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**Association of intimate partner violence and other risk factors with HIV infection
among married women in India: Evidence from National Family Health Survey 2015-16**

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Abstract:

Background:

Human immunodeficiency virus (HIV) infection remains the leading cause of morbidity and mortality throughout the world. It is fuelled by gender inequality and disparity, which has resulted in a fundamental violation of women's human rights. This study tries to find the association of intimate partner violence and other risk factors with the occurrence of HIV infection among married women in India.

Data and Methods:

This study is based on nationally representative data from the Indian National Family Health Survey (2015–16). Bivariate analysis and Multivariate analysis has been performed to determine the prevalence of HIV and Intimate Partner Violence. Logistic regression analysis is performed to find out the association of lifetime intimate partner violence and other factors with HIV infection among currently married women.

Results:

Married women who had faced physical, sexual, and emotional violence from their husbands/partners were almost twice more likely to have tested HIV positive compared to married women who did not suffer from violence [OR: 1.90, CI: 1.91-1.97]. The likelihood of testing for HIV positive was significantly higher among the married women whose husbands drink alcohol [OR: 2.49, CI: 1.69-3.66]. Interestingly, the use of condoms did not show any significant association with positive HIV status. Again, having more than one partner had a significant positive association with testing positive for HIV among married women [OR: 2.40, CI: 1.30-4.42].

Conclusion:

The findings of the study have shown that factors such as violence, having an alcoholic husband, increased number of lifetime sexual partners, having no financial autonomy, being sexually inactive for weeks, belonging to vulnerable social groups, and urban place of residence are important risk factors of HIV infection among married women in India.

Keywords: HIV, Intimate partner violence, Married women

Background

Human immunodeficiency virus (HIV) infection remains the leading cause of morbidity and mortality throughout the world. The epidemic has been fuelled by gender inequality and disparity, which resulted in the violation of women's reproductive rights (Pallitto, Campbell, Campo, & Campbell, 2005; Sarkar, 2008). Recent evidence on the epidemiology of the disease shows that HIV is no longer restricted to the commonly classified 'most-at-risk population' or 'high-risk group, but is also found in the general population (Adebayo, Olukolade, Idogho, Anyanti, & Ankomah, 2013; Fagbamigbe, Adebayo, & Idemudia, 2016; Maan, Hussain, & Jamil, 2014).

Women are at greater risk of HIV acquisition due to multiple factors including biological, behavioral, socio-demographic, cultural, regional, and structural ones (Aral, Torrone, & Bernstein, 2019; Nutor, Duah, Agbadi, Duodu, & Gondwe, 2020). The HIV infection in India is described as an outcome of a series of relationship disruptions that widely vary in terms of prevalence levels and transmission patterns (Decker et al., 2009). Similarly, a growing body of literature highlights the relevance of intimate partner violence (IPV) in understanding HIV infection patterns among married women, both in the context of South Asia and elsewhere (Bhuiya, Sharmin, & Hanifi, 2003; Li et al., 2014; Silverman, Decker, & Page, 2008). Studies also have reinforced that women who experience violence face a choice disability in terms of demanding fidelity from their partner and engage in riskier sexual behavior (Campbell et al., 2008).

A diverse body of literature has explored the causal pathways in the association of intimate partner violence with HIV infection, and have suggested a positive association between women's experience of intimate partner violence and the risk of HIV. Some studies based on women who attended health clinics reported a statistically significant association of partner violence among HIV infected women compared to non-infected women (Chakraborty, Patted, Gan, Islam, & Revankar, 2014; Kouyoumdjian, Findlay, Schwandt, & Calzavara, 2013). Also, some other studies found that the women who experience IPV had higher odds of depression, anxiety, and other mental health disorders as well as sexually transmitted infections including HIV (Kamimura, Ganta, Myers, & Thomas, 2014; Stephenson, Winter, & Hindin, 2013; Winter & Stephenson, 2013). The clinical studies on the other hand, have also found women's HIV status to be associated with their experience of physical violence,

physical or sexual violence, and any intimate partner violence (Silverman et al., 2008) and spousal control (Dunkle, Jewkes, Brown, Gray, Mcintyre, et al., 2004).

The evidence indicates the elevated rates of sexual risk behaviors among abusive men that include extramarital relationships, multiple sexual partners, no or inconsistent use of condom, and forced or unprotected sex and several sexually transmitted infections (STIs) (El-bassel et al., 2007; Gilbert, El-bassel, & Wu, 2007). A number of studies that have incorporated a diagnostic testing of HIV infection while examining the associations of HIV infection with IPV among women within voluntary testing or STI clinics, have demonstrated an elevated HIV infection among women who have experienced violence from partners (Chandrasekaran, Krupp, George, & Madhivanan, 2007; Fonck, Els, Kidula, Ndinya-achola, & Temmerman, 2005). Data from qualitative studies illustrate how an HIV-negative person experiencing IPV may be at increased risk of HIV infection because of an inability to negotiate safer sex (Dube, Nkomo, & Khosa, 2017; Go et al., 2003; Karamagi, Tumwine, Tylleskar, & Heggenhougen, 2006; Stevens & Richards, 1998).

Chin (2013) in his study in sub-Saharan Africa found that the HIV epidemic can affect the risk of spousal violence in ways other than as a direct stressor. For example, condom use can be a potential channel through which HIV prevalence increases the risk of spousal violence (Chin, 2013). Another study suggests that women generally find it difficult to negotiate condom use with their long-term partners because even the suggestion of using it might be seen as an accusation of the partner's infidelity or an admission of adultery on the part of the woman herself, which could provoke violence (Burgoyne, Drummond, & Drummond, 2014; Mash & Mash, 2010). However, another study suggests that women's HIV infection was not related to their sexual behavior based on a report of these behaviors as in the Indian HIV epidemic among married women is mostly driven by men's behavior (Newmann et al., 2000). There is also evidence that shows the associations among alcohol, violence, and risky sexual behaviors such as forced sex and multiple sexual partners (Berg et al., 2010).

Despite a great deal of previous research in India on the impact of partner violence on HIV infection, most of the studies are based on either the HIV-infected individuals or the subjects at greater risk of infection. However, the link between IPV and HIV might not be confined to them. This study overcomes such shortcomings and tries to identify the relationships between partner violence in a general population, other related factors and the risk of HIV infection, based on a set of large representative random samples. The study also provides estimates of

prevalence and socioeconomic and demographic correlates of testing HIV positive among married women in India.

Methods

Data

The study is based on nationally representative data from the fourth round of India's National Family Health Survey (NFHS, 2015–2016) conducted by the International Institute for Population Sciences, Mumbai under the stewardship of the Ministry of Health and Family Welfare (MoHFW), Government of India. NFHS provides comprehensive information on several aspects of demographic and health indicators at the national, regional, state, and district levels of India. NFHS-4 covered a nationally representative sample of 601,509 households, 699,686 women aged 15–49 years, and 103,525 men aged 15–54 years in India. It is worthwhile to mention that NFHS-4 has adopted a modular approach where the information on sexual behaviors has been collected from women of age 15–49 and men age 15–54, irrespective of their marital status, only from the households selected for the state module. A detailed description of the process of selecting households and respondents has been presented in the national report of NFHS-4, which has been kept in the public domain (<http://rchiips.org/nfhs/NFHS-4Report.shtml>) (IIPS & ICF, 2017).

As the objectives of this study deal with testing positive for HIV, the analysis is based on a sub-sample of currently married women aged 15–49 years. 60,657 currently married women were tested for HIV. After removing all the missing values and outliers, 58,409 married women were found eligible for this study.

Outcome variable

The outcome variable for the present study was 'HIV test result', recoded as 0 "HIV positive" and 1 "HIV negative".

Independent variables

There were two key independent variables in the study. Firstly, in the NFHS-4, every woman who was interviewed for the domestic violence module reported her experience of seven types of physical violence, three types of emotional violence, and three types of sexual violence. In the present study, if a married woman aged 15 to 49 ever experienced physical, emotional, and sexual violence from husband in the last 12 months was coded as 0 'no' and 1

'yes'. Secondly, the partner's alcohol drinking was coded as 0 "no" and 1 "yes". Other independent variables include 'wife justifying violence perpetrated by husband', coded as "no" and "yes", ever use of condom/nirodh, and the number of lifetime sexual partners which was coded as 0 "one only" and 1 "more than one partner".

One of the questions on financial autonomy 'has money that respondent alone can decide how to use?', which had the highest response rate among the study sample was considered in the analysis and coded as 0 "yes" and 1 "no" (Shroff et al., 2011). Recent sexual activity was recoded as 0 "active for last 4 weeks", and 1 "not active". Also, age was grouped into "15-24", "25-34", and "35-49" (Spiwak, Logsetty, Afifi, & Sareen, 2015), and children alive was coded as "yes" or "no". Educational status was recoded as 0 "no" standing for not having received any formal education, and "primary", meaning that they had received at least primary level of education, "secondary" and "higher"; wealth index was collapsed into three groups as "poorest", "poorer", "middle", "rich" and "richest". Caste groups were recoded into 0 "non-SC/ST" (scheduled caste, scheduled tribe) and 1 "SC/ST"; religion into 0 "Hindu" and 1 "other religions", and place of residence 0 "rural" and "urban" (IIPS & ICF, 2017).

Statistical analysis

Descriptive statistics and bivariate analysis has been performed to determine the prevalence of HIV and intimate partner violence. Further, multivariate analysis (binary logistic) has been conducted to show an association of lifetime intimate partner violence and other background variables with HIV infection among currently married women. in the study. The results are presented in the form of odds ratio (OR) with a 95% confidence interval (CI).

The equation for logistic regression is as follows:

$$\ln\left(\frac{P_i}{1 - P_i}\right) = \beta_0 + \beta_1x_1 + \dots + \beta_Mx_{m-1},$$

Where, β_0, \dots, β_M , are regression coefficients indicating the relative effect of a particular explanatory variable on the outcome variable.

Results:

Background characteristics of the eligible women in the present study are given in Table 1. Analysis indicates that around three percent of the married Indian women who were meeting the inclusion criterion of the study were experiencing intimate partner violence. Around one-third of the eligible women reported that their partners drink alcohol. Moreover, a little less

than half of the women justified the violence. The majority of the eligible respondents were in the age group 25-34 and 35-39 years. The vast majority of Indian women reported having a single lifetime sexual partner (96.27%) and 85% of the currently married women reported that they have never used condoms/nirodh. Further, three-fourth of the women reported being sexually active (72%). A slightly higher than half of the eligible women did not have any financial autonomy. Ninety percent of the women had children alive. As far as education is concerned, one-third of the eligible women were not educated. However, only eighteen percent of the husbands of the respondents in the study sample were not educated.

[Insert Table 1]

Prevalence rates of HIV infection among women who are currently married by different socio-economic and demographic variables are provided in Table 2. As evident from the data, 0.5 percent of the women who experienced intimate partner violence were found to be HIV positive however, among those women who did not experience IPV, only 0.2 percent were found to be HIV positive. The chi-square value was found to be 0.1 which shows that there is a significant association between women experiencing violence and their positive HIV status. Partners drinking status was also associated with women being HIV positive. A little less than thrice of the women were HIV positive (0.34) whose partners drank alcohol in comparison to those women whose partners did not drink alcohol (0.13). Prevalence of HIV was higher among women who justified the violence in comparison to those who did not justify violence. A higher proportion of women were HIV positive who had more than one sexual partner (0.55). More than one number of sexual partners was significantly associated with positive HIV status. A lower percent of the women were HIV positive (0.15), who had ever used a condom whereas 0.20 percent of the women who never used condom/nirodh were HIV positive. Lower percentages of women were HIV positive who had some financial autonomy. With the increase in age, more women were found to be HIV positive.

[Insert Table 2]

The prevalence of HIV infection was higher among married women who did not have any children alive in comparison to those who had living children. An interesting finding was observed that HIV was low (0.16) among those women who did not have education whereas 0.24 % of the women who had secondary levels of education were HIV positive. Similarly, there has not been much variation in the husband's education level. As far as wealth is concerned, HIV was more prevalent among the rich rather than the poor. In the context of the

place of residence, HIV was higher among women who belong to urban areas in comparison to women from rural areas (0.15 in rural and 0.29 in urban). HIV was higher among women from religions other than Hindu. Women from SC/STs categories were more vulnerable to HIV than women from general and other castes. Almost twice of the married women from SC/ST category were HIV positive compared to others (0.28% among SC/STs and 0.15% among non-SC/STs). The chi-square statistics were found to be significant for the number of lifetime partners, being sexually active, place of residence, religion, and caste.

Table 3 shows the results for logistic regression analysis of married women having tested as positive for HIV. Results show that experiencing physical, sexual, and emotional violence is significantly associated with positive HIV status. It revealed that the married women who had faced physical, sexual and emotional violence from their husbands/partners were almost twice more likely to have tested HIV positive compared to married women who did not suffer from violence [OR: 1.90, CI: 1.91-1.97]. The likelihood of testing for HIV positive was significantly higher among the married women whose husbands drink alcohol [OR: 2.49, CI: 1.69-3.66]. Interestingly, the use of condoms did not show any significant association with positive HIV status. Again, having more than one partner had a significant positive association with testing positive for HIV among married women [OR: 2.40, CI: 1.30-4.42]. Women who had more than one sexual partner were 2.5 times more likely to be HIV positive than their counterparts who had one sexual partner.

[Insert Table 3]

Although we did not find any statistical significance, no use of condom or nirodh ever by the husband was positively associated with testing for HIV positive [OR: 1.31, CI: 0.72-2.36]. A strong positive association of testing HIV positive was found among married women who were sexually inactive in the last 4 weeks [OR: 1.77, CI: 1.21-2.58]. Urban place of residence was found to be statistically significantly associated with HIV infection [OR: 1.89, CI: 1.25-2.85]. Moreover, married women from non-Hindu religions [OR: 2.10, CI: 1.43-3.08] and from SC/ST caste groups [OR: 1.78, CI: 1.21-2.63] were significantly more likely to be HIV infected compared to the married women from Hindu religion and non-SC/ST which mostly denotes relatively upper castes in India.

Discussion:

Findings from the current study show that women who have been facing violence in the form of sexual, physical, and emotional are more likely to be HIV infected than their counterparts. Similar finding has been observed from a study (Silverman et al., 2008) evidenced from NHS-3 data. Another study using data from the Indian National Family Health Survey (2005-06) (Ghosh et al., 2011) revealed that sexual violence was not associated with HIV infection in women who had ever been married, but was positively associated with reporting HIV infection among currently married women. Moreover, women who experienced physical or sexual IPV were significantly more likely to be HIV-positive in a study of women attending an HIV/STI clinic in Bangalore (Chandrasekaran et al., 2007).

A population-based study of married women in Rwanda (Dude, 2011), also revealed a significant association between HIV and emotional and sexual IPV, and a total IPV that includes physical violence too. On the other hand, multiple studies found no association of HIV infection with a single measure of violence that is physical or sexual or emotional (Sareen, Pagura, & Grant, 2009; Spiwak, Afifi, Halli, Garcia-Moreno, & Sareen, 2013). In addition, as evidence suggests, men who are perpetrators of violence may engage in activities such as unprotected sex, having more than one partner, or consuming alcohol or taking drugs also increase the risk for HIV among both the partners (Kouyoumdjian et al., 2013).

Studies in less-developed countries show that individuals with drinking behavior may have casual sex without using a condom or any safety and are more likely to engage in transactional sex with multiple sex partners resulting in risk for HIV (Dunkle, Jewkes, Brown, Gray, McIntyre, et al., 2004; Saggurti et al., 2008; Staton et al., 1999). Consistently, the results showed that married women whose husbands drink alcohol were at greater risk for testing positive for HIV infection. Besides, married women in an Indian study who faced alcohol-related violence from their husbands were also more prone to have more sexual risks including HIV (Berg et al., 2010). The same study also suggests that women in such a country where divorce is not considered as a viable option are often forced to have sex and such behaviors are endorsed in the society due to prevailing gender norms.

Self-reported number of lifetime partners and the history of condom use as a contraceptive method are found to be sexual risk factors in the past studies. Gupta et al. revealed that the proportion of extramarital relationships among married men is about five times higher than among married women (Gupta, Parkhurst, Ogden, Aggleton, & Mahal, 2008). Given the possibility that partners contract HIV from such extramarital relationships, married women

also may contract the virus through sexual intercourse within their marriage (Jewkes & Morrell, 2010). Similarly, we found that currently married women in our study who reported that they have multiple partners were at increased risk of contracting HIV infection. Although the association was not significant, a positive direction shows that ever use of a condom or nirodh which is common contraceptives in India (Chakrapani et al., 2011), was found to be a protective factor against HIV infection. In patriarchal societies, suggesting condom use or refusing unprotected sex in a marriage is seen as questioning male power and authority (Small & Nikolova, 2015). Earlier studies also show that the risk of HIV in marriage and in stable relationships is due to an increased frequency of sex and low condom use (Mkandawire-Valhmu et al., 2013).

Although education and wealth status showed no significant association with HIV infection in the logistic regression model, bivariate results showed that having education and being from a rich background was not protective against testing positive for HIV among married women in our study. The finding is consistent with previous studies in less-developed countries that found an increased likelihood of HIV infection among women who are educated and have better economic status (Ahmed & Seid, 2020).

The study has several limitations. Firstly, given that the study is based on a cross-sectional survey, interpretations of our findings are limited to statistical associations. Secondly, the relationships among alcohol drinking, sexual behavior, and violence that may further place women at risk of HIV infection are not taken into account in the analysis. While the study focused on partner violence within marriage, the violence in other relationships, such as premarital, extra-marital, and commercial ones, were not represented. Nevertheless, this study presents rich representative data on a sensitive topic assessed at a national level.

Conclusion

The findings of the study have shown that factors such as violence, having an alcoholic husband, increased number of lifetime sexual partners, having no financial autonomy, being sexually inactive for four weeks, belonging to vulnerable social groups, and urban place of residence are important risk factors of HIV infection among married women in India. Further, longitudinal and qualitative studies are warranted for tracking married women's sexual negotiation after facing partner violence over time and exploring their lived risky sexual experience within their marriage.

Declarations

Ethics approval and consent to participate: The data is freely available in public domain and survey agencies that conducted the NFHS survey have collected an ethics approval from a technical committee and ethical approval board and prior consent from the respondents.

Consent for publication: Not applicable

Availability of data and materials: The study utilises secondary source of data which is freely available in public domain through <http://www.dhsprogram.com/>

Competing Interests: The authors declare that they have no competing interests.

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Authors' contribution: NS and MT made a substantial contribution to the concept, design of the work, acquisition, analysis and interpretation of data; NS and MT drafted the article or revised it critically for important intellectual content; NS and MT approved the version to be published.

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Table-1. Background Characteristics of currently married women who participated in the violence and module of the NFHS-4 Women's Survey (N = 58,409) in India

Background variables		Sample	Percentage
IPV			
	No	56,680	97.04
	Yes	1,729	2.96
Partner drinks alcohol			
	No	40,281	68.96
	Yes	18,128	31.04
Wife justified violence			
	No	33,598	57.52
	Yes	24,811	42.48
Number of lifetime partners			
	One	56,230	96.27
	More than one	2,179	3.73
Ever used condom/nirodh			
	Yes	8,660	14.83
	No	49,749	85.17
Sexually active			
	Yes	42,172	72.2
	No	16,237	27.8
Financial autonomy			
	Yes	24,865	42.57
	No	33,544	57.43
Age group			
	15-24	9,732	16.66
	25-34	25,163	43.08
	35-49	23,514	40.26
Children alive			
	Yes	53,095	90.9
	No	5,314	9.1
Respondent's education			
	No	19,194	32.86
	Primary	8,517	14.58
	Secondary	25,251	43.23
	Higher	5,447	9.33
Husband's education			
	No	10,866	18.6
	Primary	8,781	15.03
	Secondary	31,136	53.31
	Higher	7,626	13.06
Place of residence			
	Rural	41,565	71.16
	Urban	16,844	28.84

Wealth status	Poorest	11,403	19.52
	Poorer	12,417	21.26
	Middle	12,183	20.86
	Rich	11,577	19.82
	Richest	10,829	18.54
Religion	Hindu	44,423	76.06
	Others	13,986	23.94
Caste			
	Non-SC/ST	37,868	64.83
	SC/ST	20,541	35.17

SC/ST: Scheduled Caste/Scheduled Tribe

Table-2. Percentage of currently married women tested for HIV positive in India, 2015-16

Background variables		Percentage	Chi-square (p-value)
IPV			0.010
	No	0.19	
	Yes	0.46	
Partner drinks alcohol			0.000
	No	0.13	
	Yes	0.34	
Wife justified violence			0.446
	No	0.18	
	Yes	0.21	
Number of lifetime partners			0.000
	One	0.18	
	More than one	0.55	
Ever used condom/nirodh			0.320
	Yes	0.15	
	No	0.2	
Sexually active			0.004
	Yes	0	
	No	0.28	
Financial autonomy			0.176
	Yes	0.16	
	No	0.21	
Age group			0.318
	15-24	0.13	
	25-34	0.2	
	35-49	0.21	
Children alive			0.814
	Yes	0.19	
	No	0.21	
Respondent's education			0.21
	No	0.16	
	Primary	0.16	
	Secondary	0.24	
	Higher	0.17	
Husband's education			0.548
	No	0.23	
	Primary	0.15	
	Secondary	0.19	
	Higher	0.22	
Place of residence			0.001
	Rural	0.15	
	Urban	0.29	
Wealth status			0.361
	Poorest	0.14	

	Poorer	0.19	
	Middle	0.2	
	Rich	0.26	
	Richest	0.18	
Religion			0.000
	Hindu	0.15	
	Others	0.33	
Caste			0.000
	Non-SC/ST	0.15	
	SC/ST	0.28	

SC/ST: Scheduled Caste/Scheduled Tribe

Table-3. Logistic regression estimates for testing HIV positive among currently married women in India, 2015-16

Background variables		Odds ratio	95% CI
IPV			
	No	Ref.	
	Yes	1.912*	0.911 - 4.010
Partner drinks alcohol			
	No	Ref.	
	Yes	2.528***	1.715 - 3.726
Wife justified violence			
	No	Ref.	
	Yes	1.033	0.708 - 1.508
Number of lifetime partners			
	One	Ref.	
	More than one	2.368***	1.286 - 4.360
Ever used condom/nirodh			
	Yes	Ref.	
	No	1.258	0.691 - 2.289
Sexually active			
	Yes	Ref.	
	No	1.763***	1.205 - 2.581
Financial autonomy			
	Yes	Ref.	
	No	1.394*	0.941 - 2.064
Age group			
	15-24	Ref.	
	25-34	1.224	0.631 - 2.373
	35-49	1.499	0.790 - 2.846
Children alive			
	Yes	Ref.	
	No	1.583	0.814 - 3.077
Respondent's education			
	No	Ref.	
	Primary	1.162	0.593 - 2.275
	Secondary	1.720*	0.981 - 3.017
	Higher	1.249	0.487 - 3.208
Husband's education			
	No	Ref.	
	Primary	0.546*	0.271 - 1.100
	Secondary	0.651	0.368 - 1.152
	Higher	0.913	0.414 - 2.011
Place of residence			
	Rural	Ref.	
	Urban	1.876***	1.224 - 2.875
Wealth status			
	Poorest	Ref.	

	Poorer	1.359	0.702 - 2.630
	Middle	1.33	0.665 - 2.661
	Rich	1.602	0.774 - 3.316
	Richest	1.208	0.509 - 2.827
Religion	Hindu	Ref.	
	Others	2.038***	1.384 - 3.000
Caste	Non-SC/ST	Ref.	
	SC/ST	1.759***	1.188 - 2.603

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; AOR: Adjusted Odds Ratio; CI: Confidence Interval; Ref: Reference category; SC/ST: Scheduled Caste/Scheduled Tribe