

# Spatial Patterns in Domestic Violence and HIV Prevalence in Nigeria

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**Abstract:** We explore the spatial patterns of domestic violence and HIV prevalence between states in Nigeria using the 2008 Demographic and Health Survey and the 2010 ANC Sentinel Surveillance Survey. The analysis revealed a sizeable number of women in the country suffer physical and sexual violence which occurs across the social strata and ethnic groups in Nigeria. Based on the previous studies that have already established a link between domestic violence and declining in health status of women, the paper examines the linkage between domestic violence and HIV prevalence in Nigeria. We found spatial linkage between the two concepts or variables though we did not establish a causal relationship. We found women in states with a high HIV prevalence rate had either experienced physical and/or sexual violence from their spouses. Based on the results, it shows that there is a need to further explore the causal relationships between domestic violence and health outcomes especially HIV infections. Thus, the spatial linkage between domestic violence and HIV prevalence in Nigeria will be highly context-specific. The study demonstrated a spatial interrelationship between domestic violence and HIV prevalence, thus, planning HIV prevention programming should also design activities or intervention to concurrently address the domestic violent aspects. Since it has been documented and current attempts reveal a connection between domestic violence and HIV infection in Nigeria, there is a need for further research to investigate the relationship between domestic violence and HIV in Nigeria to increase the evidence.

**Keywords:** HIV, domestic violence, Nigeria, spatial analysis, women.

## BACKGROUND

As in much of sub-Saharan Africa, women in Nigeria frequently suffer physical, sexual and psychological abuse. For instance, rape occurs across the social strata and ethnic groups in Nigeria [1]. It is a crime that shocks and traumatizes the victim, and undermines the status of women in society, and yet is largely suffered in silence. Domestic violence against women can cause physical injury, psychological distress and compromised sexual health [2] and is widely recognized as a global public health concern. Consistent evidence demonstrates an association between women experiencing domestic violence and an increased risk of contracting HIV/AIDS and other sexually transmitted infections (STIs) [2]. These associations may be partially explained by the combination of weak sexual protection among women who are abused [3] and high rates of risky sexual behaviors among male perpetrators of domestic violence including extramarital and multiple sex partnering, inconsistent condom use and forced unprotected sex [2].

While studies have documented high rates of intimate partner violence among multiple samples of Nigerian women [4]; there seem to be a paucity of

information about the links between domestic violence and HIV/AIDS in Nigeria. Examining this link and spatial patterns of domestic violence and HIV/AIDS prevalence will provide guidance to policy makers and program managers for developing and targeting evidence based preventive strategies to reduce HIV incidence.

## DATA AND METHOD

This paper used the 2008 Nigeria Demographic Health Survey (NDHS), conducted by the National Population Commission from June to October 2008 and the 2010 ANC Sentinel Surveillance Survey. The 2008 NDHS is designed to provide national and subnational estimates on health, nutrition, population, and HIV/AIDS indicators. It included a module on domestic violence which was administered to one married woman respondent per household [5]. The 2008 Nigeria Demographic and Health Survey (NDHS) does not test HIV status. Of the 24,066 women surveyed, all 4,363 single women and 234 women not co-habiting with their husbands were excluded from the analysis as they lacked the domestic violence module, resulting in a final sample size of 19,226. Each state had between 250 and 850 women included, providing reasonable survey estimates.

Due to the sensitive nature of the information on domestic violence, victims may conceal their experiences out of shame or fear. Thus, the

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**Table 1: Does (did) your (last) husband ever do any of the following things to you?**

Forms of Domestic Violence	Data element
Physical Violence	Push you, shake you, or throw something at you?
	Slap you?
	Twist your arm or pull your hair?
	Punch you with his fist or with something that could hurt you?
	Kick you, drag you or beat you up?
	Try to choke you or burn you on purpose?
	Threaten or attack you with a knife, gun, or any other weapon?
Sexual Violence	Physically force you to have sexual intercourse with him even when you did not want to?
	Forced her to perform any sexual acts she did not want to

interviewers received special training on domestic violence. Interviews were conducted only when maximum privacy had been secured. If privacy was not assured, the questions in the domestic violence module were not asked [5].

Percent of women experiencing domestic violence was determined through nine questions assessing current or past physical or sexual violence. A positive answer to any one of the following behaviours ever or currently i.e. during the past year suggested physical violence: “pushing or shaking you or throwing something at you”, “slapping you”, “twisting your arm or pull your hair”, “punching you with his fist or with something that could hurt you”, “kicking you, dragging you or beat you up”, “threaten or attack you with a knife, gun, or any other weapon”, and/or “trying to choke you or burn you on purpose” (Table 1). A positive answer to “physically forcing you to have sexual intercourse with him even when you did not want to” indicated sexual violence. These assessments were recorded to create three level variables reflecting percentage of women in each state experiencing physical violence only, sexual violence only and domestic violence (both physical and sexual violence) ever or during the past year.

The HIV indicator, state HIV prevalence rate, was derived from the 2010 Antenatal Sentinel Sero-Prevalence Survey among the pregnant women in Nigeria. The 2010 sero-prevalence survey was the 9<sup>th</sup> in a series of the national HIV/AIDS sero-prevalence antenatal surveys designed to track the magnitude and trend of HIV and AIDS in Nigeria since 1991 [6].

Since HIV status was not assessed in the 2008 NDHS, we cannot establish the association between

domestic violence and HIV prevalence at the household level. Instead, we performed an ecologic analysis, examining the relationship between state prevalence of HIV and percentage of women experiencing domestic violence. We first conducted a bivariate linear regression, considering a  $p$  value of 0.05 to be statistically significant. We ran three models, independently examining the relationship between state HIV prevalence and the percentage of women experiencing any domestic violence (Figure 1), physical violence alone (Figure 2) or sexual violence alone (Figure 3).

Through univariate and bivariate Anselin's Local Indicators of Spatial Autocorrelation (LISA) with queen contiguity [7], we next examined patterns of spatial clustering in domestic violence and HIV prevalence. The four univariate LISA analyzes done assessed whether there were grouping of states with high or low prevalence of HIV (Map 4a); with high or low domestic violence (Map 4b); with high or low physical violence scores (Map 4c); or with high or low sexual violence scores (Map 4d). The bivariate LISA (Map 3) shows areas where clustering of both domestic violence and HIV prevalence occur. ArcMap 10.1 was used to create choropleth quantile maps and Open GeoDa, an open source spatial analysis tool to assess clustering [7]. Again, a  $p$  value of 0.05 was considered significant. We verified the topology of the shapefile used prior to analysis.

## RESULTS

About 18% of women in the 2008 NDHS reported ever experiencing one or more episodes of physical or sexual violence while 15% reported had similar experience in the past 12 months preceding the survey

from their husband or intimate partner. Sexual violence range from 0.8% (Ogun) to 19.8% (Akwa-Ibom State). The experience of physical violence by women ranges from 2.4% (Jigawa) to 46.8% (Akwa-Ibom). Jigawa and Akwa-Ibom also had the lowest (2.8%) and highest (49.9%) percent of women respectively experiencing any violence. The experience of any form of physical violence and sexual violence varied within the Nigerian states.

Domestic violence and HIV infection are moderately correlated (Figure 1, Pearson's  $R^2 = 0.43$ ,  $p < 0.005$ ). For each 1% increase in domestic violence, states saw an average increase of 0.13% HIV prevalence. Similar

patterns were seen comparing HIV with physical violence ( $p < 0.0001$ ) (Figure 2). Sexual violence and HIV were less strongly correlated (Figure 3,  $R^2 = 0.21$ ,  $p < 0.005$ ) (Figure 3).

Nigeria is having a generalized HIV epidemic with an element of concentrated among high-risk population like sex workers, men who have sex with men. Map 1 indicates that there is a high prevalence of HIV among the north-central and south-south states and few states in the southeast. The north-central states including Benue, Nasarawa, Kogi, Plateau and the Federal Capital Territory may be describe at the HIV "red belt" zone as this region has an HIV prevalence above the

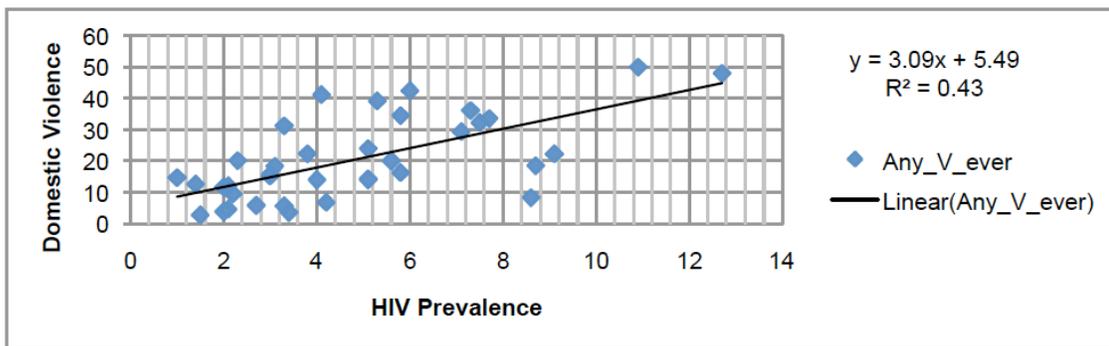


Figure 1: Result of Simple Regression Model of Women Ever Experienced any form of Physical and/or Sexual Violence from her husband or spouse.

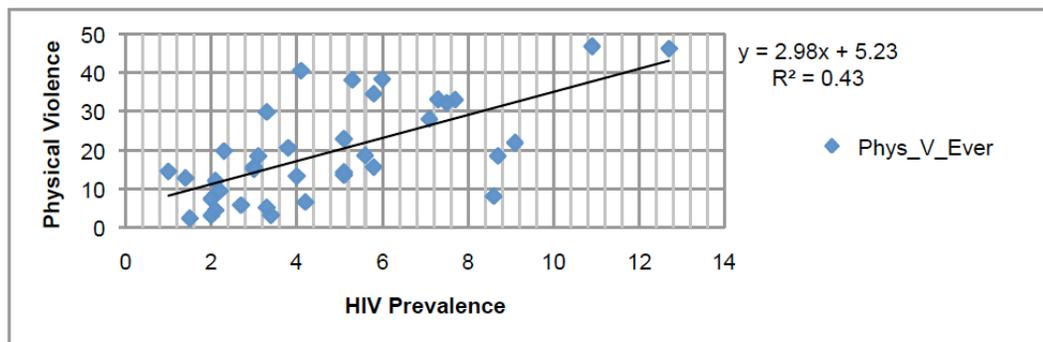


Figure 2: Result of Simple Regression Model of Women Ever Experienced any form of Physical Violence from her husband or spouse.

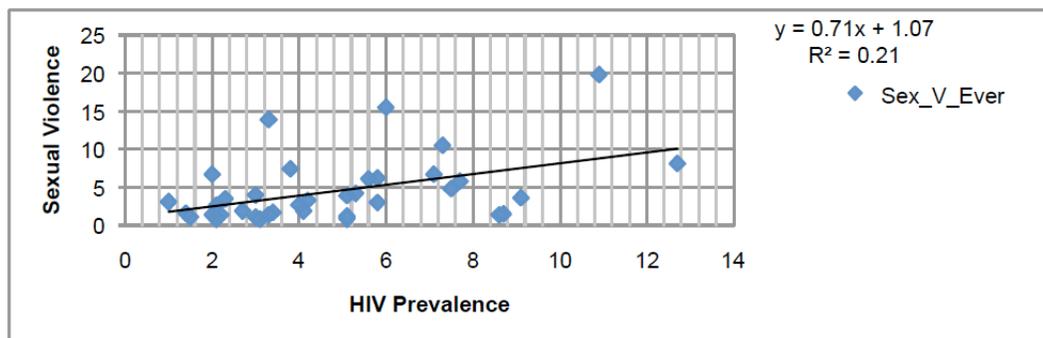
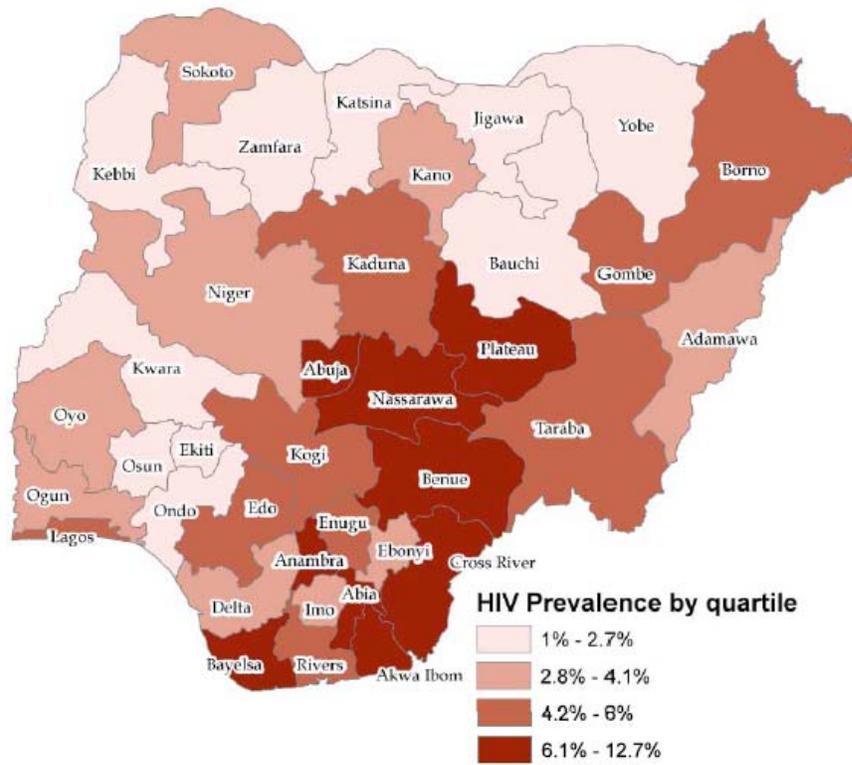
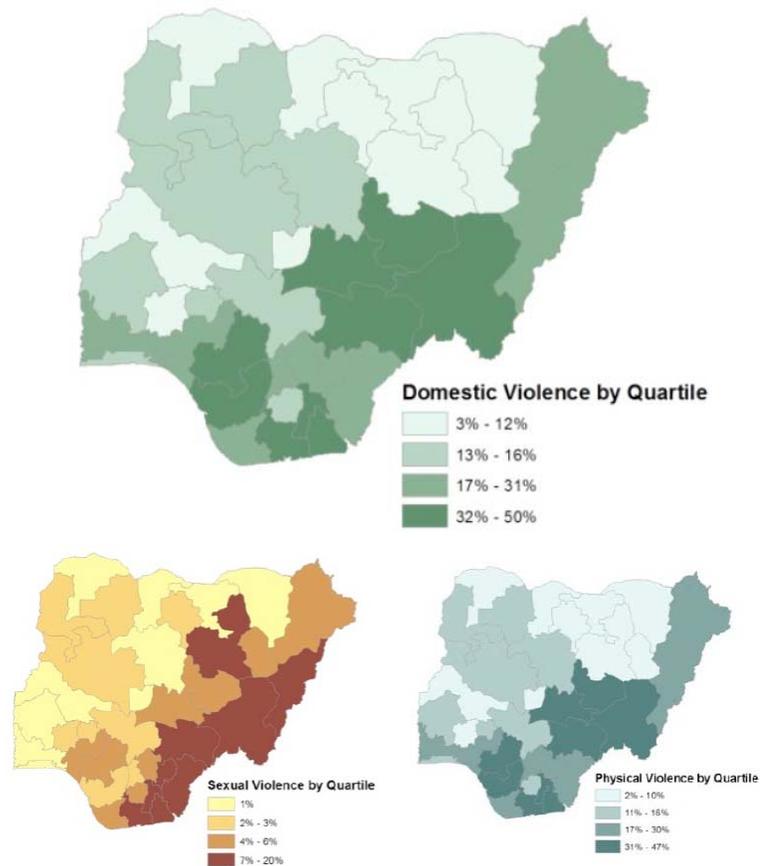


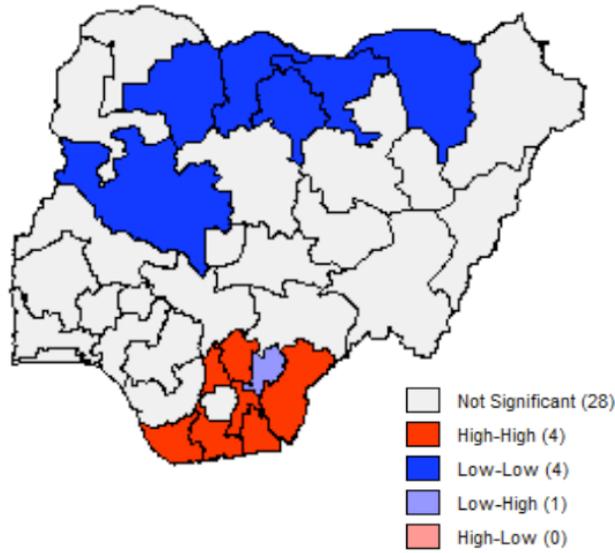
Figure 3: Result of Simple Regression Model of Women Ever Experienced any form of Sexual Violence from her husband or spouse.



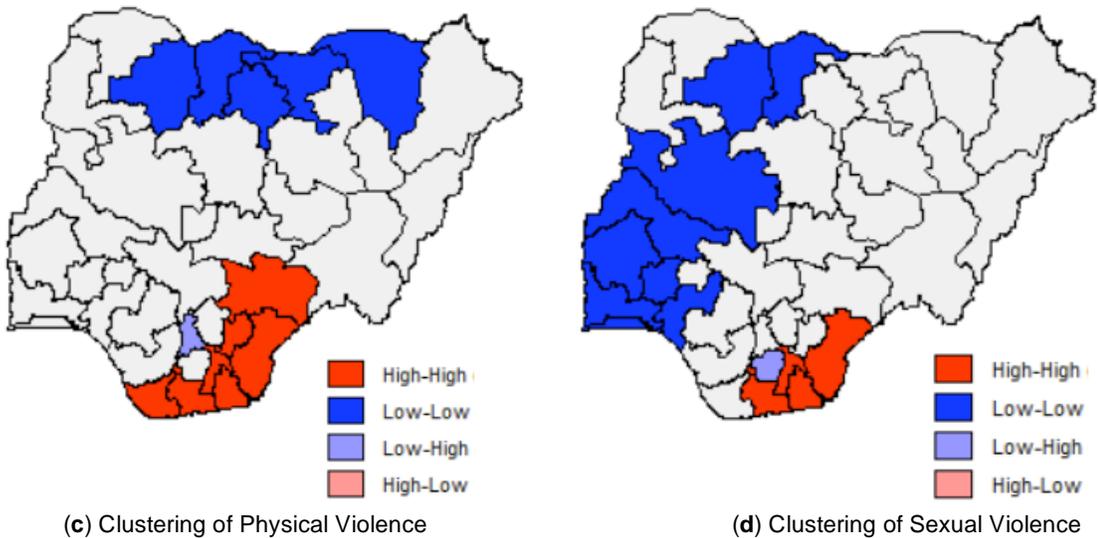
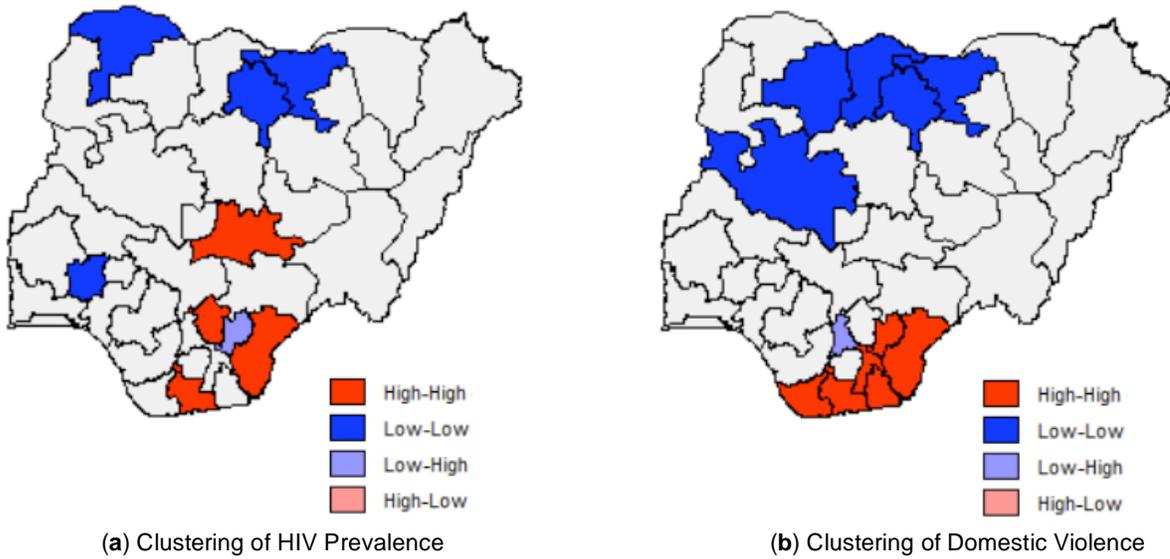
Map 1: HIV Prevalence in Nigeria: Antenatal Sentinel Sero-Prevalence Survey, 2010.



Map 2: Domestic Violence is a Function of Physical Violence modified by Sexual Violence.



**Map 3:** Bivariate Cluster Analysis of HIV Prevalence and Domestic Violence.



**Map 4:** Univariate Clustering of HIV and Violence by State.

national average. Exempting the FCT, these states also have a high percentage of women reported domestic violence.

Areas with high domestic violence have high physical violence, high sexual violence or both (Map 2). Map 3 shows the bivariate cluster map of HIV prevalence and any violence by the State, while Map 4 shows univariate cluster maps of each indicator of interest. The cluster analysis identifies groups of extreme values and spatial outliers. The analysis here shows that there is a clustering between HIV prevalence and any violence ever in Benue, Plateau, Nasarawa Abia, Delta, Ebonyi, Cross-River and Edo states (Map 3,  $p < 0.05$ ).

The clustering of sexual violence are highest in southeast and south parts of Nigeria especially in Rivers, Cross-River, Abia, Ebonyi and Akwa-Ibom states; and lowest in the southwest. The clustering of the physical violence domain of the domestic violence is high in the south-south and southeast, and low in the northern part. The states in these regions that have been significantly associated with physical violence are Rivers, Cross-River, Akwa-Ibom, Edo, Abia, Ebonyi, Kano, Katsina, Jigawa and Taraba states.

On the other hand HIV prevalence rate was lowest in Kebbi State (1.0%) and highest in Benue State (12.7%) with the national prevalence rate being 4.1 percent. Women residing in states with high HIV prevalence rates were more likely to have ever experienced any form of physical and/or sexual violence than their counterparts with HIV prevalence below national average except in 5 states. This suggests some link between domestic violence and HIV infection but cannot be interpreted without focus on the context and risk factors.

## DISCUSSIONS AND CONCLUSION

Violence against women plays a crucial and devastating role in increasing the risk of women of HIV infection [8-13]. It is a key reason why women are more vulnerable to HIV infection than men. It is both a cause and a consequence of infection, and as such is a driving force behind the epidemic. The circumstances underlying the correlation between violence against women and HIV and AIDS are a complex weave of social, cultural and biological conditions. As our study examined the correlation at a state-level, we were unable to investigate these conditions, and how they might relate to clusters of physical, sexual, or domestic violence in the north or the west of the country.

Though there was a 2 year gap between the surveys used, we felt any patterns shifts in HIV prevalence and domestic violence would be minimal, and thus would not affect the analysis.

Although, the current effort is not a direct attempt to establish an association between domestic violence and HIV infection in Nigeria, the results suggest there is a link between domestic violence and HIV infection in the context of Nigeria. The results support previous studies on the relationship between domestic violence and HIV status, particularly among women [14].

Domestic violence related to HIV may take many forms and limits open communication necessary for conversations on HIV prevention efforts within discordant couples. For instance, a Nigerian woman who reveals she is HIV-positive faces the risk of abandonment by her partner, family, and friends as well as violence due to her HIV+ status [15-18]. In addition, she will likely be accused of being unfaithful to her husband even when the culture promotes a double standard with respect to sexual behavior of men and women. A study to explore links between HIV infection, sero-status disclosure, and partner violence among women in Dar es Salaam, Tanzania found that there are serious barriers to disclosing HIV status for women [19]. A Uganda's study of linkages between domestic violence and HIV/AIDS found that women who experience rape, attacks and violence by their husbands refuse to access HIV/AIDS information, HIV testing, and HIV/AIDS treatment and counselling for fear of the repercussions from their husbands [20]. In a male dominated society like Nigeria, women who experience violence may be more vulnerable to the risk of HIV and other sexually transmitted infections (STIs) directly because it interferes with a women's ability to protect herself. This is evident in a patriarchal or male dominated environment where women do not have sexual rights such as insisting on using a condom or rejecting the sexual advances from her husband or boyfriend particularly in a union already consummated.

This paper has potentially important implications for public health policies and programs aimed at reducing domestic violence and preventing HIV and other sexually transmitted infections. The reality of domestic violence including physical and sexual violence is striking and the problem is escalating at alarming rate. Victims of domestic violence suffer not only physical and psychological abuse but as a result social and economic consequences for them and their families. Based on prior evidence and our current investigation

of a connection between domestic violence and HIV infection in Nigeria, there is a need for further research examining the relationship between domestic violence and HIV at the household level in Nigeria to increase the evidence base and drive policy and programmatic efforts. This includes both HIV testing and domestic violence modules in future surveys. Existing DHS household data could be used to investigate the relationship between domestic violence and HIV-related knowledge, attitudes and practices—key determinants of HIV status. These or other studies should focus on states in the south where clustering of both high HIV prevalence and high domestic violence was found.

## ACKNOWLEDGEMENTS

The author acknowledges the helpful comments and suggestions from JSI colleagues, namely Andrew Inglis and at the initial stage of conception and analysis and Stephanie Mullen in reviewing the draft manuscript. The support of Ojo William in refining and revising the draft map generated from the GIS is highly appreciated. The authors appreciate the editorial review by Meriwether Beatty a colleague at JSI that has helped make the paper more concise. The views expressed in this publication do not necessarily reflect the views of my working place but is solely my responsibility as an author and take responsibilities for any errors or mistakes noticed in the content.

### Appendix 1: HIV Prevalence and Domestic Violence

State	Antenatal Sentinel Sero-Prevalence Survey (2010)	Demographic and Health Survey (2008)		
	HIV Prevalence	Domestic Violence	Physical Violence	Sexual Violence
Abia	7.3	36.1	33.1	10.5
Adamawa	3.8	22.3	20.6	7.4
Akwa-Ibom	10.9	49.9	46.8	19.8
Anambra	8.7	18.5	18.5	1.5
Bauchi	2.0	11.7	7.4	6.7
Bayelsa	9.1	22.2	21.9	3.6
Benue	12.7	47.9	46.2	8.1
Borno	5.6	20.0	18.6	6.1
Cross-River	7.1	29.3	28.0	6.7
Delta	4.1	41.1	40.5	1.9
Ebonyi	3.3	31.2	29.8	13.9
Edo	5.3	39.1	38.1	4.2
Ekiti	1.4	12.6	12.8	1.6
Enugu	5.1	23.9	22.9	3.9
Federal Capital Territory, Abuja	8.6	8.3	8.1	1.4
Gombe	4.2	6.8	6.6	3.3
Imo	3.0	15.6	15.6	4.0
Jigawa	1.5	2.8	2.4	1.1
Kaduna	5.1	14.3	14.3	1.2
Kano	3.4	3.6	3.2	1.7
Katsina	2.0	3.8	3.1	1.4
Kebbi	1.0	14.7	14.5	3.1
Kogi	5.8	16.2	15.6	3.0
Kwara	2.2	9.5	9.5	1.4
Lagos	5.1	13.9	13.6	0.9
Nasarawa	7.5	32.2	32.2	4.8
Niger	4.0	14	13.3	2.7
Ogun	3.1	18.3	18.5	0.8
Ondo	2.3	20.1	19.8	3.5
Osun	2.7	5.8	5.8	1.9
Oyo	3.0	15.1	15.1	1.1

Plateau	7.7	33.6	33.0	5.8
Rivers	6.0	42.4	38.3	15.5
Sokoto	3.3	5.7	5.2	1.4
Taraba	5.8	34.5	34.5	6.2
Yobe	2.1	4.6	4.5	0.9
Zamfara	2.1	12.0	12.1	2.6

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Received on 08-10-2013

Accepted on 22-11-2013

Published on 25-02-2014

DOI: <http://dx.doi.org/10.12970/2309-0529.2014.02.01.3>

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