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Identification of Hotspot Clustering of Intimate Partner, Physical, Sexual, and Emotional Violence and Geographically Weighted Logistic Regression Analysis to Assess its Predictors Among Women in Uttar Pradesh, India

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Abstract

Intimate Partner Violence (IPV) is considered a major public health concern that violates human rights and constraints on individual and societal development. This study aims to identify hotspot clustering and odds of intimate partner violence, physical, sexual and emotional violence. We used fifth round of National Family Health Survey. We identified hotspot clustering using Getis-Ord Gi*. In addition, we applied Geographically Weighted Logistic Regression to calculate the odds of forms of spousal violence in spatial relation with independent variables. We found hotspot clustering of IPV in Akbarpur, Amroha, Auraiya, Mirzapur and Varanasi. Woman whose husband was alcoholic had 3.31 times higher odds (aOR =3.31, 95%CI = 2.92–3.75) of IPV and higher odds was observed in eastern and western regions of Uttar Pradesh. Further, we observed a higher odd of IPV in spatial relation with illiterate women in a few districts of the western region of Uttar Pradesh (Hardoi, Shahjahanpur, Moradabad, Rampur, Mau, and Balia). We suggest that the government and non-profit organization should provide better opportunities for girls' education and generate employment opportunities to engage eligible men and women in economic activities. Strict policy implementation on the sale of alcohol could lower the prevalence of forms of spousal violence.

Keywords

Geographically Weighted Logistic Regression, Hotspot analysis, Intimate Partner Violence, Uttar Pradesh

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Introduction

Intimate Partner Violence (IPV) is a behavioral activity in a close relationship in the context of marriage, cohabitation, or any form of union by the current spouse, former spouse, or dating partner in the form of abuse, aggression, sexual activity, controlling behavior (Modi et al., 2014; Sardinha et al., 2022). IPV is considered a social evil practice and a major public health concern that violates human rights and constraints on individual and societal development (Devries et al., 2013; Sardinha et al., 2022). The consequence of IPV has adverse effects on women's physical and mental health (Garcia-Moreno et al., 2013). Another study showed that IPV can cause social isolation, unemployment, income loss and poor self-care (Srivastava et al., 2023). It also obstructs the social and economic growth of women (Heise et al., 1994). Globally, about thirty-three percent of women are exposed to IPV, however, its prevalence varies across the world (WHO Regional Office for The Western Pacific), thirty-five percent in South Asia (Sardinha et al., 2022), and forty percent in Africa (Garcia-Moreno et al., 2013), twenty percent in Europe (European Union Agency for Fundamental Rights (FRA), 2015), thirteen percent in Spain (European Union Agency for Fundamental Rights (FRA), 2015) while thirty-two percent in India (IIPS & ICF, 2021). In India, physical, sexual, and emotional violence are the most common forms of domestic violence (Mog et al., 2023). Males are dominant in any form of violence perpetrated against women, a recent study showed that eighty-three percent of women have reported their husbands to be a perpetrator of IPV, in a spousal relationship husband do violence against their wife to control them (Bott et al., 2005; Jejeebhoy, 1998). Act like hitting, kicking, slapping, pushing, and twisting arms in a spousal relationship are considered physical violence, while forcing sexual activity when a female partner does not want is an act of sexual violence and emotional violence includes some forms of insult, did something to feel bad, intimidation, controlling women behavior (Yadav et al., 2023). A recent survey showed the prevalence of IPV varies by state of India: Bihar (59%), Manipur (55%), Himachal Pradesh (6%), and Sikkim (3.5%) (IIPS & ICF, 2021). IPV cannot be understood in segregation, it is influenced by individual, personal relations, community, and societal norms (Beyer et al., 2015; Jejeebhoy, 1998). Husband education is a major risk factor for the occurrence of IPV; in recent studies, it was found that the husband's low education level is inversely proportional to IPV (Jejeebhoy, 1998). In addition, a study based on Bangladesh revealed that having some formal education among married couple is protective of IPV (Islam et al., 2021). A study in Uttar Pradesh shows that poverty is an influential factor for IPV. The reported prevalence of IPV could be underestimated because women fear reporting cases as most women depend on their spouse, due to disgraced family in society (Crockett et al., 2015). Previous studies showed risk factors associated with IPV are premature marriage, illiteracy, male dominance in society, maternal affairs, educational discrepancy between partners, poverty, and poor economic status of women (Chan, 2009). Besides, likelihood of IPV is directly associated with smoking and other forms of tobacco consumption and regular alcohol consumption (Chandra et al., 2023). Further, a recent study documented that identification of hotspots could be crucial for addressing pervasive and persistent

behaviours, such as IPV (Srivastava et al., 2023). However, there are limited study, which emphasizes the risk factors of IPV in Uttar Pradesh. This study investigates determinants of IPV, physical, sexual, and emotional, which will be helpful for policymakers to initiate adequate programs for reducing any act of violence between intimate partners in Uttar Pradesh.

Material and Methods

We used fifth round of the National Family Health Survey (NFHS) (2019-2021). The NFHS-5 is a multistage cross-sectional survey that collects information on various factors such as levels of fertility, infant and child mortality, maternal and child health, and domestic violence. NFHS-5 was conducted under the Ministry of Health and Family Welfare and coordinated by the International Institute for Population Science, Mumbai (IIPS & ICF, 2021).

Sample size and sample design

In the NFHS-5 survey, the 2011 census served as the sampling frame for the selection of primary sampling units. Each district is divided into rural and urban areas. In each district, villages are stratified in rural stratum, again each rural stratum is sub-stratified into smaller sub-stratum according to village population. Within each sub-stratum (within each rural sampling stratum) a sample of villages was selected as primary sampling Units (PSU). At the same time, census enumeration blocks (CEB) are selected as primary sampling units (PSU) in urban areas within each urban sampling stratum. In the second stage of sampling, 22 households per cluster were selected using systematic sampling in the selected blocks. In Uttar Pradesh, 7,190 ever-married women aged 18-49 years were interviewed for the domestic violence module out of 93,124 women (IIPS & ICF, 2021). Questions related to their experience of any form of violence committed by their current or former husband or any family members in their lifetime were asked in the survey.

Outcome variables

In this study, the outcome variables were dichotomous taking value "1" for the presence of violence and "0" for no violence. This study included four outcome variables: IPV, physical, sexual, and emotional violence. The measurement was taken on various types of violence by asking questions from ever-married women of age 18-49 years if their husband ever did the following to them.

IPV: IPV constitutes any one or all forms of violence: physical, sexual, and emotional
Physical violence: Pushing, shaking, throwing objects at the woman, slapping, punching, hitting with a harmful object, kicking or dragging, strangling or burning, and threatening with a knife, gun, or any other weapon.
Sexual violence: Ever been physically forced into unwanted sex and physically forced to perform sexual acts, the respondent did not want to.
Emotional violence: Ever been humiliated, threatened with harm and insulted or made to feel bad.

Predictor variables

We have included the predictor variables in our study based on literature and the information on various characteristics is taken from the NFHS-5 dataset. We have included the following individual and household-level characteristics. Age (in years) is categorized as 18-24, 25-29, 30-34, 35-39, 40-44, 45-49; education level is categorized as no education, primary,

secondary, and higher; wealth quintile is categorized as lowest, second, middle, fourth and highest; women parity is categorized as 0, 1, 2, 3 and above. Further, we categorized religion into Hindu and other; place of residence as rural and urban; marital status of women as married and others; and drinking alcohol categorized as 'yes' and 'no'.

Statistical analysis

We computed the prevalence of IPV, physical violence, sexual violence, and emotional violence by districts of Uttar Pradesh. Chi-square test was used to determine significant association. Further, bivariate analysis was carried out to determine the presence of an association between each type of violence with socio-demographic factors. In addition, multivariate logistic regression was used to identify the significant factors associated with forms of violence and also estimate the odds of experiencing violence with a 95% confidence interval. Statistical significance was assumed for *p*-values less than 0.05.

Furthermore, we identified hotspot clustering using Getis-Ord Gi*. In addition, we applied Geographically Weighted Logistic Regression (GWLR) to calculate the odds of IPV, physical violence, sexual violence, and emotional violence in spatial relation with independent variables in districts of Uttar Pradesh.

The GWLR formula is as follows,

$$\log\left(\frac{p(Y_i=1)}{1-p(Y_i=1)}\right) = \beta_{0ij} + \sum_{i=1}^{k}(u_i, v_i)\, x_{ij}$$

The equation assumes x_i is experience of IPV for each individual i, x_{ij} is a set of independent variables (j=1,2,,…….k) for individual i, (u_i,v_i) is the x-y coordinates of individual i; β_{ij} is the estimated effect of independent variable j for individual i.

The GWLR model was estimated with the iterative reweighted least squares method. For modeling, a GWLR equation was estimated for each district based on the observations for nearby districts. A distance-based weighting scheme was used to calculate weights for each district. The kernel type and function for geographic weighting to estimate local coefficients for district and bandwidth size was adaptive bisquare. In the GWLR model, exponentiation of the predictor variable coefficients was ultimately calculated to acquire the odds ratio corresponding to the unit change in the variable.

We used Stata software for bivariate analysis and binary logistic regression. In addition, R software was used for generating a choropleth map of prevalence, hotspot clustering and odds ratios map obtained from MGWR analysis.

Result and Discussion

Table 1 shows the prevalence of IPV associated with demographic and socioeconomic characteristics of women. We found proportion of women who experienced IPV significantly varied by age. Illiterate women had a higher prevalence of IPV (42.34 percent) as compared with higher-educated women (24.24 percent). Women who belong to the lowest wealth quintile (45.89 percent) experienced a higher prevalence of IPV as compared with women in the highest wealth quintile (28.83 percent). It was more than double among the woman whose husband were alcoholics (62.29 percent) compared to their counterparts. Furthermore, it shows highest prevalence among women with parity three and above (42.43 percent) compared with women with parity zero (25.81 percent).

Table 1 Prevalence of various forms of violence and adjusted odds ratios by demographic and socioeconomic characteristics of ever-married women, UP, 2019-21

	Intimate Partner Violence			Physical Violence			Sexual Violence			Emotional Violence		
Predictors	n (%)	Chi Sq	aOR (CI)	n (%)	Chi Sq	aOR (CI)	n (%)	Chi Sq	aOR (CI)	n (%)	Chi Sq	aOR (CI)
Age-group		16.49*			16.10*			3.18			1.54	
18-24	371(33.83)		1.00	342(31.37)		1.00	65(5.83)		1.00	146(13.38)		1.00
25-29	563(37.31)		0.93(0.77-1.12)	506(33.47)		0.8(0.72-1.05)	107(7.07)		0.98(0.68-1.40)	207(13.24)		0.93(0.72-1.21)
30-34	587(41.87)		1.01(0.82-1.23)	540(39.23)		0.96(0.7-1.18)	98(7.29)		0.86(0.58-1.26)	192(13.10)		0.86(65-1.14)
35-39	530(38.40)		0.83(0.68-1.02)	497(35.98)		0.8(0.67-1.02)	102(6.55)		0.90(0.60-1.33)	201(14.00)		0.92(0.69-1.21)
40-44	364(38.83)		0.83(0.66-1.04)	336(35.92)		0.80(0.6-1.00)	57(5.85)		0.68(0.44-1.07)	120(12.76)		0.75(0.55-1.03)
45-49	353(37.47)		0.85(0.68-1.07)	327(34.23)		0.83(0.6-1.00)	58(6.19)		0.72(0.46-1.13)	123(13.51)		0.81(0.59-1.12)
Religion		0.50			0.71			0.24			1.09	
Hindu	2336(38.34)		1.00	2153(35.45)		1.00	413(6.73)		1.00	842(13.64)		1.00
Others	432(36.91)		1.08(0.93-1.24)	395(33.78)		1.08(0.9-1.25)	74(5.70)		1.26(0.95-1.68)	147(11.78)		1.13(0.92-1.39)
Education		98.05*			88.73*			9.89*			28.27*	
No education	1228(42.34)		1.00	1131(39.11)		1.00	216(7.62)		1.00	439(15.04)		1.00
Primary	412(43.21)		1.02(0.87-1.19)	383(40.36)		1.05(0.89-1.23)	71(7.39)		0.99(0.74-1.33)	148(15.37)		1.01(0.82-1.25)
Secondary	910(36.83)		0.89(0.78-1.02)	834(33.78)		0.91(0.80-1.00)	160(5.96)		0.94(0.73-1.21)	328(12.69)		0.93(0.77-1.12)
Higher	218(24.24)		0.62(0.51-0.77)	200(22.38)		0.66(0.54-0.80)	40(4.22)		0.84(0.55-1.28)	74(8.15)		0.71(0.52-0.97)
Wealth index		82.43*			80.47*			17.67*			33.23*	
Lowest	848(45.89)		1.00	790(42.83)		1.00	163(8.87)		1.00	313(16.89)		1.00
Second	760(38.52)		0.81(0.71-0.93)	697(35.25)		0.80(0.70-0.92)	118(6.14)		0.75(0.58-0.97)	272(13.69)		0.87(0.72-1.04)
Middle	485(37.03)		0.75(0.64-0.87)	437(33.80)		0.72(0.61-0.84)	89(6.53)		0.84(0.63-1.12)	181(13.55)		0.87(0.70-1.07)
Fourth	385(36.19)		0.8(0.67-0.96)	359(33.93)		0.82(0.68-0.98)	58(5.46)		0.72(0.51-1.03)	129(11.49)		0.84(0.68-1.07)
Highest	290(28.83)		0.62(0.5-0.76)	265(26.32)		0.61(0.50-0.76)	59(4.87)		0.85(0.57-1.27)	94(9.00)		0.69(0.51-0.94)
Place of residence		3.17			2.62			0.13			5.05*	
Urban	488(36.04)		1.00	450(33.18)		1.00	94(6.64)		1.00	159(11.97)		1.00
Rural	2280(38.77)		0.87(0.75-1.01)	2098(35.81)		0.87(0.74-1.01)	393(6.54)		0.86(0.65-1.14)	830(13.78)		1.02(0.83-1.27)
Marital status		0.01			0.09			23.44*			11.30*	
Married	2674(38.05)		1.00	2460(35.08)		1.00	452(6.25)		1.00	938(13.02)		1.00
Others	94(39.79)		0.87(0.65-1.15)	Nill			35(15.34)		2.18(1.46-3.26)	51(22.43)		1.52(1.09-2.13)
Drinking Alcohol		421.48*			428.46*			387.61*			363.76*	
No	1906(32.14)		1.00	1731(29.3)		1.00	229(3.72)		1.00	581(9.67)		1.00
Yes	862(62.29)		3.31(2.92-3.75)	817(59.01)		3.32(2.93-3.761)	258(18.07)		5.53(4.55-6.73)	408(28.22)		3.68(3.18-4.27)
Parity		85.80*			89.96*			12.11*			13.97*	
0	136(25.81)		1.00	121(23.25)		1.00	27(4.84)		1.00	62(28.22)		1.00
1	342(33.98)		1.67(1.31-2.13)	309(30.50)		1.68(1.31-2.17)	61(5.72)		1.37(0.84-2.22)	132(12.34)		1.27(0.91-1.77)
2	644(35.18)		1.7(1.34-2.16)	586(32.65)		1.75(1.37-2.24)	103(5.26)		1.22(0.76-1.96)	215(11.28)		1.09(0.79-1.52)
3 and above	1646(42.43)		2.02(1.59-2.58)	1532(39.4)		2.15(1.67-2.76)	296(7.68)		1.56(0.97-2.49)	580(14.84)		1.27(0.91-1.76)
Total number (N)	2768											

For the prevalence of physical violence, we found a higher prevalence among women aged 30-34 years (39.23 percent) as compared to women aged 18-24 years (31.37 percent) and was also found to be higher among illiterate (39.11 percent) and primarily educated women (40.36 percent), lowest wealth quintile (42.83 percent), husband drinking alcohol (59.01 percent), and parity three and above (39.40 percent).

For sexual violence, we found a higher prevalence among illiterate (7.62 percent) and primary educated women (7.39 percent) and found to be higher among women of the lowest wealth quintile (8.87 percent), currently non-marital status (15.34 percent), husband drinking alcohol (18.07 percent), and parity three and above (7.68 percent). Moreover, the prevalence of emotional violence was higher among illiterate (15.04 percent) and primary educated women (15.37 percent) as compared with higher educated women (8.15 percent) and higher among women of the lowest wealth quintile (16.89 percent). Besides, we found higher prevalence among women resided in rural areas (13.78 percent), currently non-marital status (22.43 percent), woman whose husband drink alcohol (28.22 percent), and women with zero parity (14.84 percent).

Table 1 also shows the result of binary logistic regression. This study shows women who completed higher education were associated with 38 percent less odds of experiencing IPV (aOR = 0.62, 95%CI = 0.51–0.77) than illiterate women. Besides, we found women from the highest wealth quintile were 38 percent less likely (aOR = 0.62, 95%CI = 0.50–0.76) to experience IPV than the women in the poorest wealth quintile. Among behavioral factors, it was observed that the women whose husbands were alcoholic had 3.31 times higher odds (aOR =3.31, 95%CI = 2.92–3.75) of IPV than the woman whose husband did not drink alcohol. In addition, parity was also associated with IPV, women whose parity was three and above had two times more likelihood (aOR =2.02, 95%CI = 1.59–2.58) of experiencing IPV as compared with women who had no children.

Furthermore, women who completed higher education were associated with 34 percent less odds of experiencing physical violence (aOR = 0.66, 95%CI = 0.54–0.80) than illiterate women. Besides, we found women from the highest wealth quintile were 39 percent less likely (aOR = 0.61, 95%CI = 0.50–0.76) to experience IPV than the women in the poorest wealth quintile. Besides, women whose husbands were alcoholic had 3.32 times higher odds (aOR =3.32, 95%CI = 2.93–3.76) of physical violence than the woman whose husband did not drink alcohol. In addition, women's parity was also associated with physical violence, women with parity three and above had 2 times more likelihood (aOR =2.15, 95%CI = 1.67–2.76) of experiencing physical violence as compared with women who had no children.

For sexual violence, women whose husbands were alcoholic had 5.53 times higher odds (aOR =5.53, 95%CI = 4.52–6.73) of sexual violence than the woman whose husband did not drink alcohol. In addition, the odds of sexual violence were higher among non-currently married women (aOR =2.18, 95%CI = 1.46–3.26). Moreover, women whose husband were alcoholic had 3.68 times higher odds (aOR =3.68, 95%CI = 3.18–4.27) of emotional violence than the women whose husbands did not drink alcohol. In addition, the odds of emotional violence

were higher among currently non-married women (aOR =1.52, 95%CI = 1.09–2.13).

Prevalence of different types of violence by districts

Fig 1.a shows a higher prevalence of IPV in Budaun, Etawah, Etah, Farrukhabad, Gautam Budha Nagar, Kasganj, and Mathura. Looking at Fig 1.b, we found a higher prevalence of physical violence in Agra, Bareilly, Etawah, Farrukhabad, Greater Noida, Gazipur, Mathura, Sonbhadra, and Varanasi. Further, fig 1.c shows a higher prevalence of sexual violence in Agra, Barabanki, Etawah, Farukhabad, Hapur, and Kannuj. Besides, Fig 1.d shows a higher prevalence of emotional violence in Agra, Amethi, Etawah, Farukhabad, Greater Noida, Hapur, Hardoi, Lucknow, Mathura, and Raebareli.

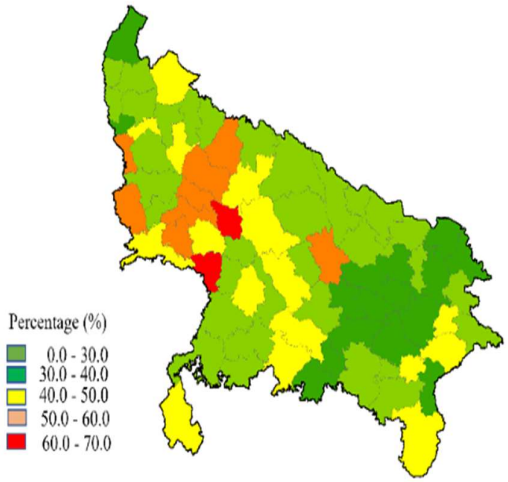

Fig 1.a Prevalence of IPV

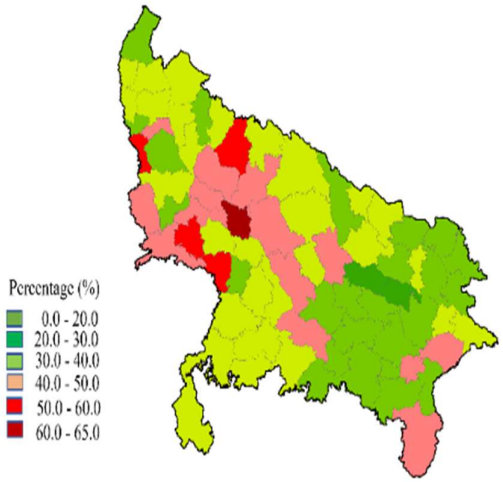

Fig 1.b Prevalence of physical violence

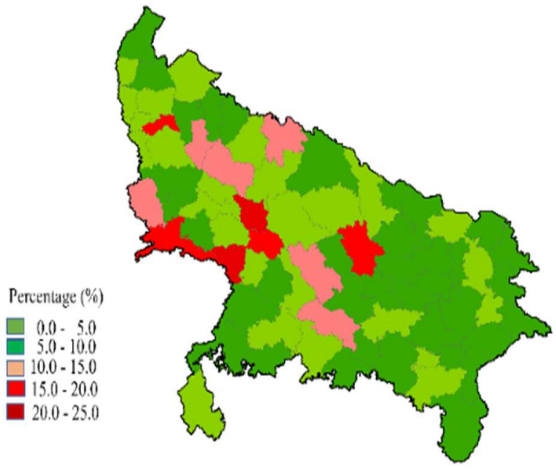

Fig 1.c Prevalence of sexual violence

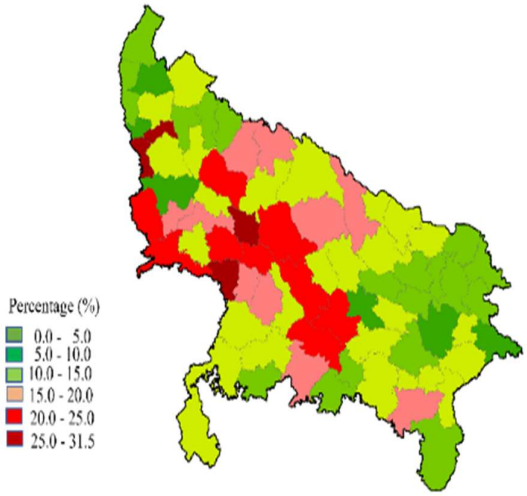

Fig 1.d Prevalence of emotional violence

Figure 1 Prevalence of IPV, physical violence, sexual violence and emotional violence among ever-married women by districts, Uttar Pradesh, 2019-21

Results of hotspot clustering

Fig 2.a shows the hotspot clustering of IPV in Akbarpur, Amroha, Auraiya, Chandauli, Deoria, Fatehpur, Ghazipur, Gyanpur, Jhansi, Mirzapur and Varanasi. Besides, fig 2.b shows hotspot clustering of physical violence in Barabanki, Bareilly, Budaun, Chandauli, Etah, Etawah, Ghazipur, and Mainpuri. Fig 2.c shows hotspots clustering of sexual violence in Agra, Barabanki, Etawah, Firozabad, Farrukhabad, Hapur, Kannauj, Mainpuri, Mathura, and Unnao. In addition, fig 2.d shows hotspot clustering of emotional violence in Amroha, Etawah, Hapur, Mainpuri, Kannauj, Farukhabad and Unnao.

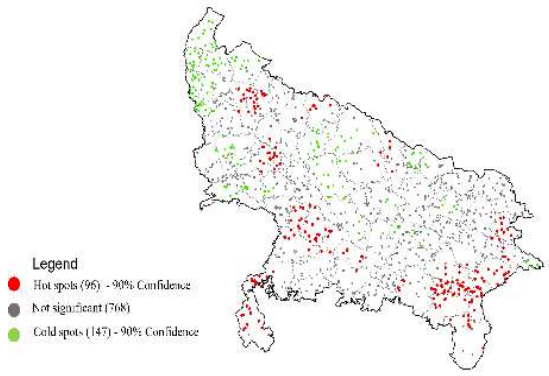

Fig 2.a Hotspots clustering of IPV

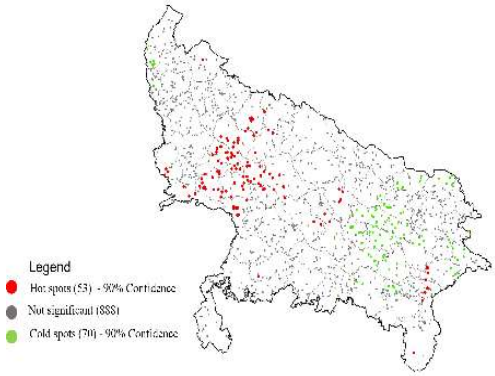

Fig 2.b Hotspots clustering of physical violence

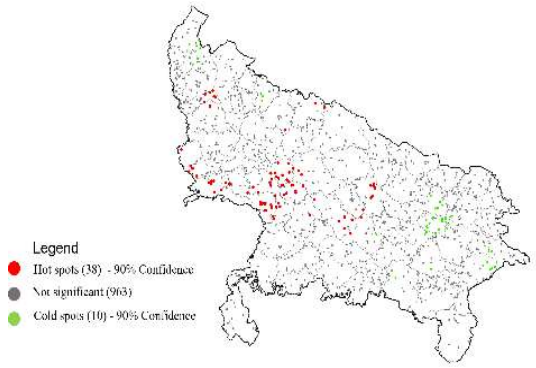

Fig 2.c Hotspots clustering of sexual violence

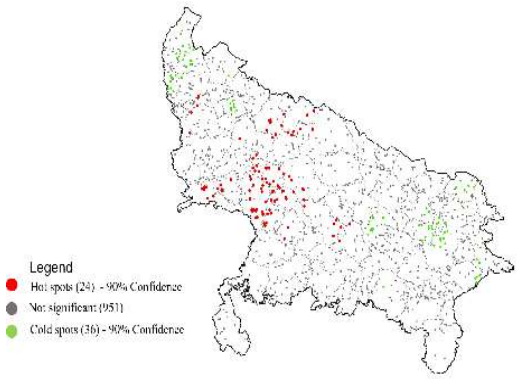

Fig 2.d Hotspots clustering of emotional violence

Figure 2 Hotspots clustering of IPV, physical violence, sexual violence and emotional violence among ever- married women by districts, Uttar Pradesh, 2019-21

Results of GWLR analysis

Fig 3.a shows a higher odds of IPV in spatial relation with illiterate women in a few districts of the western region of Uttar Pradesh (Hardoi, Shahjahanpur, Moradabad, Rampur, Mau, and Balia). Besides, we found women of the poorest household appears to have a higher likelihood of experiencing IPV in Ambedkar, Lalitpur, Khalilabad and Mahoba (Fig 3.b). Furthermore, we found higher odds of IPV among woman whose husband are alcoholics in eastern and western regions of Uttar Pradesh (Fig 3. c). We found higher odds of IPV among women with three or more parity in the western region of Uttar Pradesh (Fig 3.d).

For physical violence, we found illiterate women appear to have a higher likelihood of physical violence in Akbarpur, Chandauli, Deoria, Etah, Fatehpur, Farrukhabad, Firojabad, Hardoi, Hathras, Lakhimpur, Mathura, Meerut, Shami, Shahjahanpur and Robertsganj (4.a). Besides, this study showed higher odds of physical violence among women of the lowest wealth quintile in Auraiya, Bareilly, Farrukhabad, and Jhansi (Fig 4. b). In addition, we found higher odds of physical violence among women in association with women's husband alcohol drinking in the western and lower eastern region of Uttar Pradesh (4.c). Fig 4.d shows women of parity three and above appear to be have a higher likelihood of experiencing physical violence in Akbarpur, Jhansi, Mainpuri, Robertsganj, and north-western region of Uttar Pradesh

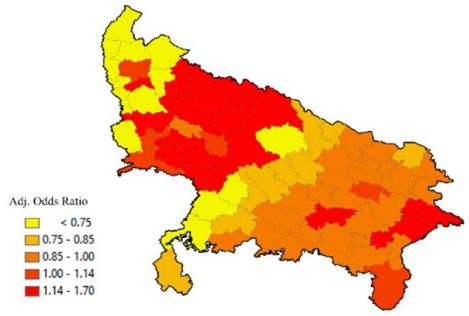

Fig 3.a Adjusted odds ratio of IPV among illiterate women

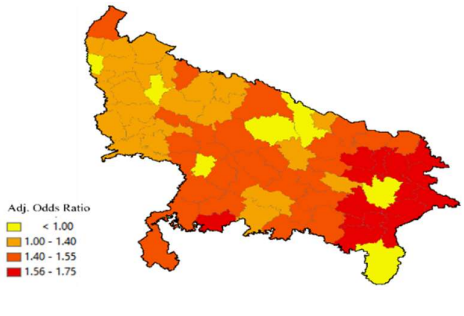

Fig 3.b Adjusted odds ratio of IPV among poorest women

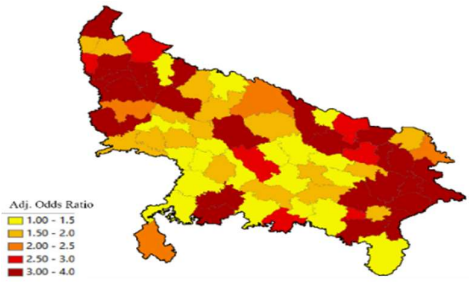

Fig 3.c Adjusted odds ratio of IPV among women whose husband drink

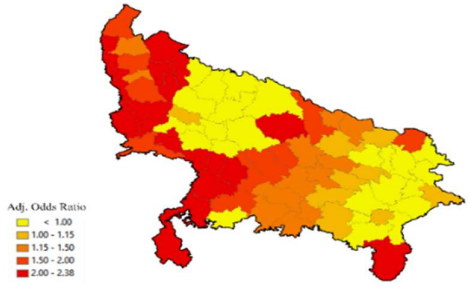

Fig 3.d Adjusted odds ratio of IPV among women with three and above parity

Figure 3 Adjusted Odds ratio of IPV by four explanatory variables by districts, Uttar Pradesh, 2019-21

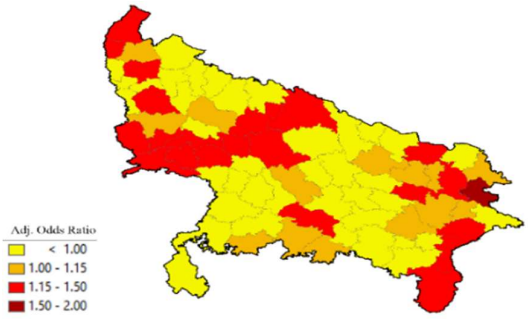

Fig 4.a Adjusted odds ratio of physical violence among illiterate women

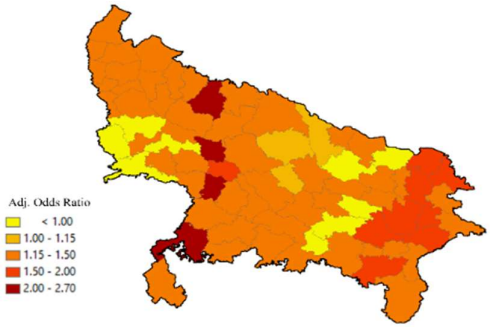

Fig 4.b Adjusted odds ratio of physical violence among poorest women

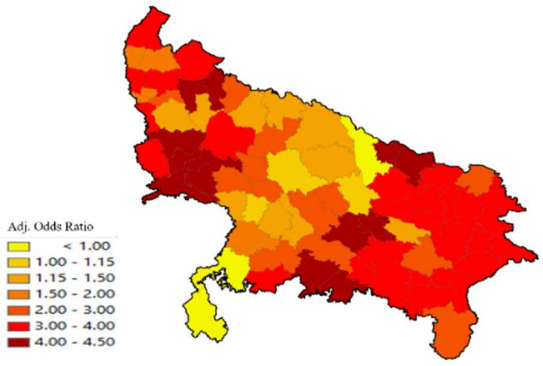

Fig 4.c Adjusted odds ratio of physical violence among woman whose husband drink alcohol

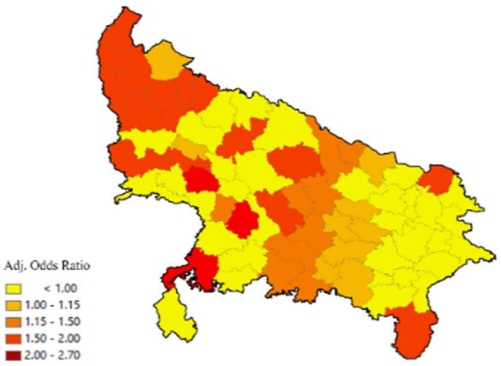

Fig 4.d Adjusted odds ratio of physical violence among women with three and above parity

Figure 4 Adjusted odds ratio of physical violence by four explanatory variables by districts, Uttar Pradesh, 2019-21

Moreover, fig 5.a shows the likelihood of sexual violence appears to be higher among illiterate women in Auraiya, Azamgarh, Balia, Banda, Jaunpur, Jhansi, Kannauj, Manjhanpur, and northern region of Uttar Pradesh. Besides, we found higher odds of sexual violence among women of the poorest wealth quintile in Akbarpur, Barabanki, Bahraich, Basti, Faizabad, Gonda, Khalilabad, Maharajganj, Lucknow and Sitapur (Fig 5.b). Besides, fig 5.c shows woman whose husband drink alcohol appear to have a higher likelihood of experiencing sexual violence in the western, northern, and southern region of Uttar Pradesh and a few districts of the eastern region of Uttar Pradesh. And also found higher odds of sexual violence among women with three and above parity in a few districts of western, southern, and eastern regions of Uttar Pradesh (Fig 5.d).

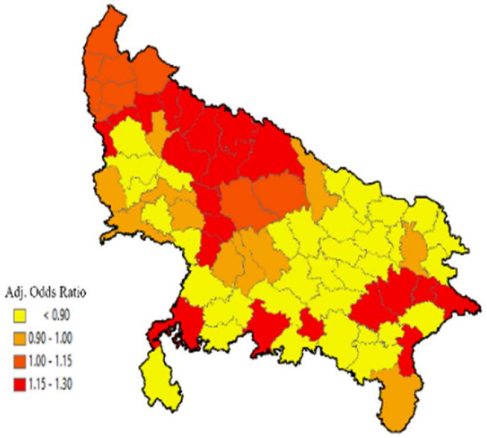

Fig 5.a Adjusted odds ratio of sexual violence among illiterate women

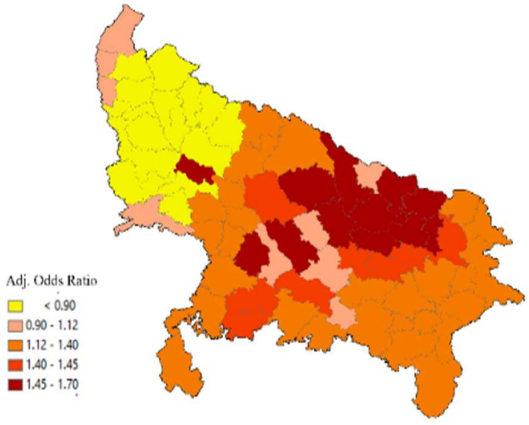

Fig 5.b Adjusted odds ratio of sexual violence among poorest women

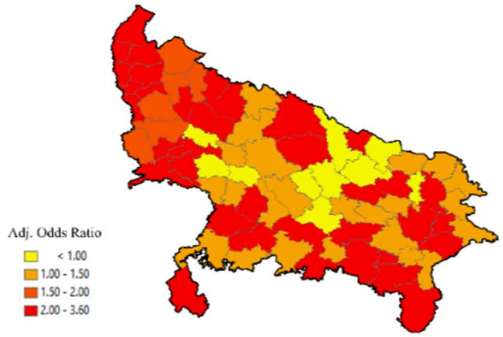

Fig 5.c Adjusted odds ratio of sexual violence among woman whose husband drink

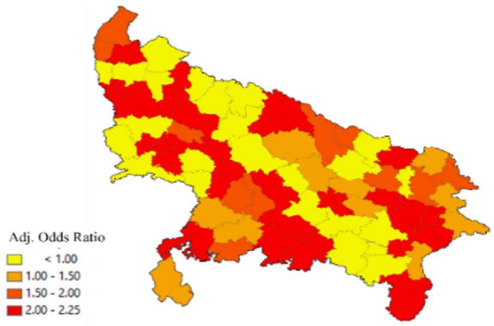

Fig 5.d Adjusted odds ratio of sexual violence among women with three and above parity

Figure 5 Adjusted odds ratio of sexual violence by four explanatory variables by districts, Uttar Pradesh, 2019-21

Fig 6.a shows odds of emotional violence were found higher among illiterate women in Amethi, Chaundauli, Fathepur, Sitapur, and Rae Bareilly. Besides, this study showed higher odds of emotional violence among women of the poorest wealth quintile in most districts of Uttar Pradesh (Fig 6.b). In addition, this study shows higher odds of sexual violence among woman whose husband drink alcohol in Akbarpur, Balarampur, Bareilly, Budaun, Etah, Faizabad, Gonda, Jhansi, Orai and lower eastern region of Uttar Pradesh (Fig 6.c). This study also shows women of parity three and above appear to be have a higher likelihood of experiencing emotional violence in north, west, central, and western-southern region of Uttar Pradesh (Fig 6.d).

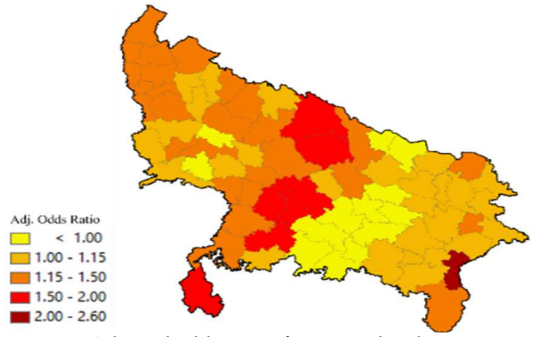

Fig 6.a Adjusted odds ratio of emotional violence among illiterate women

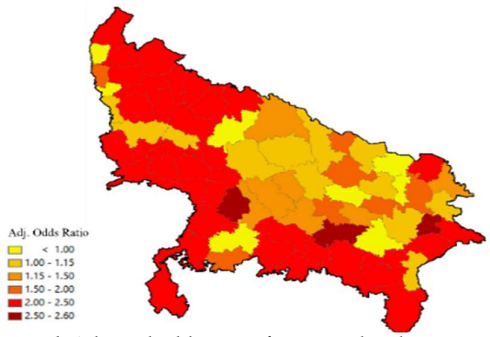

Fig 6.b Adjusted odds ratio of emotional violence among poorest women

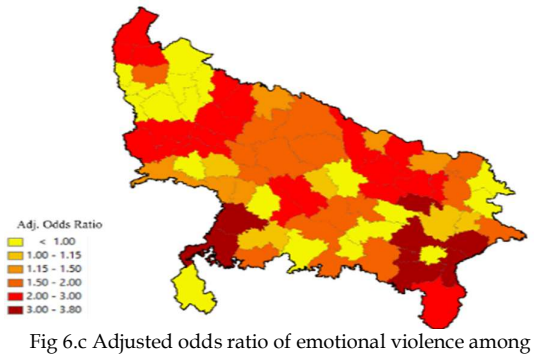

Fig 6.c Adjusted odds ratio of emotional violence among woman whose husband drink

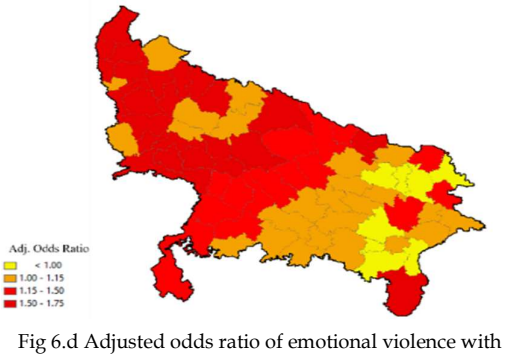

Fig 6.d Adjusted odds ratio of emotional violence with three and above parity

Figure 6 Adjusted odds ratio of emotional violence by four explanatory variables by districts, Uttar Pradesh, 2019-21

Discussion

Social integration and strain theory predicted that socioeconomic contributed to the high risk of IPV as well (Andersson et al., 2007; D'Alessio & Stolzenberg, 2010); the findings of the study strongly support the theory using a fifth round of NFHS data. This study showed demographic and socioeconomic inequalities are the root cause of IPV, physical violence, sexual violence, and emotional violence in Uttar Pradesh. We found the prevalence of IPV varied by districts: Faizabad (21.40%), Sultanpur (21.58%), Gautam Buddha Nagar (59.81%), Farrukhabad (66.06%). For physical violence, the prevalence of physical violence varied from Jaunpur (18.53%) to Farrukabad (63.64). We also observed higher variation in the prevalence of sexual violence in districts (from Sant Kabir Nagar (1.59%) to Etawah (20.67%). Besides, the prevalence of emotional violence varied from Saharanpur (3.84%) to Gautam Buddha Nagar (29.96%). Literature showed prevalence of forms of violence vary by geographical region in India (Mog et al., 2023).

We found prevalence of IPV, physical violence, sexual violence, and emotional violence vary by women's age. A previous study based on Maharashtra showed prevalence of IPV was lower among the younger women (Jungari & Chinchore, 2022), which could be due to gender hierarchy and roles. A young married woman entering a new household generally belongs to the lowest hierarchy in a new family (Kapadia-Kundu et al., 2007). This study also showed prevalence of IPV varies by religion, which is consistent with the findings of another study (Jungari & Chinchore, 2022).

Furthermore, this study showed hotspots clustering of IPV in districts of Akbarpur, Amroha, Mirzapur, and Varanasi. These findings are justified by our univariate analysis where the prevalence of IPV was also higher in above mentioned districts. A previous study also showed a higher prevalence of IPV, physical violence, sexual violence, and emotional violence in Uttar Pradesh (Mog et al., 2023). Furthermore, GWLR showed four significantly associated predictor variables: illiterate educational status of women, women of lowest wealth quintile, woman whose husband drinks alcohol, and women with parity three and above were significant and spatially related to IPV, physical violence, sexual violence, and emotional violence in Uttar Pradesh. Previous studies documented that education plays a crucial role in association with IPV, as it generates employment opportunities and creates positive behavior, which lowers the risk of wife beating, awareness, and women's rights (Chandra et al., 2023; Jahromi et al., 2016). Similar to their findings, these studies also showed higher prevalence and odds of IPV, physical violence, sexual violence, and emotional violence. Other studies also highlighted increase in the education level of women leads to lower domestic violence (Raj et al., 2018, Dalal et al., 2012; Rani & Banu et al., 2009). Further, the lower economic status of women is a root cause of economic stress, and conflict which is directly associated with marital relationships (Parke et al., 2004; Thompson et al., 2006); we found that women of the poorest wealth quintile showed higher odds of IPV and other forms of domestic violence. Our finding showed that there are less odds of IPV in currently married women as compared with divorced and separated women, which is parallel to the finding of another study (Haobijam & Singh, 2022). Alcohol consumption by the husband

increases the likelihood of IPV. Frequent consumption of alcohol elevates aggressiveness causing tensity and financial difficulties which could lead to conflicts within the family and spoil the marital relationship (Chang et al., 2022; Leonard, 2005). This study's findings show that prevalence and odds of experiencing IPV, physical violence, sexual violence, and emotional violence were higher among women when their husband drink alcohol (Chaurasiya et al., 2018; Mog et al., 2023). Moreover, this study highlights women having higher parity showed a higher likelihood of IPV, physical violence, sexual violence, and emotional violence than the women with lower parity. Previous findings also show similar results (Haobijam & Singh, 2022).

Strength and limitations

Our study has some limitations. We worked on the NFHS-5 dataset which is cross sectional survey; there might be a chance of causality between socio-demographic determinants and IPV. During the data collection, recall bias might be included in the study. Besides, it is not necessary that the correct information is provided by women, owing to fear of partners, family members, and social disgrace. There may be under-reporting of IPV, physical violence, sexual violence, and emotional violence. One of the strengths of this study was that it is based on nationally representative data of ever-married women. Therefore, the findings could be generalizable for the whole region of Uttar Pradesh.

Conclusion

The findings of this study show that higher education and higher economic status among women are potential covariates to minimize IPV. In addition, we found alcohol consumption by husband and higher parity of women are risk factors for spousal violence. We suggest that the government and non-profit organization should provide better opportunities for girls' education and generate employment opportunities to engage eligible men and women in economic activities. Moreover, strict policy implementation on the sale of alcohol could lower the prevalence of IPV, and physical violence, sexual violence, and emotional violence in Uttar Pradesh.

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