0.88	0.00
limit contact with family (n=493)	0.18	90.5%	0.81	0.23	0.95	0.88	0.03
know whereabouts (n=491)	0.40	79.4%	0.59	0.53	0.87	0.57	0.05
won't trust with money (n=491)	0.41	87.8%	0.76	0.48	0.93	0.76	0.01
Emotional violence (n=487)	0.34	83.0%	0.66	0.44	0.90	0.69	0.03
Humiliate (n=464)	0.36	91.6%	0.83	0.40	0.95	0.86	0.03
Threaten (n=409)	0.34	90.2%	0.80	0.39	0.95	0.84	0.00
Insult (n=463)	0.30	87.3%	0.75	0.37	0.93	0.80	0.04
Physical Violence (n=498)	0.46	76.1%	0.52	0.64	0.82	0.34	0.05
Push (n=474)	0.49	90.3%	0.81	0.54	0.95	0.79	0.04
Slap (n=476)	0.47	78.2%	0.56	0.62	0.85	0.42	0.00
Twist (n=455)	0.49	89.2%	0.78	0.55	0.94	0.76	0.02
Punch (n=459)	0.35	91.3%	0.83	0.39	0.95	0.86	0.02
Kick (n=455)	0.49	89.0%	0.78	0.55	0.94	0.76	0.05
Choke (n=450)	0.42	97.1%	0.94	0.43	0.99	0.95	0.02
Attack (n=459)	0.32	97.4%	0.95	0.33	0.99	0.96	0.02
Sexual violence (n=478)	0.33	91.4%	0.83	0.37	0.95	0.86	0.06
Hus forced sex (n=455)	0.35	92.3%	0.85	0.39	0.96	0.87	0.05
unwanted Sex acts (n=444)	0.44	95.3%	0.91	0.46	0.98	0.91	0.03
High Risk Sex Behaviors (n=464)	0.02	87.5%	0.75	0.06	0.93	0.87	0.07
Anal sex (n=464)	0.03	88.4%	0.77	0.07	0.94	0.88	0.07
Sex with someone other than husband (n=464)	0.12	97.2%	0.94	0.13	0.99	0.97	0.02
Violence against Men (n=492)	0.16	85.8%	0.72	0.24	0.92	0.81	0.04
Hurt him (n=484)	0.26	93.2%	0.86	0.30	0.96	0.90	0.01
Humiliate him (n=485)	0.11	89.3%	0.79	0.16	0.94	0.87	0.05

*Audio Computer Assisted Self Interview

†Face to face interview[§]

PABAK – Prevalence Adjusted Bias Adjusted Kappa

±PI – Prevalence Index
^BI – Bias Index



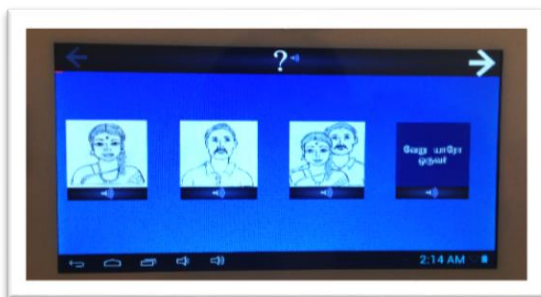
Did your husband ever push you, shake you, or throw something at you?

- YES
- NO



Is your husband jealous or angry if you talk to other men?

- YES
- NO
- DK/DR



Who makes decisions about your own health care?

- YOU
- HUSBAND
- JOINT
- SOMEONE ELSE



The last time you had sexual intercourse with your husband, did you want to have sex or were you forced to against your will to have sex.

- WANTED
- FORCED
- DK/DR

Figure 3.2: Screen shots of different types of questions as they appear in Audio Computer Assisted Self Interview using tablet computers

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CHAPTER 4

ASSOCIATION BETWEEN HIV AND INTIMATE PARTNER VIOLENCE – A STUDY OF MARRIED WOMEN IN THENI DISTRICT, TAMIL NADU, INDIA USING AUDIO COMPUTER ASSISTED SELF INTERVIEWS AND FACE TO FACE INTERVIEWS

Introduction

According to the Indian National AIDS Control Society's (NACO) 2015 estimates, India is home to nearly 2.1 million people with HIV infection. Among those infected, 40% are women of age 15+ years. ¹ The estimated national adult prevalence (15-49 years) of HIV infection was 0.26% (0.22%-0.32%); 0.30% in males and 0.22% in females. New HIV infections in India had declined by 66% from 2000 to 2015 as a result of rigorous prevention programs, and increased access to HIV care and treatment for the people affected with HIV. Even though HIV prevalence is low (<1%) in India, due to its population size it accounts for 38% of new HIV infections in Asia and the Pacific. ² The decline in the rate of new HIV infections has slowed down in recent years indicating the need to devise newer and more effective HIV prevention strategies. Eighty-seven percent of all HIV infections in India occurs through heterosexual mode of transmission. ³ With the increasing number of women being infected with HIV, there is also narrowing of the gap in the rate of HIV infection between males and females in the general population. This necessitates a better understanding of the factors that place women at risk for HIV infection since the majority of Indian women do not have a risk factor of their own.

The biological makeup of women's genital system independently places women in a disadvantageous position by increasing their risk of acquiring HIV higher than that of males. ^{4,5} Previous studies have shown that the male to female transmission is 2-4 times

higher than the female to male transmission in a single act of unprotected sex among sero-discordant couples.^{6,7} In addition to this, STDs play a vital role in the delay of detection of infection & transmission due to its asymptomatic nature.⁸ Transmission of HIV virus is 10 times higher among females with sexually transmitted infection.⁹ Evidence from both quantitative and qualitative studies conducted across various parts of the world has shown that intimate partner violence (IPV) as one of the major risk factors in the transmission of HIV/STI among women^{5,6,9-20} that causes lack of control in a marital relationship to exercise or negotiate safe sex behaviors.

According to the United Nations Declaration on the Elimination of Violence against Women (1993), violence against women is defined as “any act of gender-based violence that results in, or is likely to result in, physical, sexual or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life.”²¹ Violence in an intimate relationship leaves women powerless and dependent on their husbands with no autonomy of their own. This severely limits their ability to communicate with their partners about reproductive choices or to negotiate safe sex behaviors. The mechanism of violence in a close relationship tends to be a complex phenomenon with a variety of factors attributing to it.

A large national study in India has showed that women who were highly educated had lower risk for IPV. However, education had little effect on IPV risk in communities where women’s mistreatment is considered normal.²² In a South Indian study of young married women of ages 16-25 years, women with “love marriages” had higher odds of

reporting violence compared to women whose marriages were arranged by their families.

²³ Young age, childhood abuse, growing up with abuse, and alcohol use were likely to increase women's risk for IPV. ^{14,24-26} Changes in spousal employment also increased the risk of physical violence in contrast to when both men and women had stable employment. ²³ Studies have also shown that women with higher household assets had lower odds of reporting physical violence. ^{24,27}

Women's experience of intimate partner violence is also dependent on their partner's characteristics. Partner's alcohol use has been linked to domestic violence in many communities across the world. ²⁸⁻³⁰ Men who had experienced childhood abuse or witnessed marital violence in their family were likely to engage in intimate partner abuse. ^{25,28} Older men, alcoholics, those who had longer duration of marriage, two or more children and had not received any dowry payment from their wives were more likely to engage in physical violence. ²⁷ Men with high risk behaviors like extra marital sex, symptoms of STI, drug and alcohol use were more likely to abuse their wives than men without any high risk behaviors. ^{29,30} Evidence also suggests that HIV affected individuals were more likely to engage in unprotected sexual intercourse in relationships where they were likely to be victims or perpetrators of abuse. ³¹

Women were more likely to suffer from gynecological morbidities if they had experienced physical, or sexual abuse from their intimate partners, thereby putting them at higher risk for HIV. ^{29,32,33} Hence, IPV is critical in the understanding of the dynamics of HIV transmission and STIs among married women in India because of the lack of other high risk behaviors in these women who live in a monogamous marital relationship.

^{34,35} While ninety percent of Indian women live in a monogamous relationship with their married partners, men usually have the freedom to have multiple sexual partners. It's the men's high risk sexual behaviors that introduce HIV and STI to women in the marital relationship. ^{20,32,36,37} Nonetheless, women are usually blamed for their husband's infection even if they are not HIV positive. ³⁸ Along with gender inequality, cultural norms, social status, and poverty are major threats to the prevention of transmission of HIV infection in Indian women. ^{20,39,40, 41} Thirty-five percent of married Indian women reported experiencing physical violence with or without sexual violence in a national level survey in India. Exposure to physical violence with sexual violence was linked to the increased HIV prevalence in India. ⁴² The presence of HIV in women might also likely to increase women's risk for intimate partner violence. Meta-analysis of studies conducted in the US showed women's experience of IPV was not that different with respect to their HIV status, however the frequency and severity of IPV was greater among HIV positive women. ³⁷ Nevertheless, studies from Africa and other developing nations showed significantly higher rates of victimization in HIV positive women compared to HIV negative women. ^{5,11,12,43} Intimate partner violence was also shown to act as a barrier for women with HIV to access health care and treatment. ^{26,36,44}

The intersection of intimate partner violence and HIV has been recognized worldwide and has gained increased attention in recent times. While there are several studies that explored violence in sex workers, studies that explicitly deal with the co-existence of partner abuse and HIV infection among married women in India are scant. Sensitive behaviors such as sexual behaviors and IPV are also subjected to under

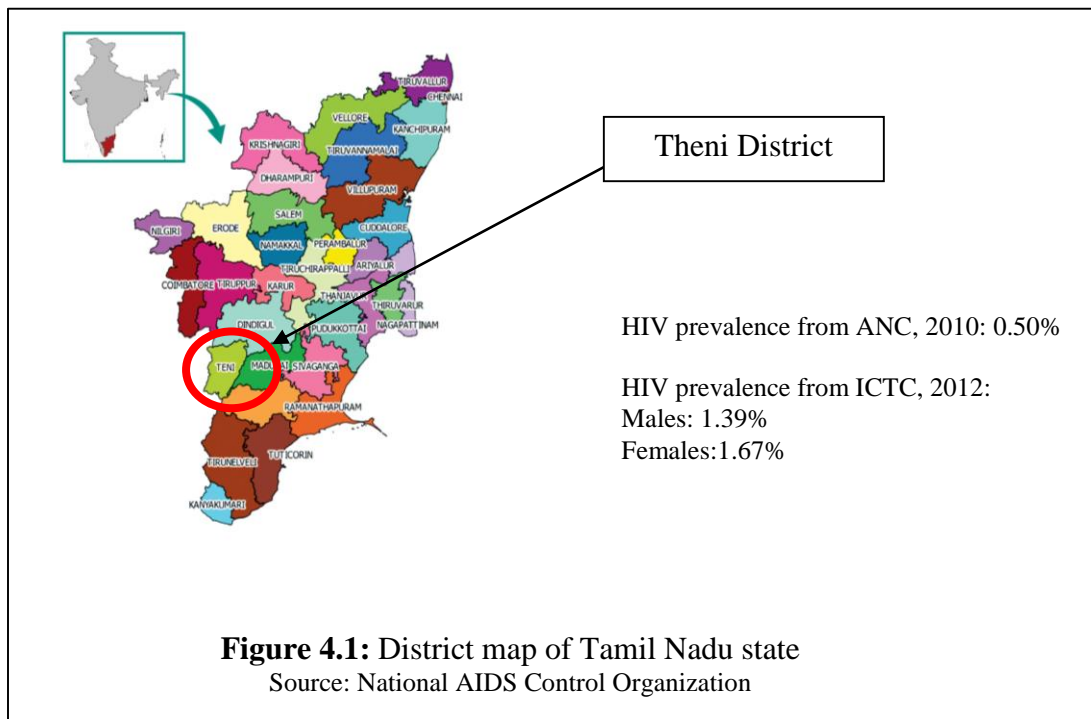
reporting due to social desirability bias and fear of stigmatization.⁴⁵⁻⁴⁷ Studies that employed computer assisted surveys to provide and protect the privacy of the participants had shown increased reporting of such behaviors.^{45,46, 48-52} Hence, we investigated different types of IPV and its association with HIV infection in women from a semi-rural district in South Tamil Nadu, India using two different modes of interviews - face to face interviews (FTFI) and Audio Computer Assisted Self Interviews (ACASI). We utilized an IPV assessment scale identical to the scale used in National Family Health Survey 3 to determine the association of IPV and HIV infection. The specific objectives of this study were to 1) determine the prevalence of different types of IPV in currently married women based on their HIV status 2) determine the association between IPV and HIV infection and to describe other correlates of IPV 3) compare HIV-IPV association using data from the two interview types (FTFI and ACASI) and 4) determine the relationship between women's experience of abuse and perpetration of abuse against their husbands.

Methods

In 2012, the prevalence of HIV from HIV Sentinel Surveillance ANC sites was 0.42% in Chennai district which houses Chennai, the capital and the largest city of Tamil Nadu. Salem (1.5%), and Namakkal (0.75%) districts are two of the high HIV prevalent districts in Tamil Nadu.⁵³ Most of the HIV/AIDS research in Tamil Nadu is focused in these two districts and the areas surrounding Chennai city due to easy accessibility. There is a dearth of research from other regions of Tamil Nadu in spite of higher prevalence rates than national prevalence. Theni district has a fluctuating HIV prevalence trend from antenatal clinic (ANC) sites with 0.5% of HIV prevalence reported in 2010 and more

than 1% prevalence from Integrated Counselling and Testing Centers (ICTC) for both males and females in 2012. Hence, we recruited study participants from Theni district in South Tamil Nadu for the purposes of our research.

A cross-sectional case control study was conducted with HIV positive women as cases and HIV negative women as controls. Eligibility criteria included women between the ages of 18 to 50 years, currently married and living with their husbands at the time of interview. A total of 796 women were recruited of whom 33 women dropped out due to



various reasons. The final sample included 763 women who had completed both types of interviews. Out of this, there were a total of 256 HIV positive and 507 presumed to be HIV negative women. HIV positive cases were enrolled through the help of two NGOs in Theni district. Staff working at the NGOs contacted HIV positive women who

received services from their office and obtained their consent to participate in the study. The study required women to participate in two different modes of interviews in succession. Interviewers contacted those who consented to participate and conducted the interviews at the NGO's office. Each participant's information was recorded with a unique id number. To recruit controls, interviewers noted down the addresses of the cases without registering any other personal identifiers. For each case, two neighborhood controls presumed to be HIV negative were recruited in a random manner. First, houses in the same neighborhood as that of the cases were mapped. Next, interviewers used a random number table generated for sampling purposes to approach households and recruit controls. Only one control was selected from a household if there were more than one eligible participants. After recruitment of controls, the addresses of the cases were permanently deleted from our research records. Controls were not tested for HIV infection. During the interview, controls were asked for their HIV status if they had been previously tested for HIV. All participation in this research was purely voluntary and anonymous. Privacy of the participants was maintained at all times. Ethical board approval was obtained from the ethical committee of YRG CARE center, Chennai, Tamil Nadu and the Institutional Review Board of University of California, Los Angeles.

The survey instrument was developed to collect quantitative data on the following areas: i) socio-demographic characteristics, ii) marital control behaviors, iii) intimate partner violence experiences, iv) high risk sexual behaviors v) HIV disclosure and treatment for cases. The questionnaire was adapted from Indian Family Health Survey by Demographic Health Surveys (DHS) that used Modified Conflict Tactics Scale for

measuring partner abuse.⁵⁴ This scale can be modified and used for a culturally sensitive population because it asks about specific acts of violence rather than general occurrences of violence. There were two components to the interview process for each participant, i) a traditional Face to Face Interview (FTFI) and ii) an Audio Computer Assisted Self Interview (ACASI) using tablet computers. Participants randomly picked their order of interview methods before beginning the interviews. All interviews started with questions from the interviewers gathering social and demographic data. Depending on the participants' random selection, interviews were continued either in FTFI or ACASI to collect the rest of the data. When participants completed the first mode of interview, the next one was administered immediately. Interviewers guided the participants in answering a set of sample questions with varying response types before leaving them alone to continue with ACASI interviews.

The ACASI instrument was created using Adobe PhoneGap tool. It was developed to work on an android platform. We used iBall 7-inch touch screen tablets with headphones to administer ACASI. All questions were worded similarly in both FTFI and ACASI. However, the format in which they were administered were different between the interviews modes. In FTFI, the interviewers read out the questions to the participants and noted down their responses on the paper questionnaires. In ACASI, there was an audio and visual component to the questionnaire. Participants heard the questions & answers in an audio track with a female voice in Tamil that provided instructions to touch the correct responses on the tablets' screen. Questions were only heard through audio and did not appear in text on the screen. Answer choices appeared either in text

form or as pictures on the tablet screens along with the audio. Questions that had answers YES/NO/DON'T KNOW were displayed as green/red/orange boxes with respective texts. We followed the same coloring coding system wherever applicable in the entire ACASI program. Participants could touch the speaker icon next to the question symbol or on the answer boxes to repeat the corresponding audio track if they want to hear it again. At any moment, participants could use the forward and backward arrows to skip questions or to go back and change their responses for previous questions.

Outcome variables

Outcome variables included different types of intimate partner violence and abuse against husband. For the purpose of this research, IPV was defined as any type of violence perpetrated by the husband who was currently residing with the participant at the time of interview. IPV is used interchangeably with domestic violence, violence, abuse, wife abuse, partner abuse and domestic abuse in this paper. Three types of wife abuses were measured; emotional, physical and sexual abuse. Physical violence was measured using a 7 items scale that included measurement of physical violence perpetrated by current husband such as did your husband ever “push, shake or throw something at you?”, “slap you?”, “twist your arm or pull your hair?”, “punch you?”, “kick, drag or beat you?”, “try to choke or burn you?”, “threaten or attack with a knife, gun or any weapon?”. A positive response to any one of the items indicated physical violence. Cronbach alpha for measuring physical violence in FTFI was 0.86 and in ACASI was 0.82. Sexual abuse was measured using two items: husband ever “physically force you to have sexual intercourse even when you did not want to?”, and “force you to

perform any sexual acts that you did not want to?”. A positive response to either of these two items indicated the presence of sexual IPV. Cronbach alpha for measuring the reliability of sexual abuse was 0.86 in FTFI and 0.80 in ACASI. Emotional abuse was described as a positive response to any of the following, did your husband ever “say or do something to humiliate you in front of others?”, “threaten to hurt or harm you or someone close to you?”, “insult you or make you feel bad about yourself?”. A positive response to any of these three items indicated the presence of emotional IPV. Cronbach alpha for emotional abuse measured in FTFI was 0.81 and in ACASI was 0.78. We classified IPV experiences as lifetime abuse and recent abuse (in the past 12 months) based on the timing of occurrence of abuse.

Another type of violence measured was violence perpetrated by women against their husbands. We used two questions to measure violence against husbands, 1. “Have you ever hit, slapped, kicked, or done anything else to physically hurt your husband at times when he was not already beating or physically hurting you?”, 2. “Have you ever said or done something to humiliate your husband in front of others when he was not arguing with you or humiliating you?”. A positive response to any of these two questions indicated perpetration of violence against husbands. The reliability score for measuring violence against husband was poor with a Cronbach of 0.58 in FTFI and 0.41 in ACASI.

Independent variables

To address our hypothesis, HIV status of women was included as an independent variable. Variables that could potentially confound or modify the relationship between HIV and IPV along with risk factors for IPV were selected for inclusion in the model.

Demographic characteristics of participants such as age, education, employment, wealth status and their intimate partner characteristics such as age, education, employment were considered. Women's lifetime number of sexual partners (one or more than one partners), history of witnessing IPV in parents (father ever beat mother or never), previous experience of IPV (physical abuse after age 15 by someone other than husband), dowry (given before/after marriage), type of marriage (love or arranged marriage), duration of time lived with current husband (≥ 10 years or more), difference in age between intimate partners (≥ 10 years or more), husband's alcohol use (ever used alcohol or never used), and number of children alive (≤ 2 or more than 2) were considered for regression model building. Women's HIV status and marital controlling behaviors were previously found to be associated with a higher risk for experiencing physical and sexual violence among married women.³⁷ Hence, husband's controlling actions were considered for inclusion in the model. It was measured by using 6 items that includes "he is jealous or angry if you talk to other men", "he accuses you of being unfaithful", "he does not permit you to meet your female friends", "he tries to limit your contact with your family", "he insists on knowing where you are at all times", and "he does not trust you with any money". If women reported anyone of these behaviors, they were marked as victims of husband's controlling behavior.

Statistical analysis

All analyses were performed using Stata 13 (Stata Corp, College Station, TX). First, we computed the economic status of the participants by computing a relative wealth quintile using Principal Component Analysis (PCA). Several variables were used in the

calculation of wealth quintile such as home ownership, drinking water source, no. of bedrooms in the house, type of toilet facility, type of cooking fuel used in the household, house floor type, type of wall, agricultural land ownership, and possession of utensils like pressure cooker, mobile, watch, table, chair, bed, mattress, bicycle, fridge, DVD, car, and motorbike. Next, frequencies for demographic correlates for both women and their intimate partners by HIV status were computed. Venn diagrams were created to demonstrate the overlapping of different types of abuses among HIV positive and negative women using data from both FTFI and ACASI interviews. Odds ratios and adjusted odds ratios for different abuse types by HIV status were calculated and compared between interview methods.

Since sexual violence is considered as an extension of severe form of physical violence, we created a categorical variable with three mutually exclusive categories: 1) physical abuse in the absence of sexual abuse 2) sexual abuse with or without physical abuse and 3) no physical or sexual abuse (no abuse). We used polytomous logistic regression analysis using a multinomial approach. All covariates included in the model were selected based on *a priori* knowledge and from statistically significant bivariate results at p-value <0.05. Model diagnostics for multinomial logistic regression analysis were performed and variables that were not significant across all outcome levels were not considered for the final model. Categorical variables with many levels were reduced to fewer levels or to a binary level to increase model performance. Separate models were run for data collected from FTFI and ACASI. Relative Risk Ratios (RRR) were calculated in multinomial logistic regression which is a ratio of the odds ratios. Data

records with missing information for certain variables were not included in the analysis if it involved the variables with missing data. Hence the final sample for multinomial regression model consisted of 712 participants for FTFI and 702 participants for ACASI.

Results

All enrolled women were between the ages of 18 and 50 years old (Table. 4.1). On an average, woman in the HIV negative group were almost three years younger than women in the HIV positive group. More than half of the HIV positive women (53.6%) had no education or only elementary education, whereas 69.6% of HIV negative women had some middle school education or more. An overwhelming majority of the participants (97%) were Hindus in both groups. Sixty-nine percent of HIV positive women had employment that paid in cash or kind compared to 46% of HIV negative women. About 80% of HIV negative women and 69.5% of HIV positive women reported paying dowry to their husbands/marital families either during or after their wedding. In general, women in the HIV positive group belonged to relatively lower wealth quintile groups when compared to women in the HIV negative group. The mean duration of years living with husband was longer for HIV positive women than HIV negative women by 2 years. A greater proportion of HIV positive women compared to HIV negative women had spouses who were older than them by more than 10 years of age. Higher percent of HIV positive women reported more than one lifetime sex partners in both FTFI (13.3%) and ACASI (16.6%) interviews compared to HIV negative women (2.4% in FTFI and 4.3% in ACASI).

The mean age for current spouses of HIV positive women was 41 years (Table 4.2). The spouses of HIV negative women were slightly younger than the spouses of HIV positive women with an average age of 39.7 years. Almost 47% of them had some high school education or college education. Most of the spouses of HIV positive women (95.3%) and HIV negative women (98.8%) were sero-concordant with regards to their wives' HIV status.

Types of IPV by HIV sero-status

Figures 4.2 – 4.3 present Venn diagrams that show different types of intimate partner violence in the study population by type of interview, FTFI and ACASI. It shows that in general all three types of abuse occur in combination with other types of abuse. More women reported abuse in ACASI than FTFI. Women reported more physical abuse than sexual or emotional abuse irrespective of their HIV sero-status and interview types. Majority of the women who reported sexual abuse and/or emotional abuse had also reported physical abuse. The proportion of women who reported only one type of abuse was similar between HIV positive and HIV negative women using both modes of interviews. However, the proportion of women who reported all three types of abuse was significantly different between the two groups of women in both ACASI [all women: 8.1%; HIV +ve :14.9%, HIV-ve: 4.3% p-value <0.001] and FTFI [all women: 2.9%; HIV +ve: 5.9%, HIV-ve: 1.4% p-value <0.001].

Nearly 30% of all women reported lifetime abuse (presence of any abuse) in FTFI compared to 51% of HIV positive women and 41% of HIV negative women who reported lifetime occurrence of abuse in ACASI (Table 4.3). Physical violence was the

most reported form of abuse with 30% of HIV negative women and 27% of HIV positive women reporting lifetime experience of physical abuse in FTFI and 35% of HIV negative women and 42% of HIV positive women reporting the same in ACASI. Almost all women who reported abuse, also reported recent occurrence of abuse within the past 12 months of the interview. Sexual abuse was the least reported form of abuse. HIV positive women were more likely to report lifetime sexual abuse (FTFI: AOR - 2.54, 95% CI: 1.11-5.82; ACASI: AOR - 3.31, 95% CI: 1.91-5.75) and recent sexual abuse in the past 12 months (FTFI: AOR - 3.42, 95% CI: 1.38-8.50; ACASI: AOR - 3.90, 95% CI: 2.14-7.09) than HIV negative women. HIV positive women were also more likely to report lifetime emotional abuse (AOR - 2.00, 95% CI: 1.26-3.16) and recent emotional abuse in the past 12 months (AOR - 2.12, 95% CI: 1.28-3.54) than HIV negative women in ACASI. Furthermore, HIV positive women were very likely to engage in perpetration of violence against their husbands than HIV negative women in ACASI (AOR - 2.02, 95% CI: 1.08-3.74). In FTFI, HIV positive women were less likely to engage in violence against their husbands than HIV negative women (AOR - 0.51, 95% CI: 0.25-1.03).

Association between IPV types, HIV and other correlates of IPV

Table 4.4 presents results from multinomial regression analysis for types of IPV and its correlates from both FTFI and ACASI methods. Similar results were obtained from both interview methods with respect to the association between IPV and HIV after controlling for certain demographic characteristics and risk factors that independently affect IPV. HIV positive women who were currently married and living with their husbands were more likely than HIV negative women to be victims of combined physical

abuse and sexual abuse (FTFI: RRR – 2.44, 95% CI: 1.06-5.62; ACASI: RRR – 3.03, 95% CI: 1.76-5.21) than no abuse.

Correlates of IPV differed based on the type of interview. In FTFI, the following attributes of women were correlates to at least one type of physical abuse: women's HIV status, number of lifetime sex partners, husband's paid employment status, husband's ever use of alcohol, husband's controlling behaviors, and witnessing parental IPV. In ACASI, the following attributes of women were correlates to at least one type of physical abuse: women's HIV status, women's age >35 years, difference of more than 10 years of age between partners, husband's ever use of alcohol, husband's controlling behavior, physical abuse by non-partners, and parental IPV. In both modes of interviews, husband's controlling behavior was significantly related to both physical abuse and physical abuse with sexual abuse. Experiencing physical abuse in the presence of sexual abuse was positively related to women's experience of witnessing father beating mother when compared to experiencing no abuse (FTFI: AOR – 4.14, 95% CI: 1.93-8.91; ACASI: AOR – 4.47, 95% CI: 2.47-8.08).

Women's IPV and abuse against husbands

Data from ACASI and FTFI showed similar results for abuse against husbands after controlling for confounding attributes of women and their husbands. Women who were victims of intimate partner violence were more likely to engage in perpetration of violence against their husbands (FTFI: AOR – 9.88, 95% CI: 5.37-18.18; ACASI: AOR – 7.26, 95% CI: 3.70-14.21) (Table 4.5). HIV positive women were two times more likely

than HIV negative women to perpetrate violence against their husbands (ACASI: AOR – 2.02, 95% CI: 1.08-3.74) (Table 4.3).

Discussion

IPV & HIV infection

The results of this study showed that in our sample of currently married women from a semi-rural area, the prevalence of emotional, physical and sexual abuse was higher in HIV positive women than HIV negative women. Physical abuse was the most common type of abuse, while sexual abuse was the least common form of abuse which was similar to the pattern observed in the data from Indian National Family Health Survey 2005-2006.⁵⁵ Among our study population, the prevalence of lifetime abuse reported in FTFI (31.7%) was less than the prevalence of lifetime abuse reported in NFHS 2014-2015 (40.6%) for married women in Tamil Nadu state. The inconsistency in the reported prevalence of IPV between the national survey and our study could be attributed to the social, cultural and religious differences between our study population and the general population of the state as well due to the difference in sampling method. On the other hand, women reported higher prevalence of lifetime abuse (44.4%) in ACASI which shows that the measure of IPV was subjected to social desirability bias in which more women reported being victims of IPV in ACASI than in FTFI.

This study demonstrated a positive association between HIV infection and women's experience of physical violence combined with sexual violence using two interview methods, FTFI and ACASI. Previous research using Indian NFHS 3 data showed that the prevalence of HIV infection was nearly 4 times higher for women who

experienced physical and sexual abuse compared to women who were never abused.⁴² It showed that women's HIV infection was not related to their own sexual risk behaviors such as condom use or number of sexual partners thereby providing evidence to the theory of spread of HIV infection among married Indian women occurring largely through their husbands in a monogamous sexual relationship. The authors also showed increased prevalence of HIV infection in women who experienced both physical and sexual violence and not in those who experienced only physical violence or no violence. Results from our study utilizing both interview methods were also consistent with this finding. We found a significant positive relationship between women's HIV status and IPV in those who experienced both physical and sexual abuse and not in women with physical abuse alone when compared to women who were not abused.

Our findings show that it is common for married women to experience violence in the hands of their intimate partners. The likelihood of experiencing more severe forms of violence such as combined physical and sexual violence was higher for HIV positive women than HIV negative women. Previous studies have shown that HIV infection can lead to violence or exacerbate existing violence in an intimate relationship.^{56,74} We need to investigate further to determine the timing of occurrence of violence to determine whether HIV disclosure was the cause of increased violence among HIV positive women. However, a majority of women who reported lifetime abuse also reported recent occurrence of abuse irrespective of their HIV status which may indicate that these women were prone to intimate partner violence on a regular basis. Most of the women who reported sexual violence and emotional violence reported the presence of physical

violence or a combination of physical, sexual and emotional violence. It is possible for one type of violence leading to another type of violence, for instance women whose partners insisted on sex without their consent were more likely to be beaten.^{20,56} Studies from other countries have shown that in some countries women experience sexual violence in combination with physical violence more often than sexual violence alone and in some countries women experience more sexual violence than any other types of violence.⁵⁶⁻⁵⁸ Usually this pattern reflects the underlying socio-cultural norms as to what was culturally accepted for men to impose on their wives.

IPV and husband's controlling behavior

Findings from our study supports evidence from other studies that showed husband's controlling behavior may be acting as a risk factor for intimate partner violence. Previous findings from different parts of the world have shown that women whose husbands were jealous and controlling caused severe form of violence such as sexual violence.^{57, 60-63} In our study population, husband's controlling behavior had a significant positive relationship with physical abuse in the presence or absence of sexual violence. Controlling behavior of a husband reflects the patriarchal household/society in which the women lives and the lack of freedom to make decisions for herself and for her children. It also limits her ability to create social interactions or a social network or her own.

IPV and parental violence

From ACASI we found that women's exposure to violence in their natal family, particularly father beating mother was significantly associated with increased physical

and sexual violence. This finding relates to the findings from a multi-site household survey conducted in India that showed women whose fathers beat their mothers were two times more likely to be victims of physical violence than women whose fathers did not beat their mothers.⁶⁴ This finding is also consistent with the existing body of evidence that describes a multigenerational effect of violence in women's life.²⁵ Women who experience violence in their families or in their neighborhood can also normalize violence in an intimate relationship, thereby falling as a victim to partner abuse.⁶⁵

Other correlates of IPV

Furthermore, our study showed slightly different correlates of IPV depending on the type of interview. This could be attributed to women's increased disclosure of sensitive behaviors in ACASI than FTFI. We found increased reporting of sensitive behaviors from women in both HIV positive and negative groups. Women's demographic characteristics such as age, education, employment and wealth status of the household were not consistently related with the different types of physical abuse in both ACASI and FTFI. Husband's characteristics such as his age and education were not correlated to IPV experiences in women. However, we found that husband's alcohol use was positively associated with both physical violence and combined physical and sexual violence in ACASI and with physical abuse in FTFI. The relationship with alcohol and all types of abuse had been demonstrated previously with increased reporting of violence by women whose husbands used alcohol.^{25, 41, 64} Alcohol use can mask men's judgement and inhibition resulting in perpetration of violence against wives.

Women's perpetration of violence against husbands

With increased attention to IPV research around the world, we now know that women are also the perpetrators of violence in an intimate relationship.⁷⁵⁻⁷⁷ However, there is not enough empirical evidence to show women's IPV perpetration in a patriarchal society like India. In our study, only a small percent of women were perpetrators of violence against their husbands compared to those who were victims of violence. Hence, IPV against women is a bigger problem than IPV against men. Data from both types of interviews showed that women who had experienced intimate partner abuse were more likely to engage in violent behaviors against their husbands when they were not engaged in perpetration of abuse against their wives. A meta-analysis that studied women's use of violence against their intimate partners found reasons for such violence as anger, jealousy, retribution, a way to seek attention, and a defensive mechanism to protect from IPV.^{66,67} Men tend to resort to physical violence to show his want of power or control in the relationship and women resort to physical violence in self-defense to protect themselves or out of fear.⁶⁷ In our study, we do not know whether the motive of the women was based on a precautionary action to protect themselves from an imminent IPV attack from their husbands or other reasons. From ACASI, we also found that HIV positive women had higher odds of engaging in violence against their husbands than HIV negative women. Owing to a small percent of women who reported perpetration of violence against their husbands, we were unable to determine whether women's perpetration of violence was associated with a specific type of violence inflicted on them. Further research is required to investigate the causes and to understand the intricacies

involved in women's perpetration of violence against their intimate partners in our population. Since women who engage in violence against their spouses were more likely to be victims of violence themselves, behavioral interventions that target changes in both intimate partners should be considered instead of interventions that only target males' violence against women depending on the severity of the problem.

Methodological considerations

There are numerous limitations to this research. Our study is based on a convenient sample of cases and neighborhood controls. Sensitive data such as sexual behaviors and domestic violence experiences are subjected to social desirability bias and also recall bias. To overcome social desirability bias, we used ACASI method to collect sensitive information. Data from our study showed that women reported more sensitive information in ACASI than FTFI. The results obtained using ACASI may be closer to the actual experience of sensitive behaviors in our study population. However, we cannot be certain as to which method of interview resulted in the most accurate reporting of such behaviors. Both interviews were conducted in sequence within the same day. Hence, answering questions in one interview could've influenced participants' answers in the interview that followed. Nonetheless, this will not favor any one type of interview method because we had randomized the order in which the interviews were administered. Previous studies have shown that the order of interview methods do not affect the way participants answered in the interviews.^{68,69} Even though all questions were worded the same in both interview modes, questions in ACASI had a different format than in FTFI. There were also a lot of missing values in ACASI compared to FTFI. ACASI can be

designed to minimize missing values. Nonetheless, we found that the participants should be given the autonomy to choose whether or not they want to answer certain questions given the sensitive nature of this research. Although we cannot determine the validity of the responses using a gold standard, increased reporting of censored behaviors is considered truthful and indicates more accurate reporting of sensitive behaviors.^{70,71}

In general, recall bias is a problem when asking about events that happened in the past. The measurement of recent occurrence of violence in the past 12 months may have been subjected to recall bias compared to lifetime abuse because of the difficulty in remembering events in context to the specific time period that it occurred. Hence, we utilized lifetime partner abuse in our regression analysis instead of partner abuse in the last 12 months, to reduce recall bias and to make it comparable between HIV positive and HIV negative women. We found that the proportion of women who reported lifetime abuse nearly remained the same as the proportion of women who reported recent abuse in the past 12 months. This may indicate that women who experience violence were more likely to experience violence on a regular basis.

Even though we established a positive association between HIV and combined physical and sexual violence, we could not establish a temporal relationship. Owing to a small sample size from a smaller geographical area, findings from this study are not generalizable to populations from the other parts of the state or country as it is not a representative sample of the entire population of married women in the state or country. HIV negative women were never tested to rule out HIV infection. We do not expect it to

be a problem since the prevalence of HIV infection is very low among the general population in India.

We utilized women's reporting of husband's controlling behaviors which may have resulted in the over reporting of such behaviors. We find this method acceptable than asking men which may have resulted in underreporting of their own controlling behaviors. More women reported husband's controlling behaviors in ACASI than FTFI indicating that over reporting may not be a source of concern. Further, we did not impute missing values for any variable. This can potentially lead to biased estimates. The final sample for FTFI and ACASI were missing only 7% and 8% of the total sample respectively which may not have caused biased estimates. We could not assume that the missing values for abuse outcome variables were missing at random. Intuitively we expect those women who had experienced stigmatized behaviors to not readily disclose such information resulting in underreporting. If this reasoning holds true, the obtained results may be an underestimate of the true effect.

Conclusion

Despite the limitations, our findings suggest a positive relationship between HIV infection and physical violence combined with sexual violence. Violence occurs throughout the life cycle of women starting from female feticide even before the birth of a female child to elderly abuse or homicide of widows.⁷² Hence, increased attention is needed to address the families and communities in which father beating mother is a normalized behavior. The occurrence of increased violence among HIV positive women is a source of real concern in regards to their HIV treatment and care. Studies have shown

that women who undergo abuse are subjected to increased stress levels, increased negative life experiences, increased levels of depression and reduced T-cell function.⁷³ This is especially concerning given HIV infection primarily attacks T-cells in the body. IPV acts as a barrier for women with HIV to seek treatment and care for their illness. IPV in HIV positive women was associated with lower ART use, lower ART adherence, lower viral load suppression and increased risk of clinical progression to HIV.^{36, 44} Hence, programs need to be devised to empower women, change cultural norms that place women in a vulnerable state to intimate partner violence and promote social environments that promotes gender equality and women's autonomy in an intimate relationship. These programs also need to address the multigenerational effect of violence in women by addressing violence that occurs in the different phases of women's life. Our study also showed that ACASI can be used as an effective tool in collecting sensitive data from a semi-rural population like ours. Future research that involves the study of sensitive behaviors should incorporate ACASI as a part of their data collection method even for a semi-rural population.

Table 4.1: Selected characteristics of currently married women in Theni district, Tamil Nadu by HIV sero status

Characteristics	HIV +ve (n=256) n (%)	HIV -ve (n=507) n (%)	p-value from χ^2
Age in years, categories			<0.001
≤24	7 (2.7)	75 (14.8)	
25-29	26 (10.2)	105 (20.7)	
30-34	73 (28.5)	88 (17.4)	
35-39	79 (30.9)	114 (22.5)	
40-44	36 (14.1)	73 (14.4)	
≥45	35 (13.7)	52 (10.3)	
Mean	35.8 (6.2)	33 (7.6)	<0.001*
Education			<0.001
None	69 (27.0)	70 (13.8)	
Elementary	68 (26.6)	84 (16.6)	
Middle School	71 (27.7)	137 (27.0)	
≥High school	48 (18.8)	216 (42.6)	
Religion			0.983
Hindu	249 (97.3)	493 (97.2)	
Others	7 (2.7)	14 (2.8)	
Caste class (n=759)			0.263
Scheduled Caste / Scheduled Tribe	43 (16.9)	101 (20.0)	
Most Backward Caste	83 (32.7)	138 (27.3)	
Others (Forward and Backward Caste)	128 (50.4)	266 (52.7)	
Paid employment			<0.001
Yes	177 (69.1)	234 (46.2)	
No	79 (30.9)	273 (53.9)	
Dowry			<0.001
Before or after marriage	178 (69.5)	406 (80.1)	
No dowry	78 (30.5)	101 (19.9)	
Wealth status			<0.001
Lowest	85 (33.2)	70 (13.8)	
Second	68 (26.6)	83 (16.4)	
Middle	51 (19.9)	101 (19.9)	
Fourth	32 (12.5)	122 (24.1)	
Highest	20 (7.8)	131 (25.8)	
Type of marriage			0.422
Arranged marriage	239 (93.4)	465 (91.7)	
Love marriage	17 (6.6)	42 (8.3)	
Duration living with husband			0.0006*
Mean (years)	16.5 (6.8)	14.6 (8.0)	
Age difference between spouses			0.007
≤ 10 years	218 (85.2)	464 (91.5)	
> 10 years	38 (14.8)	43 (8.5)	

Table 4.1 continued: Selected characteristics of currently married women in Theni district, Tamil Nadu by HIV sero status

Characteristics	HIV +ve (n=256) n (%)	HIV -ve (n=507) n (%)	p-value from χ^2
Participation in social activities[†]			0.052
Yes	126 (49.2)	212 (41.8)	
No	130 (50.8)	295 (58.2)	
Alcohol use			0.861
Yes	7 (2.7)	15 (3.0)	
No	249 (97.3)	492 (97.0)	
Tobacco use			0.189
Yes	7 (2.7)	7 (1.4)	
No	249 (97.3)	500 (98.6)	
No. of lifetime partners (FTFI, n=733)			<0.001
One	31 (13.3)	12 (2.4)	
More than one	203 (86.8)	487 (97.6)	
No. of lifetime partners (ACASI, n=709)			<0.001
One	40 (16.6)	20 (4.3)	
More than one	201 (83.4)	448 (95.7)	

* p-value from t-test

[†]social activities include women's groups, political, religious, social work groups, arts/crafts groups

Table 4.2: Selected characteristics of spouses as reported by currently married women in Theni district, Tamil Nadu by women's HIV sero status

Spouse characteristics	HIV positive (n=256) n (%)	HIV negative (n=507) n (%)	p-value from χ^2
Age in years, categories (n=753)			<0.001
≤34	16 (6.3)	143 (28.7)	
35-39	77 (30.1)	116 (22.9)	
40-44	62 (24.2)	100 (19.7)	
45-49	64 (25.0)	82 (16.2)	
≥50	37 (14.5)	66 (13.0)	
Mean age (years)	42.4 (6.4)	39.7 (8.1)	<0.001*
Median age (years)	41	39	
Education			<0.001
None	78 (30.5)	90 (17.8)	
Elementary	48 (18.8)	76 (15.0)	
Middle School	67 (26.7)	104 (20.5)	
≥High school	63 (24.6)	237 (46.8)	
Employed			0.31
Yes	233 (91.0)	472 (93.1)	
No	23 (9.0)	35 (6.9)	
Drinks alcohol			0.65
Yes	169 (66.0)	343 (67.7)	
No	87 (34.0)	164 (32.4)	
HIV Status			0.003
Positive	244 (95.3)	6 (1.2)	
Negative	12 (4.7)	501 (98.8)	

* p-value from t-test

Table 4.3: Proportions, odds ratios and adjusted odds ratios with 95% confidence intervals for husband’s controlling behavior and types of abuse by HIV infection in currently married women in Theni district, Tamil Nadu, India*

	Face to face interviews				Audio Computer Assisted Self Interviews			
	HIV +ve n=256	HIV -ve n=507	Odds ratio (95%CI)	Adjusted odds ratio [†] (95% CI)	HIV +ve n=256	HIV -ve n=507	Odds ratio (95%CI)	Adjusted odds ratio [†] (95% CI)
Husband controls wife [‡]	0.31 n=251	0.37 n=498	0.80 (0.58-1.10) n=749	0.54 (0.37-0.80) n=721	0.47 n=255	0.45 n=502	1.05 (0.78-1.42) n=757	0.81 (0.57-1.17) n=707
Types of Intimate Partner abuse								
Emotional abuse by husband [§]	0.19	0.17	1.16 (0.79-1.71)	1.01 (0.59-1.72) n=721	0.29 n=244	0.14 n=487	2.48 (1.70-3.62) n=731	2.00 (1.26-3.16) n=697
Emotional abuse last 12 months [§]	0.18	0.17	1.13 (0.76-1.68)	0.94 (0.55-1.61) n=721	0.23 n=244	0.10 n=487	2.85 (1.87-4.35) n=731	2.12 (1.28-3.54) n=697
Physical abuse by husband [§]	0.27	0.30	0.87 (0.62-1.22)	0.70 (0.45-1.09) n=721	0.42 n=248	0.35 n=498	1.30 (0.95-1.78) n=746	1.22 (0.83-1.79) n=703
Physical abuse last 12 months [§]	0.26	0.30	0.84 (0.60-1.17)	0.64 (0.41-1.00) n=721	0.38 n=248	0.28 n=498	1.57 (1.14-2.17) n=746	1.47 (0.99-2.17) n=703
Sexual abuse by husband [§]	0.08	0.04	2.06 (1.09-3.91)	2.54 (1.11-5.82) n=712	0.25 n=236	0.10 n=478	3.06 (2.00-4.68) n=714	3.31 (1.91-5.75) n=678
Sexual abuse last 12 months [§]	0.07	0.03	2.18 (1.08-4.40)	3.42 (1.38-8.50) n=712	0.22 n=236	0.07 n=478	3.42 (2.09-5.61) n=714	3.90 (2.14-7.09) n=678
Lifetime abuse [§]	0.3	0.33	0.87 (0.63-1.20)	0.73 (0.47-1.13) n=721	0.51 n=241	0.41 n=484	1.53 (1.12-2.09) n=725	1.42 (0.98-2.09) n=691
Injuries from abuse [§]	0.11	0.08	1.41 (0.84-2.37)	1.25 (0.67-2.33) n=721	0.23 n=249	0.19 n=498	1.29 (0.89-1.87) n=747	1.06 (0.69-1.69) n=704
Husband abuse [¶]	0.07	0.11	0.59 (0.34-1.02)	0.51 (0.25-1.03) n=733	0.16 n=244	0.08 n=492	2.27 (1.40-3.67) n=736	2.02 (1.08-3.74) n=684

Table 4.3 continued: Proportions, odds ratios and adjusted odds ratios with 95% confidence intervals for husband's controlling behavior and types of abuse by HIV infection in currently married women in Theni, Tamil Nadu, India *

	Face to face interviews				Audio Computer Assisted Self Interviews			
	HIV +ve n=256	HIV -ve n=507	Odds ratio (95%CI)	Adjusted odds ratio [†] (95% CI)	HIV +ve n=256	HIV -ve n=507	Odds ratio (95%CI)	Adjusted odds ratio [†] (95% CI)
Other types of abuse								
Non partner abuse [‡]	0.03	0.02	2.01 (0.75-5.42)	1.66 (0.53-5.21)	0.08 n=247	0.04 n=495	2.09 (1.10-3.96) n=742	1.58 (0.76-3.26) n=742
Witnessed parental abuse [#]	0.16 n=251	0.22 n=502	0.66 (0.44-0.98) n=753	0.75 (0.47-1.17) n=753	0.13 n=250	0.15 n=497	0.80 (0.51-1.25) n=747	0.83 (0.50-1.38) n=747

*n=763 (HIV +ve =256; HIV -ve=507) unless specified.

[†]Excludes 30 women in FTFI and 54 women in ACASI for whom lifetime no. of partners' data were missing; excludes 14 women in FTFI and 6 women in ACASI for whom husband's controlling behavior data were missing.

[‡]Adjusted for women's age, education, employment, wealth status, no. of lifetime partners.

[§]Adjusted for women's age, education, employment, wealth status, no. of lifetime partners, controlling behavior by husband.

[¶]Adjusted for women's age, education, employment, wealth status, no. of lifetime partners, lifetime abuse.

[#]Adjusted for women's age, education, employment, wealth status.

Bold faceted text refers to significant values at p<0.05.

Table 4.4: Relative risk ratios (RRR) from multinomial regression analysis of correlates of intimate partner violence by type of violence in currently married women in Theni district, Tamil Nadu, India

Characteristics	FTFI [§] (n=712)		ACASI [†] (n=702)	
	Adjusted RRR [‡] Physical vs None	Adjusted RRR [‡] Physical & Sexual vs None	Adjusted RRR [‡] Physical vs None	Adjusted RRR [‡] Physical & Sexual vs None
HIV status				
HIV+ve women	0.68 (0.43-1.08)	2.44 (1.06-5.62) *	0.83 (0.53-1.30)	3.03 (1.76-5.21) ^
HIV-ve women	Reference	Reference	Reference	Reference
Age				
18 - 35 years	Reference	Reference	Reference	Reference
36 - 50 years	0.80 (0.53-1.17)	0.99 (0.47-2.06)	0.67 (0.46-0.99) *	1.14 (0.69-1.88)
Education				
Less than high school	Reference	Reference	Reference	Reference
High school or more	0.76 (0.49-1.17)	1.77 (0.81-3.88)	0.93 (0.61-1.41)	1.34 (0.77-2.32)
Difference in age				
<= 10 years	-	-	Reference	Reference
> 10 years	-	-	1.93 (1.07-3.49) *	2.45 (1.23-4.86) *
Husband employment				
Not employed	Reference	Reference	-	-
Paid employment	5.12 (1.20-21.78) *	0.46 (0.12-1.74)	-	-
Husband ever used alcohol				
No	Reference	Reference	Reference	Reference
Yes	1.85 (1.17-2.92) *	1.93 (0.78-4.77)	1.55 (1.03-2.32) *	1.84 (1.07-3.17) *
Lifetime no. of partners				
One partner	Reference	Reference	-	-
More than one partner	1.73 (0.76-3.94)	4.66 (1.68-12.89) *	-	-
Husband's controlling behavior				
No	Reference	Reference	Reference	Reference
Yes	4.91 (3.31-7.26) ^	7.54 (3.44-16.56) ^	2.16 (1.50-3.11) ^	2.56 (1.57-4.16) ^

Table 4.4 continued: Relative risk ratios (RRR) from multinomial regression analysis of correlates of intimate partner violence by type of violence in currently married women in Theni district, Tamil Nadu, India

Characteristics	FTFI [§] (n=712)		ACASI [†] (n=702)	
	Adjusted RRR [‡] Physical vs None	Adjusted RRR [‡] Physical & Sexual vs None	Adjusted RRR [‡] Physical vs None	Adjusted RRR [‡] Physical & Sexual vs None
Physical abuse by others				
Not abused	-	-	Reference	Reference
Yes	-	-	2.15 (0.87-5.34)	2.98 (1.12-7.91) *
Father beat mother				
No	Reference	Reference	Reference	Reference
Yes	1.59 (1.00-2.53)	4.14 (1.93-8.91) ^	1.57 (0.92-2.69)	4.47 (2.47-8.08) ^

[§] Face to face interview

[†] Audio Computer Assisted Self Interview

[‡] Adjusted for all the variables listed in the table

* p<0.05

[±] p=0.001

[^] p<0.001

Table 4.5: Association between perpetration and victimization of abuse in currently married women in Theni district, Tamil Nadu, India

	FTFI [§] (n=763)			
	Abused Husband n (%)	Did not Abuse husband n (%)	OR (95% CI)	Adjusted OR (95% CI) [‡]
Ever abused by husband	61 (80.2)	181 (26.4)	11.37 (6.30-20.51) *	9.88 (5.37-18.18) *
No abuse	15 (19.7)	506 (73.7)	ref	ref
	ACASI [†] (n=716)			
Ever abused by husband	62 (84.9)	252 (39.2)	8.74 (4.52-16.93) *	7.26 (3.70-14.21) *
No abuse	11 (15.1)	391 (60.8)	ref	ref

[§] Face to face interview

[†] Audio Computer Assisted Self Interview

* p value <0.001

[‡] Controlled for women's age, education, employment, wealth status, HIV sero-status and husband's ever use of alcohol

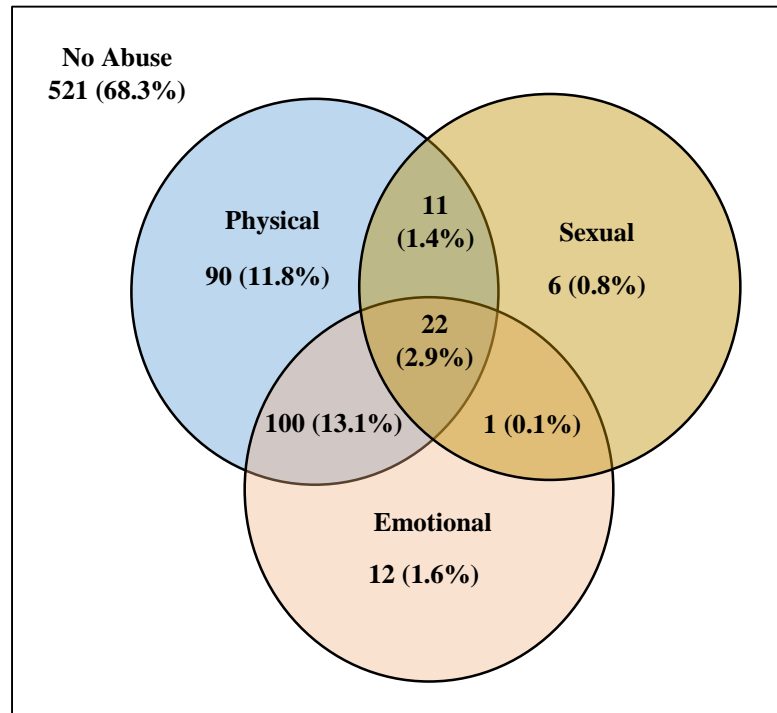


Figure 4.2: Frequencies of intimate partner abuse types reported in face to face interviews by women in Theni district, Tamil Nadu, India (n=763)

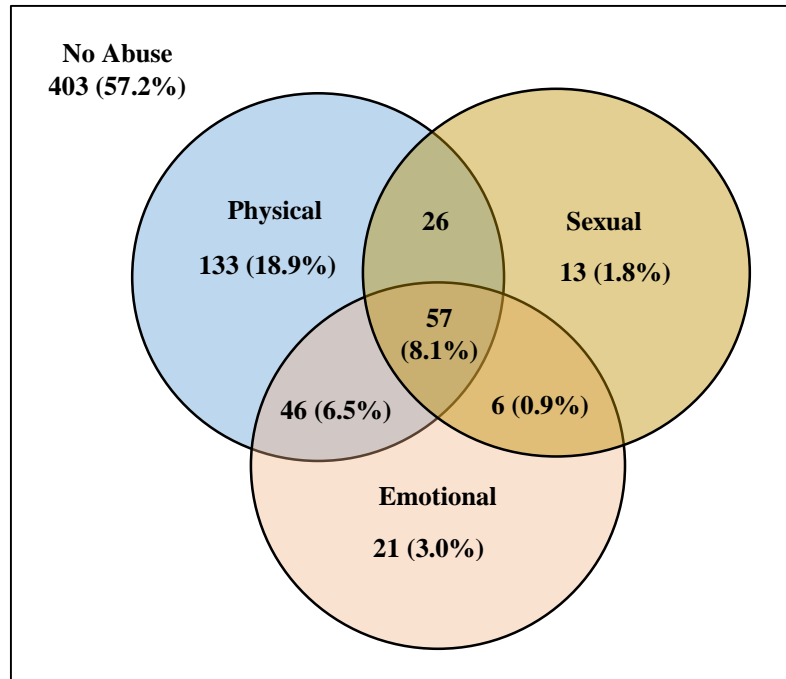


Figure 4.3: Frequencies of intimate partner abuse types reported in Audio Computer Assisted Self Interviews by women in Theni district, Tamil Nadu, India (n=705)

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CHAPTER 5

INTIMATE PARTNER VIOLENCE AND THE DISCLOSURE OF HIV AMONG HIV POSITIVE WOMEN IN A SEMI-RURAL SETTING IN SOUTH INDIA

Introduction

Violence against women is a common problem across the world. Nearly 10-52% of women were physically abused and 10-30% were sexually abused by their intimate partners during their lifetime.^{1,2} The presence of HIV in women is likely to increase women's risk for intimate partner violence (IPV). Meta-analysis of studies conducted in the US showed women's experience of IPV was not that different with respect to their HIV status, however the frequency and severity of IPV was greater among HIV positive women.³ Nevertheless, studies from Africa and other developing nations showed significantly higher rates of victimization in HIV positive women compared to HIV negative women.⁴⁻⁷ Violence in any intimate relationship and fear of abandonment hinders women's ability to disclose their HIV status to their intimate partners which in turn acts as a major barrier to their access to health care and treatment.⁸⁻¹¹

In India, thirty-five percent of married Indian women reported experiencing physical violence with or without sexual violence in a national level survey. Exposure to physical violence with sexual violence was linked to the increased HIV prevalence in the Indian population.¹² Among all those who are infected with HIV virus, 40% are women of age 15+ years.¹³ With an increasing number of women being infected with HIV, there is also a narrowing of the gap in the rate of HIV infection between males and females in the general population. While ninety percent of Indian women live in a monogamous relationship with their married partners, men usually have the freedom to have multiple

sexual partners. It's the men's high risk sexual behaviors that introduce HIV and STI to women in a marital relationship.^{3,9, 14,15} Nonetheless, women are usually blamed for their husbands' infection and bringing bad luck even if they are not HIV positive.^{16,17} For Indian women who face intimate partner violence in their everyday lives, diagnosis and disclosure of HIV infection may add another burden on women by increasing their risk for further intimate partner violence, fear of stigma, neglect, abandonment and discrimination. If women face negative consequences as a result of disclosure, it not only disrupts her relationship with her husband but also affects her other familial relationships and social life. In a qualitative study conducted in Mumbai, India, women experienced more discrimination, stigmatization and denial after HIV disclosure among close family members compared to their men counterparts.¹⁸ In another study conducted in antenatal clinics in rural South India, the majority of the women expressed their interest in screening for HIV infection. However, most of them were concerned about negative reactions from their husbands, family members and the community.¹⁹

Among people with HIV infection, having greater social support, positive thinking, and cohesive families played a significant role in their adherence to HIV treatment whereas depression, lower perceived social support, and the conflicts in family resulted in poor adherence to treatment.²⁰⁻²² In a qualitative study of African American women in the US, women reported lack of care, feeling unloved, relationship conflicts, and having a husband with HIV infection as major hurdles to adherence to treatment.²³ Partner notification is an essential part of successful HIV treatment and prevention programs. However, there needs to be a careful consideration of partner notification

policies if it puts women under increased risk for adverse consequences due to the disclosure of their HIV infection. The purpose of this paper is to explore the conditions in which adverse reactions following HIV disclosure occurs in married women. We chose to study Indian women owing to the growing incidence of HIV epidemic in this group. We describe the frequency of women's disclosure of HIV to their husbands, the reasons for such disclosure and adverse reactions from their husbands following disclosure. To further understand the circumstances in which adverse reactions occur following the disclosure to husbands, we examine other factors such as the previous history of intimate partner violence, non-partner violence, and the social support network of these women. We hypothesize that women with a previous history of interpersonal violence, non-partner violence, controlling and alcoholic husbands, more than one lifetime sexual partners, no social network, no family support and whose HIV status was disclosed without their consent, would be more likely to experience negative consequences after the disclosure to their intimate partners.

Methods

A total of 271 HIV-positive women were recruited between June 2014 to September 2014 from two NGO centers in Theni district, Tamil Nadu, India. Out of this, 15 participants withdrew after enrollment due to various reasons (very long interview - 4, did not like to use tablet - 5, did not like to answer personal questions - 6). This resulted in a sample size of 256 (94%) HIV positive women. Of the 256 HIV positive women recruited for the study, 5 women (2%) were diagnosed with HIV infection within the last 12 months. These women were excluded from the analysis since the time of occurrence

of abuse could not be calculated to determine whether abuse occurred before or after the diagnosis of HIV infection. Hence the final sample consisted of 251 (93%) HIV positive women for the purpose of this research. This study was part of a larger case control cross-sectional study conducted with HIV positive women as cases and HIV negative women as controls with a 2:1 case control ratio. Staff working at the NGOs contacted HIV positive women who received services from their office and obtained their consent to participate in the study. Interviewers contacted those who consented to participate and conducted interviews at the NGO's office. Each participant's information was recorded with a unique id number. Eligibility criteria included women between the ages of 18 to 50 years, currently married and living with their husbands at the time of interview.

The study required women to participate in two different interview methods in succession. The survey instrument was developed to collect quantitative data on the following areas: i) socio-demographic characteristics, ii) marital control behaviors, iii) intimate partner violence experiences, iv) high risk sexual behaviors v) HIV disclosure and treatment for cases. The questionnaire was adapted from Indian Family Health Survey by Demographic Health Surveys (DHS) that used Modified Conflict Tactics Scale for measuring partner abuse.²⁴ This scale can be modified and used for a culturally sensitive population because it asks about specific acts of violence rather than general occurrences of violence. The two interview methods used were, i) a traditional Face to Face Interview (FTFI) and ii) an Audio Computer Assisted Self Interview (ACASI) using a tablet computer. Qualified female interviewers who had prior experience in interviewing women and working with NGOs conducted the interviews in Tamil. The

interviewers were recruited from the same study area and were between the ages 25-50 years. They underwent adequate training to recruit participants, obtain informed consent, and administer both face to face interviews and ACASI. The participants randomly picked the order of interview methods before the beginning of their interviews. All interviews started with questions from the interviewers gathering social and demographic data. Depending on what the participants chose through random selection, interviews were continued either in FFTI or ACASI mode to collect the remainder of the data. When participants completed the first mode of interview, the next one was administered immediately following it. Interviewers guided the participants in answering a set of sample questions with varying response types before leaving them on their own to complete ACASI interviews.

The ACASI instrument was created using Adobe PhoneGap tool. It was developed to work on an android platform. We used iBall 7-inch touch screen tablets with headphones to administer the ACASI instrument. All questions were worded similarly in both FFTI and ACASI. However, the format in which they were administered differed between the two modes of interview. In FFTI, interviewers read out the questions to participants and noted down their responses on the paper questionnaire. In ACASI, there was an audio and visual component to the questionnaire. Participants heard the questions & answers in an audio track with a female voice in the local Tamil language that provided instructions to touch the correct responses on the tablet screen. Questions were only heard through the audio track and did not appear in text on the screen. Answer choices appeared either in text format or as pictures on the tablet screen accompanied

with audio. Questions that had answers YES/NO/DON'T KNOW were displayed as green/red/orange boxes with respective texts. This color coding of responses was followed for the entire length of the ACASI instrument. Participants could touch the speaker icon next to the question symbol or on the answer boxes to repeat the corresponding audio track if they want to hear it again. At any moment, participants could use the forward and backward arrows to skip questions or to go back and change their responses for the previous questions.

All participation in this research was purely voluntary and anonymous. Privacy of the participants was maintained at all times. Ethical board approval was obtained from the ethical committee of YRG CARE center, Chennai, Tamil Nadu and the Institutional Review Board of the University of California, Los Angeles.

Measures

Face to face interviews were used to collect all information including demographic variables, sexual behaviors, interpersonal violence experiences, and HIV disclosure characteristics. ACASI interviews were used to collect only sensitive information such as sexual behaviors and interpersonal violence experiences.

Demographic characteristics

Demographic characteristics of HIV positive women such as age (<30 , 30-34, 35-39, 40-44, >=45 years), education (less than high school / high school education or more), employment (job that didn't pay or no job / job that paid in cash or kind), religion (Hindu / others), caste class (scheduled caste / most backward class / backward or forward class), dowry (no dowry given / dowry given either before or after marriage),

wealth status (lower / middle / higher) , participation in social activities (no social activities / participation in women's groups, political, religious, social work groups, arts or crafts groups), type of marriage (arranged marriage / love marriage), relationship to husband before marriage (not related / related) were collected using FTFI. Husband's demographic characteristics such as age (<35, 35-39, 40-44, >=45 years), education (less than high school / high school education or more), employment (job that didn't pay or no job / job that paid in cash or kind), alcohol use (no alcohol / ever use of alcohol) were also collected from women using FTFI. Difference in age between intimate partners (< 10 years / ≥ 10 years of age), and duration of time lived with current husband (< 10 years / ≥ 10 years of age) were calculated using the collected information.

HIV disclosure

Details regarding HIV disclosure was collected by FTFI. Women were asked about the people to whom they had disclosed their HIV status. The answers were categorized into two groups: those who had disclosed only to their husbands and those who had disclosed to people other than their husbands. Other disclosure characteristics such as time taken to disclose to husband, the reasons for disclosure to husband, and the consequences of disclosing to husbands were also obtained. Responses for consequences of disclosure were categorized into two groups, those who experienced negative consequences as a result of disclosure and those who did not experience any negative consequences.

Family support & social network

We measured women's social network by asking if they had participated in any social activities such as women's community groups, political, religious, social work groups, arts/crafts groups on a regular basis (no social activities / participation in social activities). We also determined women's family support by asking whether they can count on their birth family for support in case any problems (no family support / family support).

Sensitive behaviors

Sensitive behaviors such as number of lifetime sexual partners (one partner / more than one partner), experiences of intimate partner abuse before the diagnosis of HIV (no abuse / previous IPV), witnessed father beating mother (no abuse / parental IPV), previous experience of physical abuse by someone other than the current husband (no abuse / previous non-partner abuse), and husband's controlling behavior (husband does not control wife / husband controls wife) were collected using both face to face interviews and Audio Computer Assisted Self Interviews.

Previous history of intimate partner abuse was a combined measure of three types of abuse: emotional, physical and sexual abuse. Physical violence was measured using a 7 items scale that included measurement of physical violence perpetrated by current husband. It asked whether he ever "push, shake or throw something at you?", "slap you?", "twist your arm or pull your hair?", "punch you?", "kick, drag or beat you?", "try to choke or burn you?", "threaten or attack with a knife, gun or any weapon?". A positive response to any one of the items indicated physical violence. Sexual abuse was measured

using two items: husband ever “physically force you to have sexual intercourse even when you did not want to?”, and “force you to perform any sexual acts that you did not want to?”. A positive response to any of these two items indicated the presence of sexual IPV. Emotional abuse was described as a positive response to any of the following, did your husband ever “say or do something to humiliate you in front of others?”, “threaten to hurt or harm you or someone close to you?”, “insult you or make you feel bad about yourself?”. A positive response to any of these three items indicated the presence of emotional IPV. Positive response to any of the physical, sexual or emotional abuse was classified as intimate partner abuse. Husband’s controlling actions were measured by using 6 items such as “he is jealous or angry if you talk to other men”, “he accuses you of being unfaithful”, “he does not permit you to meet your female friends”, “he tries to limit your contact with your family”, “he insists on knowing where you are at all times”, and “he does not trust you with any money”. If women reported anyone of these behaviors, they were marked as victims of husband’s controlling behavior. We also determined if the partner abuse and controlling behaviors occurred before the diagnosis of HIV.

Statistical analysis

All analyses were performed using Stata 13 (Stata Corp, College Station, TX). First, we computed the wealth status of the participants by computing a relative wealth quintile using Principal Component Analysis (PCA). Several variables were used in the calculation of wealth quintile such as home ownership, drinking water source, no. of bedrooms in the house, type of toilet facility, type of cooking fuel used in the household, floor type, wall type, agricultural land ownership, and possession of utensils like pressure

cooker, mobile, watch, table, chair, bed, mattress, bicycle, fridge, DVD, car, and motorbike. Next, frequencies for demographic correlates for both women and their intimate partners were computed. Then, we calculated frequencies of women's HIV disclosure experiences and presented in the form of pie charts and bar graphs.

Separate logistic regression analyses were conducted using the data two interview methods to examine the association between negative consequences due to HIV disclosure to husband, previous history of partner abuse, and other study variables. All covariates included in the model were selected based on *a priori* knowledge and from statistically significant bivariate results at p -value <0.05 . Model diagnoses were performed to assess the fit of the model to the given data. Variables such as women's age and intimate partner's age were categorized. Categorical variables with many levels were reduced to fewer levels or to binary level data to increase model performance. Odds ratios and adjusted odds ratios for experiencing negative consequences following disclosure were calculated for independent variables. All responses that were classified as don't know/refused/don't remember were included as missing information. Data records with missing information for variables in the model were excluded in the analysis. Hence the final sample for logistic regression analysis included 246 participants in FTFI and 235 participants in ACASI.

Results

Demographic characteristics

The average age of women in the sample was 35.8 years (Table 5.1). A majority of the women (86%) were less than 45 years old. About 80% of all women had less than

high school education. Two thirds of the women reported a job that paid them in cash or kind. Half of the women reported participating in social activities like women's groups, political, religious, social work groups, and arts/crafts groups. Nearly 70% of the women had given dowry to their husbands before or after marriage. The reported average age of the husbands was 42.4 years. A vast majority of husbands also had less than high school education (75%) and were employed in a job (91%) that paid them in cash or kind.

Nearly 67% of the women reported alcohol use by their husbands.

Abuse and sexual characteristics

History of intimate partner violence and number of sexual partners were measured in both FTFI and ACASI interviews. One third of the women reported a history of intimate partner violence in face to face interviews that included physical, sexual or emotional abuse before the diagnosis of HIV infection. Nearly 50% of women reported a history of intimate partner violence in ACASI. More women reported husband's controlling behaviors in ACASI than in FTFI (46% vs 31%). Similarly, more number of women reported having more than one lifetime sexual partners in ACASI than in FTFI (16.5% vs. 13.5%). Very few women reported non-partner abuse in FTFI (3.2%) compared to ACASI (8.3%).

Other characteristics

Most of the women (94%) in our sample reported that their marriage was arranged by their families and about 38% reported that they were related to their husbands before marriage. Eighty percent of women in our sample had been living with

their husbands for a period of more than 10 years. Over half of the women (60%) reported that they can rely on their birth family members for any problem.

Disclosure of HIV Status

Almost all of the women had disclosed their HIV status to their husbands (Figure 5.1). Nearly 87% of the women had told their family members but only 50% or less had told their female friends. Sixty-three percent of women had told their health care providers about their HIV infection. A very few women (20%) had disclosed their disease status to their neighbors. Among all those who had disclosed to husbands, 94.5% had disclosed within the first week of diagnosis and 84% had disclosed within the same day of the diagnosis (Figure 5.2).

The most frequent reason for disclosure of HIV infection to husbands was that they will take care of the women (77.3%) (Figure 5.3). Nearly half of the women (49%) reported that their HIV status was disclosed to husbands without their consent. About 60% of women reported feeling obligated and responsible to disclose their HIV status, and that their husbands had the right to know about their HIV infection. Nearly one fourth (23%) of the women faced negative consequences from their husbands as a result of HIV disclosure (Figure 5.4). The most frequently reported negative reactions were becoming angry (13%), verbal abuse (8.8%), talking badly to others (7.6%), blaming for acquiring HIV infection (6.8%) (Figure 5.4).

Relationship between negative consequences, IPV, and other study variables

Table 5.2, presents results from logistic regression analysis that examined the relationship between negative consequences due to disclosure of HIV, previous history of intimate partner abuse and other study variables for both ACASI and FTFI modes of interviews separately. Models from both the interview types resulted in a similar set of independent variables. A previous history of any intimate partner abuse was associated positively with experiencing negative consequences after the disclosure of HIV infection to husband (FTFI: AOR – 3.51, 95% CI: 1.66 – 7.42; ACASI: AOR – 2.74, 95% CI: 1.31 – 5.70). Similarly, women who reported alcohol use by their husbands had greater odds of experiencing adverse reactions from husband following HIV disclosure compared to women whose husbands did not use alcohol (FTFI: AOR – 2.19, 95% CI: 0.96 – 4.99; ACASI: AOR – 2.90, 95% CI: 1.18 – 7.11). Even though it is not significant, we found that women with controlling husbands had higher odds for experiencing negative consequences following HIV disclosure in comparison to women who were not controlled by their husbands (FTFI: AOR – 1.83, 95% CI: 0.88 – 3.79; ACASI: AOR – 1.81, 95% CI: 0.90 – 3.68).

Discussion

HIV disclosure plays a central role in the prevention of HIV infection. It's the first step in combating stigma and discrimination against people living with HIV/AIDS thereby gaining acceptance from others. Previous studies had shown that disclosure rates vary across populations and depend on women's perceived social and emotional support. In some areas participants disclosed more to friends than family members and in other

areas participants disclosed readily to family members but not to friends or relatives outside their immediate family.²⁵⁻²⁷ In our sample, almost all of the HIV positive women had disclosed their HIV status to their husbands as reported by previous studies.²⁸⁻²⁹ A modest number of women had also told their family members. However, only a small percent of women had disclosed to their female friends, and neighbors. This may be due to the fear of stigma, abandonment and discrimination for people with HIV/AIDS in the society.^{30,31} Even though we found high rates of disclosure among HIV positive women, previous research had shown that disclosure to partners may vary with respect to HIV test results.³²⁻³⁴ Women were more likely to disclose their test results to their partners if they tested negative than if they tested positive for HIV infection. Since our study sample consisted exclusively of HIV positive women, we were unable to determine whether test results influenced disclosure behaviors in our sample.

Being a patriarchal society, Indian families often deny education and access to materials to female children compared to their male counterparts. Marriage is often considered as a safe transfer of control over a woman's life from her parents to her husband. Violence against women is normalized in an intimate relationship when women do not adhere to their perceived gender roles.³⁵ Some of the gender roles include being faithful and obedient to their husbands, performing household chores and bearing children, etc. Hence, women are expected to abide by their traditional gender roles by disclosing to their husbands soon after diagnosis. This was also apparent from the motivations for disclosure stated by these women. The majority of women felt that their husbands would take care of them if they knew about their HIV status and expressed their

need for financial help for medical care. A similar pattern was observed from a sample of HIV positive men and women in South India who stated emotional and material support from family members as the main reasons for the disclosure.³⁶ This shows the economic dependency of these women on their partners or family members. More than half of the women in our sample also reported that it was their responsibility and obligation to tell their husbands and that he has the right to know about it. This coincides with the expected gender roles of these women in the society. However, it is concerning that almost half of the women in our sample stated that their HIV status was disclosed to their husbands without their consent. This is not unusual in settings like India or South Africa where it had been shown that women were forced to disclose to their partners or disclosed by health care workers without their consent.^{19,28} Hence it is important for care providers at the Integrated Counseling and Testing centers (ICTC) to respect the desires of women and develop interventions that will help facilitate partner notification in a safe and appropriate manner for all women.

In India, 90% of the women live in a monogamous relationship with their married partners. It's the men's extramarital sexual behaviors that introduce HIV and STI to women in marital life.³⁷⁻⁴¹ Even though men are responsible for the heterosexual spread of HIV in married Indian women, they are often not the first ones to undergo testing for HIV. It is not unusual for women to get tested first during regular antenatal checkups before the diagnosis of HIV in husband or disclosure of husband's HIV status. If diagnosed with a positive test result, women are left with no choice, but to disclose to their husbands so they can be tested. Almost 70% of women in our sample stated that

their motivation to the disclosure to partners was to get them tested. Thus, women's disclosure was not only motivated by reasons to take care of themselves but also to take care of their intimate partners. Testing for HIV before husbands may result in the shaming and blaming of women by their husbands, family members or societal members. A study conducted by Maman et al. in a low economic setting in Africa showed that the person who got tested positive for HIV first was usually the one to get blamed for the transmission of HIV infection into the family.⁴² Having a partner with unknown or negative HIV status had also been shown to increase the risk for abuse after diagnosis.⁴³ One limitation in our study is that we do not know whether men already knew about their HIV sero status at the time of women's disclosure or the proportion of men who got tested as a result of women's HIV positive test. Hence we could not determine whether men's HIV status influenced the occurrence of negative reactions following women's disclosure.

Intimate partner abuse before the diagnosis of HIV was prevalent in this sample with one third of the women reporting partner abuse in FTFI and nearly half of the women reporting partner abuse in ACASI. This is consistent with previous literature that participants were more likely to report sensitive behaviors in ACASI than traditional face to face interviews.⁴⁴⁻⁵⁷ Among our study population, the prevalence of lifetime abuse reported in FTFI (31.7%) was less than the prevalence of lifetime abuse reported in the Indian National Family Health Survey 2014-2015 (40.6%) for married women in Tamil Nadu state.⁵⁸ The inconsistency in the reported prevalence of IPV between the national survey and our study could be attributed to the social, cultural and religious differences

between our study population and the general population of the state. On the other hand, women reported a higher prevalence of lifetime abuse (48%) in ACASI which shows that the measure of IPV may be subjected to social desirability bias in which more women reported as victims of IPV in ACASI than FTFI. One limitation of this study is that we combined all violence types (physical, sexual and emotional abuse) into one dichotomized variable (abuse or no abuse) for analytical reasons and did not take the severity of violence into consideration. In order to depict the severity of the violence these women faced, we need to measure the frequency of the violent acts, and the consequences of such harmful acts.

Almost all women who reported partner abuse before HIV diagnosis also reported recent IPV in the past 12 months. This shows that HIV was probably not the cause of intimate partner violence among these women. Since we did not measure the severity of the violence acts, we cannot determine if the diagnosis of HIV infection increased the severity of intimate partner violence. We only measured the adverse reactions caused directly by women's disclosure of HIV to their husbands. Nearly a quarter of the women in our sample reported adverse reactions following the disclosure of HIV status to their husbands. Findings from our study are similar to previous studies that found married women who experienced physical, sexual or emotional abuse before the diagnosis of HIV infection to be more likely to experience adverse reactions from husbands following disclosure after adjusting for other selected variables.^{59,60} We also found that our data was consistent with a positive relationship between adverse reactions and controlling behaviors by husbands even though it was not statistically significant. Similarly, there

was a positive association between experiencing adverse reactions and husband's alcohol use. The results were similar irrespective of the interview modes. Disclosure characteristics such as time to disclosure, other people that the women had disclosed, disclosure without consent, other abuse experiences such as physical abuse by non-partners, witnessing of parental abuse, number of sexual partners, dowry, social networks, family support and other socio-demographic characteristics did not contribute to experiencing adverse reactions from husband after HIV disclosure. Interestingly, our study found no specific characteristics of women to be responsible for experiencing adverse reactions. Thus it is important to conduct routine screening in testing and treatment centers to identify women with a history of abuse. Interventions and support services need to be developed which also includes intimate partners of women.

Methodological considerations

Results from this study must be interpreted with caution given the methodological limitations. All women were recruited through local NGO centers and a vast majority of them were under anti-retroviral treatment. Hence, the results obtained from this study may not be applicable to all HIV positive women in the general population. No information was recorded for women who refused to participate in the study. Hence we could not determine the true characteristics of women who refused to participate. It is not possible to draw causal inference from our data since our study was cross-sectional in nature with retrospective data collection. Only associations between negative consequences of HIV disclosure to husband, history of IPV and other covariates can be determined. In general, recall bias is a problem when asking about events that happened

in the past. Any recent occurrence of violence before the diagnosis of HIV may have been subjected to recall bias compared to lifetime abuse because of the difficulty in remembering events in context to specific time period that it occurred. However, given the impact of HIV diagnosis in one's life we expect recall bias to be minimal because people can usually remember incidents associated with important life events.

Our study was based solely on self-reports of all behaviors including husband characteristics, partner abuse and HIV disclosure. Numerous factors may have influenced the reporting of these behaviors such as various social and cultural factors that may have resulted in the underestimate of any effects from face to face interviews. We expect ACASI interviews to be reliable in capturing sensitive behaviors as shown in previous research.⁴⁴⁻⁵⁰ However, it is of a concern that some sensitive behaviors such as HIV disclosure behaviors were not measured in ACASI due to time constraints. This resulted in a final logistic regression model that had a mix of variables from both FTFI and ACASI. Hence the results from two models may not truly depict the difference between the two interview methods. However, the results indicate that ACASI can be used as an efficient tool to collect sensitive information even in populations from a semi-rural setting.

Conclusion

Given all the limitations, we nonetheless believe that findings from our study have significant implications for testing and counseling services and in the treatment of HIV positive women. Our findings suggest that women who had a previous history of partner abuse, controlling and alcoholic husbands were likely to experience adverse

reactions following the disclosure. Women usually have no control over such behaviors as they are mainly due to husbands' behaviors. Hence it is important for HIV care providers to identify women at risk for such abuse. Routine screening for previous intimate partner abuse should be incorporated into HIV counseling and treatment programs. Intimate partners should be included for pre-test counseling before the disclosure. Even though 50% of women in our sample reported participation in social activities, only 30% of women had paid jobs and 20% of women had high school education or more. This shows that these women are ill equipped to face any dire situations that may arise due to the disclosure. Hence, specific ways to empower women and to provide continued counseling during treatment of HIV infection need to be devised.

Table 5.1: Selected characteristics of 251 women living with HIV in Theni district, Tamil Nadu, India

HIV positive women's characteristics	Cases (n=251) n (col %)	Abuse & Sexual characteristics	Cases (n=251) n (col %)
Age (years)		IPV before HIV diagnosis - FTFI	
<30	33 (13.2)	Yes	73 (29.1)
30-34	71 (28.3)	No	178 (70.9)
35-39	78 (31.1)	IPV before HIV diagnosis - ACASI (n=235)	
40-44	36 (13.9)	Yes	114 (48.5)
>=40	34 (13.6)	No	121 (51.5)
Mean (Std. dev)	35.8 (6.2)	Controlled by husband – FTFI (n=246)	
Median	35	Yes	76 (30.9)
Education		No	170 (69.1)
Less than high school	203 (80.9)	Controlled by husband – ACASI (n=235)	
High school or more	48 (19.1)	Yes	116 (46.4)
Paid employment		No	134 (53.6)
Yes	174 (69.3)	Non-partner abuse - FTFI	
No	77 (30.7)	Yes	8 (3.2)
Religion		No	243 (96.8)
Hindu	245 (97.6)	Non-partner abuse - ACASI (n=242)	
Others	6 (2.4)	Yes	20 (8.3)
Caste class		No	222 (91.7)
Scheduled Caste / Scheduled Tribe	45 (17.9)	Witnessed parental IPV- FTFI (n=246)	
Most Backward Caste	83 (33.1)	Yes	40 (16.3)
Others	123 (49.0)	No	206 (83.7)
Dowry		Witnessed parental IPV- ACASI (n=245)	
Before or after marriage	173 (68.9)	Yes	31 (12.7)
No dowry	78 (31.1)	No	214 (87.4)
Wealth status		No. of sexual partners – FTFI (n=229)	
Lower	85 (33.9)	One	198 (86.5)
Middle	83 (33.1)	More than one	31 (13.5)
Upper	83 (33.1)	No. of sexual partners – ACASI (n=237)	
Participates in social activities *		One	198 (83.5)
Yes	124 (49.4)	More than one	39 (16.5)
None	127 (50.6)	Adverse reactions after disclosure – FTFI	
		Yes	58 (23.1)
		None	193 (76.9)

Table 5.1 continued: Selected characteristics of 251 women living with HIV in Theni district of Tamil Nadu state, India

Husband's characteristics	Cases (n=251) n (col %)	Other characteristics	Cases (n=251) n (col %)
Age (years)		Related to husband before marriage	
Less than 35	16 (6.4)	Yes	94 (37.5)
35-39	75 (29.9)	No	157 (62.6)
40-44	61 (24.3)	Type of marriage	
45-49	62 (24.7)	Arranged marriage	235 (93.6)
>=50	37 (14.7)	Love marriage	16 (6.4)
Mean age (Std. Dev)	42.4 (6.4)	Difference in age between intimate partners	
Median age	41	Less than 10 years	214 (85.3)
Education		10 years or more	37 (14.7)
Less than high school	188 (74.9)	Duration living with husband	
High school or more	63 (25.1)	Less than 10 years	49 (19.5)
Paid employment		10 years or more	202 (80.5)
Yes	230 (91.6)	Family support	
No	21 (8.4)	Count on birth family for problems	146 (58.2)
Alcohol use		No family support	105 (41.8)
Yes	167 (66.5)		
No	84 (33.5)		

* social activities include women's groups, political, religious, social work groups, arts/crafts groups

Table 5.2: Odds ratios (OR) & adjusted odds ratios (AOR) of experiencing any adverse reactions following the disclosure of HIV infection to husbands – Results from multiple logistic regression analysis

	Unadjusted OR (95% CI) n=251	FTFI Adjusted OR* (95% CI) n=246	ACASI Adjusted OR* (95% CI) n=235
Age			
<30	1	1	1
30-34	1.83 (0.62 - 5.45)	1.71 (0.49 - 6.04)	1.64 (0.50 - 5.37)
35-39	2.44 (0.84 - 7.09)	3.49 (1.01 - 12.05)	2.35 (0.75 - 7.37)
40-44	1.12 (0.31 - 4.08)	1.09 (0.24 - 4.93)	0.75 (0.17 - 3.29)
>=45	1.39 (0.40 - 4.94)	2.49 (0.59 - 10.57)	1.65 (0.41 - 6.64)
Education			
High school education or more	1.30 (0.64 - 2.67)	1.22 (0.54 - 2.79)	1.39 (0.60 - 3.24)
Less than high school	1	1	1
Previous intimate partner abuse (FTFI)			
Yes	4.13 (2.22 - 7.67)	3.51 (1.66 - 7.42)
No	1	1	
Previous intimate partner abuse (ACASI)			
Yes	3.53 (1.78 - 6.98)	2.74 (1.31 - 5.70)
No	1		1
Husband uses alcohol			
Yes	3.46 (1.61 - 7.45)	2.19 (0.96 - 4.99)	2.90 (1.18 - 7.11)
No	1	1	1
Husband controls wife (FTFI)			
Yes	3.27 (1.76 - 6.07)	1.83 (0.88 - 3.79)
No	1	1	
Husband controls wife (ACASI)			
Yes	2.00 (1.09 - 3.65)	1.81 (0.90 - 3.68)
No	1		1

[†]Face to face interview

[§] Audio Computer Assisted Self Interview

* Adjusted for all the variables listed in the above table

Bold faceted numbers indicate significant values at p<0.05

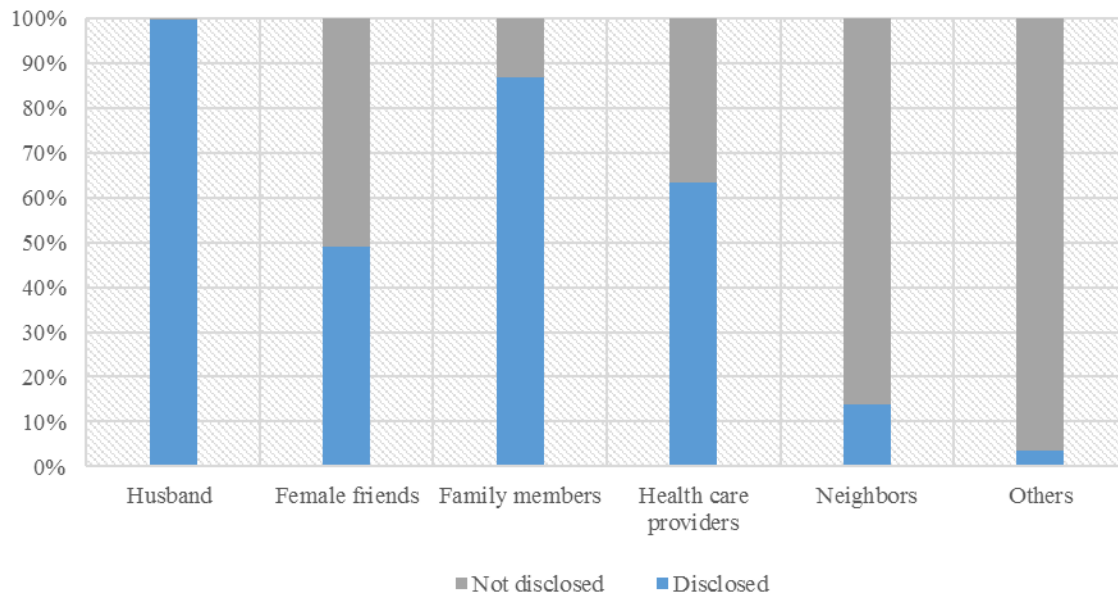


Figure 5.1: Disclosure of HIV status by 251 HIV positive women in Theni district, Tamil Nadu, India

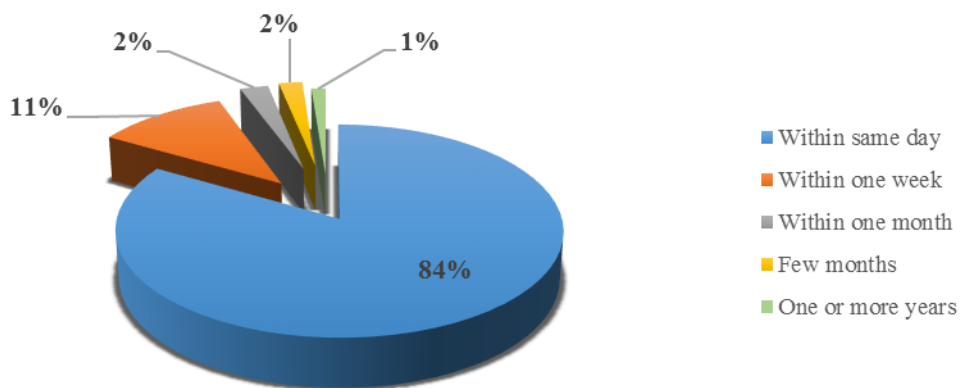


Figure 5.2: Time to disclosure of HIV status to husband by 250 HIV positive women in Theni district, Tamil Nadu, India

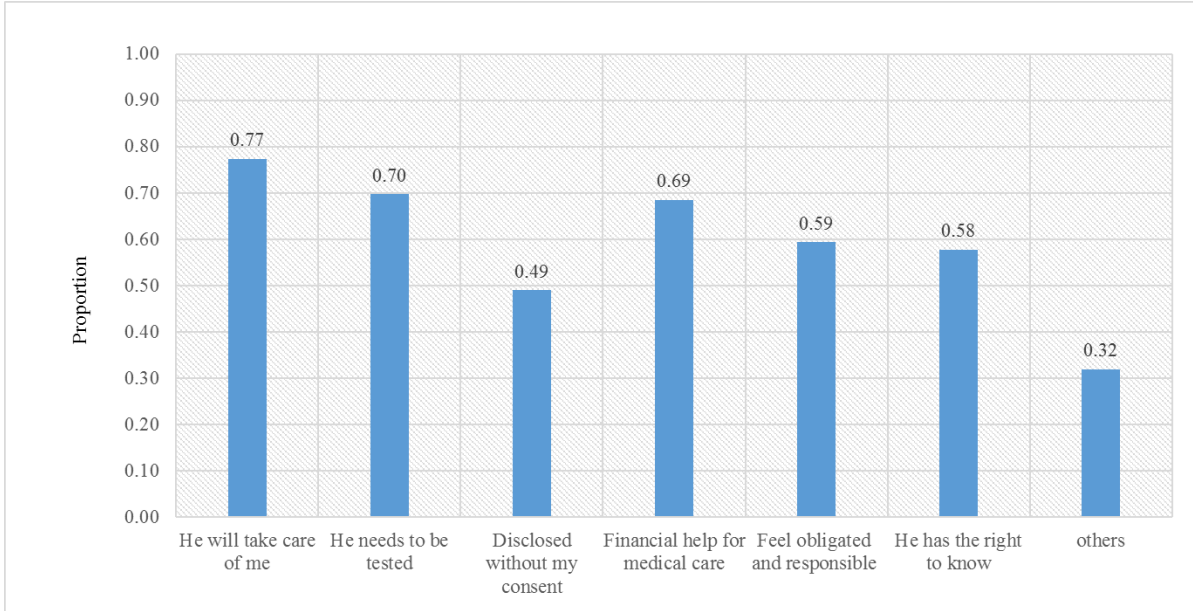


Figure 5.3: Reasons for the disclosure of HIV infection to husbands by 251 HIV positive women in Theni district, Tamil Nadu, India

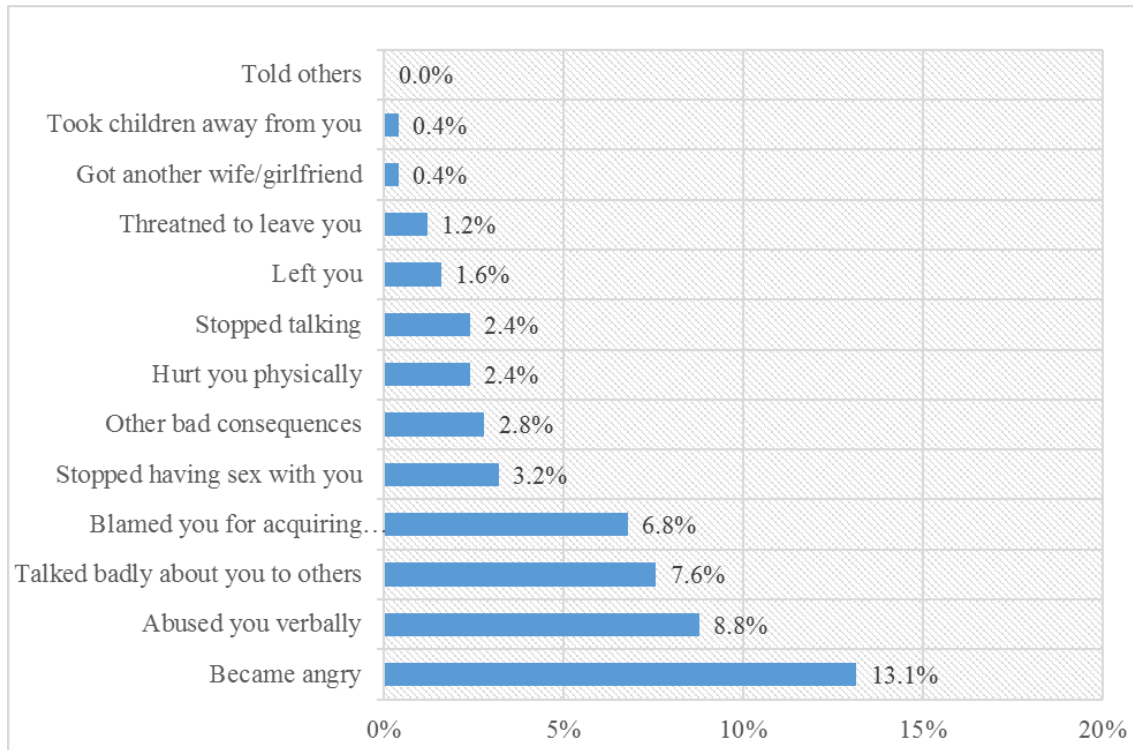


Figure 5.4: Adverse reactions* following the disclosure of HIV status to husband in 251 HIV positive women in Theni district, Tamil Nadu, India

*adverse reactions are not mutually exclusive

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CHAPTER 6

CONCLUSION

The findings from this study provide valuable information in understanding the relationship between intimate partner abuse and HIV infection among currently married women in the reproductive age group in Theni district, Tamil Nadu state in South India. We demonstrated that the use of ACASI was effective in collecting sensitive information such as domestic violence experiences, and sexual behaviors in predominantly poor and illiterate women from rural areas. Our study adds to the existing body of literature that more participants disclosed positively for sensitive behaviors in ACASI than FTFI. We found that the responses from both the interviews were in perfect agreement with respect to reporting of non-sensitive behaviors and in moderate agreement for reporting sensitive behaviors. We also found that HIV negative women were more consistent in reporting between the two interview modes in comparison to HIV positive women indicating that ACASI can be a very useful tool for collecting sensitive information from vulnerable populations like people living with HIV infection. Even though there was inconsistency in the reporting of sensitive behaviors, similar pattern of abuse was reported in both types of interviews. Physical abuse was the most commonly reported form of abuse and sexual abuse was the least reported form of abuse. This pattern was reflective of the national level data obtained from the Indian National Family Health Survey. However, the prevalence of partner abuse was different between the surveys owing to the socio cultural differences in the population under study. Most women in our study who reported

intimate partner abuse reported a combination of different types of abuses indicating the possibility of one type of abuse leading to another. We also showed that the likelihood of experiencing more severe forms of violence such as combined physical and sexual violence was higher for HIV positive women than HIV negative women. Women who experienced physical violence or physical violence with sexual violence were more likely to be controlled by their intimate partners in their marital relationship. We also showed that in intimate relationships women were not the only victims of violence. We found that HIV positive women were more likely to engage in perpetrating violence against their husbands than HIV negative women. Similarly, women who were victims of intimate partner abuse were also likely to perpetrate violence against their husbands. However, violence against men was not as prevalent as violence against women in our population.

When we investigated the disclosure of HIV infection, we found that almost all of the women had disclosed to their husbands within the first week of diagnosis. Women with a previous history of intimate partner abuse were likely to experience adverse reactions from husband following the disclosure than women who with no previous history of IPV. Most women felt obligated and responsible to disclose their HIV status to husbands. One striking finding we observed was that nearly half of the HIV positive reported that their status was disclosed to husbands without their consent. The results also showed that there may still be concerns about stigma associated with one's HIV disclosure. Only a small percent of women had disclosed to friends, neighbors and health care providers.

Studying sensitive behaviors is not without challenges and limitations. Despite the availability of data from two interview modes, we cannot ascertain which method produced more valid results due to the lack of an objective standard. There were several missing values in ACASI for sensitive questions. Hence we utilized only complete data for analysis excluding missing value records which may have resulted in reduced power and less precise estimates. Though we found an association between HIV and intimate partner violence, it is difficult to ascertain the temporality of the association due to the cross-sectional nature of the study. Recall bias may also be a problem since the participants were asked to recall events from the past 12 months. However, the recall bias will be minimal given that the participants are likely to remember significant events in their life and that there was more than one instance to disclose specific types of IPV. Since both groups of women were subjected to the same recall bias it will be non-differential in nature. The results from this study cannot be used to make inferences for the general population due to the restriction of study of participants from a specific geographic location. Only HIV positive women receiving services from the two NGO centers were recruited for this study. There may be differences in the experiences of HIV positive women who seek services for their disease compared to those who do not obtain any services specific to HIV infection.

There are several strengths to this study despite the limitations. Even though we studied a sensitive topic, the refusal rate was less than 5%. We compared two different modes of interviews and showed that the results were somewhat consistent between the two interviews. We showed that ACASI can be a very useful tool in the measure of

sensitive behaviors even in rural population with a low literacy level. Future research that involves the study of sensitive behaviors should incorporate ACASI as a part of the data collection method even for low income and low literate women. Use of ACASI system resulted in the increased reporting of sensitive behaviors thereby reducing the social desirability bias and increasing the reliability of the results.

The findings from this study will add value to the existing literature in understanding the association between HIV infection and intimate partner abuse. We have highlighted the problems and concerns pertinent to the subject matter in the discussion sections of the individual manuscripts. Using the results of the study, we would like to make a few recommendations to the local health policy makers of the state especially for policies concerning HIV positive women. They are:

1. Strict measures should be taken by health care providers and integrated counseling and testing centers (ICTC) to avoid disclosure of women's HIV status to husbands or any other family members without their consent.
2. Couple counseling and testing for HIV should only be carried out after screening for any domestic violence.
3. Intimate partners of abused women should be offered pretest counseling before the disclosure and necessary resources should be provided to minimize conflicts between the couples.
4. Women who seek HIV testing should be screened for domestic violence. They should be provided with resources to obtain help in the presence of any abuse.

5. Women who are offered routine HIV testing during ante-natal visits should also be screened for domestic violence.
6. HIV prevention programs should include couple counseling and therapy sessions when needed.
7. ACASI method should be adopted for data collection purposes involving sensitive information wherever routine data collection is carried out.