

Crimes Against Women in India: A District-Level Analysis (1991–2011)

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Abstract

Crimes against women (CAW) in India have been rising despite faster economic growth, higher education attainment, and increasing numbers of women in the economic sphere. This article explores the reasons for the incidence of reported CAW in India. We study five CAW (rape, kidnapping, cruelty, dowry deaths, and molestation), across 35 states and union territories, 594 districts, over three decades (1991–2011). We use panel fixed-effects regression models to explain crime. Our results confirm the importance of female literacy rates, female paid workforce participation, and female–male ratio in understanding crime. We find that these commonly-used socioeconomic variables have nonlinear effects on CAW. Our findings improve upon earlier results that have not explored either spatial distribution or nonlinearity in India. These findings could have significant implications for the policies aiming to reduce CAW.

Keywords

crimes against women, backlash hypothesis, spatial distribution, women's empowerment, panel fixed effects

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The issue of crimes against women (CAW) is an international concern. The United Nations (UN) Agenda 2030 has 17 Sustainable Development Goals (SDGs) and commits the member states of the UN to fulfill them by 2030. CAW is explicitly spelt out in Goal 5, which is aimed at achieving gender equality and empowering all women and girls. However, ending CAW is a requirement for the achievement of several other SDGs such as improving health and well-being (Goal 3), recognizing the importance of human rights (Goal 5), providing equal opportunity (Goal 8), building safe, peaceful, and inclusive societies (Goals 11 and 16), and reducing all forms of inequality (Goal 10).

CAW has been a principal concern for feminist movements worldwide, particularly during and after the 1960s (Hall, 2015; Molony & Nelson, 2017). Earlier work on CAW has tried to understand the impacts of (a) violence on the victim, families, and the community (Garcia-Moreno & Riecher-Rössler, 2013); (b) support groups for victims and other curative intervention (Renzetti et al., 2018); and (c) legal reform (Goonesekere, 2004; Richards & Haglund, 2015; UN, 2010) among other factors. Yet some questions remain unanswered owing to the complexities of CAW. The law differentiates between CAW in the private (domestic violence) and public spheres, but this public–private dichotomy has been critiqued in feminist scholarship on violence (Goldfarb, 2000). It has been argued that the very reasons which cause in-house CAW are also the causes of out-of-house CAW (Bhattacharyya, 2015) and power relations transcend such spatial divisions (Datta, 2016).

Factors that affect CAW have additional dimensions in developing countries which have large proportions of poor and marginalized groups. It would, therefore, be of interest to understand the challenge for a country like India. It is home to the largest population of people living in poverty in the world (Sumner, 2012), and where female literacy, female paid workforce participation, and the Human Development Index are much lower than the world averages (Drèze & Sen, 2002, 2012).

Background

In December, 2012, one of the most heinous incidents of gang rape, referred to as the Nirbhaya case, took place in Delhi, the capital city of India (Rana, 2020). The victim, aged 23, who did not survive the attack, was an educated woman traveling on a bus, down a crowded street, with a male companion. Her six assailants hailed from economically deprived sections of society. This case received much media attention which then resulted in wide condemnation and public anger against CAW. After the Nirbhaya case, laws governing rape were amended and made more stringent following the

recommendations of the Justice Verma et al. (2013) report. The Criminal Law (Amendment) Act of 2013 aimed to lower the incidence of CAW in the country. Data from National Crimes Records Bureau (NCRB) in India, however, reveal that reported CAW in India has been on the rise over time (Ansari et al., 2015; McDougal et al., 2018; Verma et al., 2019).

We must note that the rise in reported crime is not necessarily an accurate representation of the actual incidence of CAW. It is well recognized that one of the major challenges faced in CAW has been “under-recording by state agencies and under-reporting by women survivors” (Pickup et al., 2001, p. 109). In India, too, it is known that reported crime is lower than the actual incidence (Prasad, 2013; Visaria, 2000).

Research to understand the causes of CAW have focused on multiple aspects: from individual factors such as behavior, mental status, and education of offenders (Chibber et al., 2012; Kumar, 2005; Martin et al., 2006), women’s vulnerability to victimization (Englander, 2017), age at marriage (Sharma, 2015), to dyadic, institutional, and social linkages to violence (Ahmad et al., 2019), including family size and income status (Babu & Kar, 2010; Jeyaseelan et al., 2007; Koenig et al., 2006). CAW has also been linked to women’s empowerment, challenges to stereotypes and changing roles (Rudman et al., 2012). This has been described as the “backlash hypothesis” where men, on being challenged in the economic, political or sociocultural arenas by empowered women, tend to commit CAW (Russell, 1975). It includes counterreactions and patriarchal responses to the dress choices of empowered women (Beiner, 2007; Lahiri & Bandyopadhyay, 2012) and the increased presence of women in public places (Phadke, 2007), including paid employment (True, 2012). Others believe that this increase in CAW is a “transitory” phase (Simister & Mehta, 2010) and as society evolves and traditional hierarchies break down, CAW will reduce.

The evidence connecting women’s empowerment to increasing CAW is not unanimous. Some argue that the link between women’s economic independence and domestic violence is not significant (Ahmad et al., 2019), while others suggest that economic empowerment of women reduces the likelihood of domestic violence (Donta et al., 2016). This fits in with the expectation of the Marxist and ameliorative hypotheses which predict less CAW when there is greater gender equality and higher women’s economic achievement (Martin et al., 2006; Schwendinger & Schwendinger, 1983; World Health Organization, 2012). In a similar vein, an inverse relationship has been found between CAW (dowry deaths in particular) and social change associated with transforming gender roles (Hackett, 2011). Others have found that both development indicators and legal provisions are considered important in reducing CAW in India (Drèze & Khera, 2000).

To reduce CAW, researchers have advocated increasing female literacy (Rani & Bonu, 2009), recognizing it as a public health problem (Chrisler & Ferguson, 2006; Heise et al., 1994), controlling alcohol consumption (Sharma, 2015), creating an enabling environment for women's access to justice, legally empowering women (Cornwall & Rivas, 2015), enabling social gender sensitization (Ahmad et al., 2019), and addressing attitudes towards gender differences (Rodriguez et al., 2019), among other interventions.

There have been several policy initiatives undertaken by the Government of India (GoI) to reduce gender gaps, empower women, bring about gender equity, and eliminate all forms of discrimination against women (GoI, 1974, 1988, 2001; UN, 1993). These have targeted promotion of female literacy, making the law more stringent (Section 498 A of Indian Penal Code [IPC] in 1983, Protection of Women from Domestic Violence Act 2005, Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) [POSH] Act 2013, Criminal Law (Amendment) Act 2013, and women's participation in social, economic, and political life (GoI, 2001). Despite multi-pronged initiatives, the jury is still out on the reasons for the continuing rise in CAW. It is particularly intriguing because this rise has occurred during a period when per capita incomes (Karnik & Lalvani, 2012; Loyalakar & Mukhopadhyay, 2017), educational outcomes, and developmental indicators (Deaton & Kozel, 2005; Kohli, 2007) have systematically improved across the country, leaving contradictions regarding the relationship between these economic transitions and increasing CAW.

This article aims to understand the impact of women's educational, economic, and social empowerment on CAW. We use female literacy as an indicator of educational empowerment, the participation of women in the paid workforce to represent economic empowerment, and the female-male ratio (FMR) as an indicator of social norms and women's position in society (Croll, 2001; Klasen & Wink, 2003; Sen, 1992).

The motivation for this study is to explain the puzzle that CAW has increased during a period when most empowerment indicators for women have improved in India. The expectation is that the opposite should have happened—that CAW should have decreased with women's empowerment. This has led us to the specific research question: How do female literacy, female paid workforce participation, and the FMR impact five CAW, namely rape, kidnap, dowry, molestation, and cruelty?

We address this question using data from India along with a formal model to predict CAW. The study spans the three decades of 1991–2011, across all districts in India (and therefore all states and union territories). In the next section, we present the materials and methods used in this study, followed by

the sections on the results and analyses. The article concludes with a discussion of our findings and their relevance to policy.

Materials and Methods

Researchers have considered multiple empirical strategies to understand CAW. Dhawan and Deepika (2018) used the hierarchical and K-means clustering techniques. They examined the relationship between crime rates and socioeconomic variables such as poverty rate, per capita income, literacy rate, and the human development ranking of the states across India. Regression methods with dependent categorical variables (Ahmad et al., 2019; Dalal & Lindqvist, 2012) and multivariate regressions have been used (Hackett, 2011). Maity (2019) applied the stochastic frontier analysis to evaluate relative efficiencies of the Indian states in controlling sexual assault or rape for two decadal periods (2001 and 2011).

We contribute to the empirical strategies in CAW research by using a regression-based approach. In regression analysis, it is common to estimate an ordinary least squares (OLS) model to examine the impact of certain variables on the dependent variable. The OLS models, however, are known to suffer from certain drawbacks such as the inability to deal with unobserved variables and spatial variation (Wooldridge, 2018). The panel data models are able to overcome these problems. As compared to the OLS, the panel models are more informative, and contain more variations and less collinearity among the variables (Hsiao, 2014). There is greater availability of degrees of freedom with panel data and this, as a result, increases efficiency in the estimation. Such models also allow for the specification of more complicated behavioral hypotheses, including effects that cannot be addressed using pure cross-sectional or time-series models. Since the same units are being observed across time periods, pooling is not a preferred strategy. We, therefore, propose a panel data model which tracks the same variables over a period of time for each unit of observation. We had to choose between the random effects model and the fixed effects model. The Hausman test helped us choose between these two options. The chi-square test for four of the CAW (rape, kidnap, cruelty, and dowry) rejected the null hypothesis of the difference in coefficients not being systematic. Therefore, the fixed-effects model was preferred to the random effects model for our analysis. We then set up the panel data model with district-level fixed effects (see equations 1 and 2).

Taking a cue from the received literature as discussed earlier, we use the following factors to predict CAW: educational attainment of the population (measured by female literacy rate [FLIT]), relative status of women in society (measured by FMR and FMR_child), and economic independence (measured by include female paid workforce participation rate [FWP]). In much

of the regression-based literature, the impact of these factors has been used for measuring linear relationship overlooking the possibility of nonlinearities. We improve upon the existing models by incorporating measures of nonlinearity by including the squared value of FMR and FWP.

The relational model we use is as stated in the following equations:

Crime = f (educational attainment, relative status of women in society, economic independence) ... (1)

The specific empirical model that incorporates the panel data fixed effects is as follows:

$$Y_{it} = \alpha_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \beta_6 X_{6it} + \varepsilon_{it} \quad (2)$$

where

Y_{it} = CAW

α_i = entity-specific intercept

X_1 = female literacy

X_2 = square of female literacy

X_3 = female paid workforce participation

X_4 = square of female paid workforce participation

X_5 = FMR

X_6 = child FMR (age group 0–6 years)

e_{it} = stochastic error

t = time (relevant year)

The regression estimates presented further were obtained by using the “areg” command in Stata 15.1 with robust (standard errors) option to control for heteroskedasticity (<https://www.stata.com/manuals13/rareg.pdf>). The “absorb” option allows for fixed effects with districts as units of observation. It is better suited for this type of fixed-effects analysis in comparison to “xtreg(fe)” command as per the Stata manual. We discuss next the data used for our study.

Data

Empirical contributions in India have used different data sources which include field studies as well as secondary data sources (Kalokhe et al., 2017). The local and regional surveys (e.g., Babu & Kar, 2010; Rao, 1997; Visaria, 2000) are limited by having a smaller number of observations for analysis and lower heterogeneity in the sample. Conclusions drawn from such studies are relevant largely to the sample of these studies and cannot be extrapolated to a larger spatial domain. National level surveys like the National Family Health Survey (NFHS) overcome the regional limitation but pose other challenges (Ahmad et

al., 2019). In the latest three rounds of NFHS, questions on CAW were included in the surveys (International Institute for Population Sciences [IIPS] & ICF, 2017; IIPS & ORC Macro, 2002, 2007). However, since the questions on CAW differed in each round as did the households interviewed, it limits the possibility of a longitudinal analysis of CAW using this data.

We use a nationwide database from the NCRB (<https://ncrb.gov.in/en/crime-india>) that overcomes the problems of sample-based studies. The NCRB was established in 1986 and is the repository for crime data from all over India. We use the database, Crime in India (GoI, 1991–2011) for our study which collects crime data from 36 states, union territories, and mega-cities (cities with a population of 1 million or more, as per the 2011 Census). The NCRB receives its information from the different State Crime Records Bureaux who in turn receive data from the District Crime Records Bureaux at the end of every calendar year. The annual report contains comprehensive statistical information on the number of cognizable crimes. In this database, the CAW is broadly classified by the NCRB under two broad heads: (a) Crimes under the IPC and (b) Crimes under Special and Local Laws. Crimes under the IPC include Rape (Sec 376, IPC), Kidnapping and Abduction (Sec 363–373, IPC), Dowry Deaths (Sec 304-B, IPC), Physical and Mental Torture (Sec 498, IPC), Molestation (Sec 354, IPC), Sexual Harassment (Sec 509, IPC), and Importation of Girls (Sec 366-B, IPC). The crime rate in the database is presented as a ratio of reported CAW per 100,000 female population. Several scholars have used the NCRB data in their analysis (e.g., Ahmad et al., 2019; Ansari et al., 2015; Hackett, 2011; Mukherjee et al., 2001; Prasad, 2013). The advantage of this database is that it provides complete enumeration of CAW in India every year and therefore overcomes the problems that sample surveys encounter.

We have chosen five CAW under IPC which constitute the majority of the CAW in the NCRB database, that is, “Rape”, “Kidnapping and Abduction of Women” (henceforth “kidnap”), “Dowry deaths” (henceforth “dowry”), “Molestation” (henceforth “molest”) and “Cruelty by Husband or his relatives” (henceforth “cruelty”). We also examined the data on “Sexual Harassment” initially, but we did not proceed in detail as we anticipate non-comparability of reported crime before and after the POSH Act 2013. After this Act, all places of work are required to have a mechanism by which a victim can seek redressal at the workplace without having to go to the police. There is a strong likelihood that many cases do not get reported to the police after the Act and, therefore, longitudinal data on sexual harassment are non-comparable. The NCRB follows the “Principle Offense Rule” while recording crime. This implies that when a case has multiple counts of offense, only the most “heinous crime (maximum punishment)” is recorded in order to avoid double counting (NCRB, 2018).

We combined the NCRB data with socioeconomic data from the decadal surveys of the Census of India (<http://censusindia.gov.in/>). The Indian Census conducted every decade provides comprehensive statistical information on different socioeconomic characteristics of the people of India. We considered the latest three decadal rounds (1991, 2001, and 2011) for our analysis. There are a number of characteristics at the individual, household, village, district, and state levels for which the Census reports provide information. We have chosen to test the frequently-used explanators of CAW. These include FWP (number of women in the paid workforce per 100 women; Tayal, 2014), FMR (number of females per 1,000 males; Vicente et al., 2020), female literacy rate (FLIT—number of females who are literate per 100 females; Deyessa et al., 2010), and the proportion of rural population in the district (rural; Amaral et al., 2014; Little et al., 2005).

Since the crime data as well as socioeconomic data from Census reports are available for select cities, all districts and all states, we have chosen the district as the unit of our analysis. There are a number of reasons for choosing the district. First, it is the lowest geographical unit which covers both rural and urban segments, and has both crime data (from the NCRB) as well socioeconomic data (from the Census). Second, there is a greater homogeneity within the districts than at the state level. Third, the districts are large in number and dispersed in terms of characteristics to provide reasonable heterogeneity with a large state for statistical analysis. Fourth, they provide a complete coverage of the country and thereby avoid the problem of selection bias.

We have considered information on CAW for the years 1991, 2001, and 2011 in order to make it period compatible with the socioeconomic data from the Census. After extracting the relevant variables from these two sources, we merged the three rounds of Census data at the district level with the crime data for the relevant years for the corresponding districts. In order to visualize the spatial spread of CAW we used shapefiles from Github repositories shared under the Creative Commons license (Github, 2014). CAW is measured per 100,000 female population. The data on two CAW (rape and kidnap) are available from 1991 onwards and for the other CAW (dowry, cruelty, and molest) from 2001 onwards. In the next section we discuss our results.

Results

The descriptive statistics are presented in Table 1. Rape and kidnap show a maximum of 22.2 and 19.8 respectively, with an average of 3.8 for both. Dowry cases reported were a maximum of 20 and an average of 1.5. The highest rate of molest was 54, with an average of 7.8. Among all the CAW considered, cruelty was the highest with a maximum of 85, and an average of 10.8.

Table 1. Descriptive Statistics*.

S no	Unit of Measurement	Obs	Mean	SD	Min	Max
1	Female–male ratio (FMR)	1,752	937.7	60.71	534	1205
2	Child female–male ratio (FMR_child)	1,752	933.6	43.1	766.3	1036
3	Female literacy rate (FLIT)	1,752	43.4	17.1	6.1	88.6
4	Female paid workforce participation (FWP)	1,752	12.3	6.25	0.5	29.5
5	Rape	1,752	3.8	3.74	0	22.2
6	Kidnapping	1,752	3.8	3.77	0	19.8
7	Dowry deaths	1,166	1.5	2.07	0	20
8	Molestation	1,166	7.8	8.36	0	56.2
9	Sexual harassment	1,166	1.5	4.34	0	11.2
10	Cruelty	1,166	10.7	11.4	0	77.2
11	Year				1991	2011

Source. NCRB and Census of India (Multiple years).

Note. *The cases of rape exclude one observation which is an extreme high value (outlier). This is the observation pertaining to district Upper Dibang Valley in Arunachal Pradesh state where the number of rapes was 83 (per 100,000 female population) followed by the next highest value of 22.2. While the high number of cases in this case is of great social concern, we exclude this observation to avoid distortion of averages due to outlier values. Similarly, the highest reported value of cruelty is 85 reported in Murshidabad of West Bengal (per 100,000 female population). This is followed by 77.25. We have dropped the outlier from our analysis. The data on molestation has three outliers with values greater than 57 (per 100,000 female population). These three districts are Angul, Jharsuguda, and Sambalpur in Odisha. We have also dropped these from our analysis. The data on dowry deaths have four outliers. These include three districts from Odisha (Angul, Jharsuguda, and Sambalpur) and one from Punjab (Bhatinda). On similar lines we examined the outliers for kidnap year-wise. We used all values less than 20 (per 100,000 female population) for the years 2011 and 1991, and below 40 for 2001.

We now discuss the covariates impacting CAW. FWP was only 12.3% with a maximum of 29.5% and a minimum of 1%. The low recorded FWP has been a matter of debate as this represents participation of women only in the paid workforce but leaves out a majority of women whose labor is unpaid (Hirway & Jose, 2011; Lahoti & Swaminathan, 2016). FMR (which is number of females per 1,000 males) is considered a critical variable indicating women's social empowerment (UN Women, 2014). It has been skewed towards men in India, with an average of 937.9, varying between a maximum of 1205 and a minimum of 534. The time trend has indicated a worsening of FMR which is likely to continue in the near future as evidenced from the lower FMR_child. With regard to the FMR_child, the ratio has been adverse for women (John et al., 2008). With an average of 933.6, this ratio varies between maximum of 1036 and minimum of 766. Average FLIT has also been low at 43.4% and varies between a maximum of 88.6 and a minimum of 6.1. The graph summarizing this indicates that all forms of CAW have increased over the years (Figure 1).

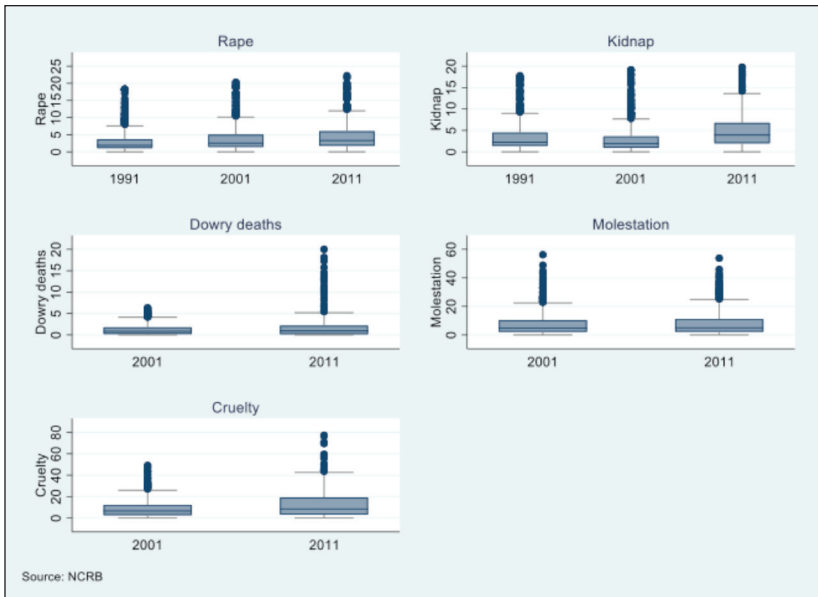


Figure 1. Box plots showing range of reported cases of CAW (1991–2011).

Bivariate Relationship Between CAW

We next examine the correlation between the different forms of CAW to see if the behavior is convergent or divergent. We find that the correlation is positive among the five CAW—implying that reporting of CAW has collectively increased. The strongest correlation is between molest and rape followed by kidnap and cruelty (Table 2). However, to get a deeper understanding of how the socioeconomic variables influence CAW, we rely on a formal econometric model and we discuss the regression results next.

As we noted earlier, the main policy thrust in reducing CAW is based on the expectation that as women get empowered (either through education or through participation in the paid workforce) the rate of crime will decline (GoI, 2001; UN, 2010, 2015). In Figure 2, we present the reported incidence of CAW with respect to FLIT and FWP. The scatter plots suggest that the relationship between rape and FLIT over time shows an increasing slope—as FLIT increases, so does rape over time (subgraph A). This relation starts with a slightly downward sloping curve (in 1991) and transitions to a slightly upward sloping curve with respect to rape (in 2011). The line of best fit between rape and FWP is positively sloped in all three years (subgraph B)—as FWP increases, so does rape in each period. On the contrary, kidnap and dowry decrease as FLIT and FWP rises, indicated by a downward slope with respect to both FLIT and FWP (subgraphs C–D and E–F). Molest shows an increase as FLIT and FWP rise, implying that as empowerment rises so does molest (subgraphs G–H). Cruelty shows an upward slope with respect to FLIT and a downward slope with respect to FWP (subgraphs I–J).

Table 2. Correlation Between CAW.

Variable	Rape	Kidnap	Dowry	Molestation	Cruelty
Rape	1				
Kidnap	0.24	1			
Dowry	0.05	0.1	1		
Molestation	0.56	0.12	0.3	1	
Cruelty	0.26	0.4	0.13	0.3	1

Source. NCRB (various years).

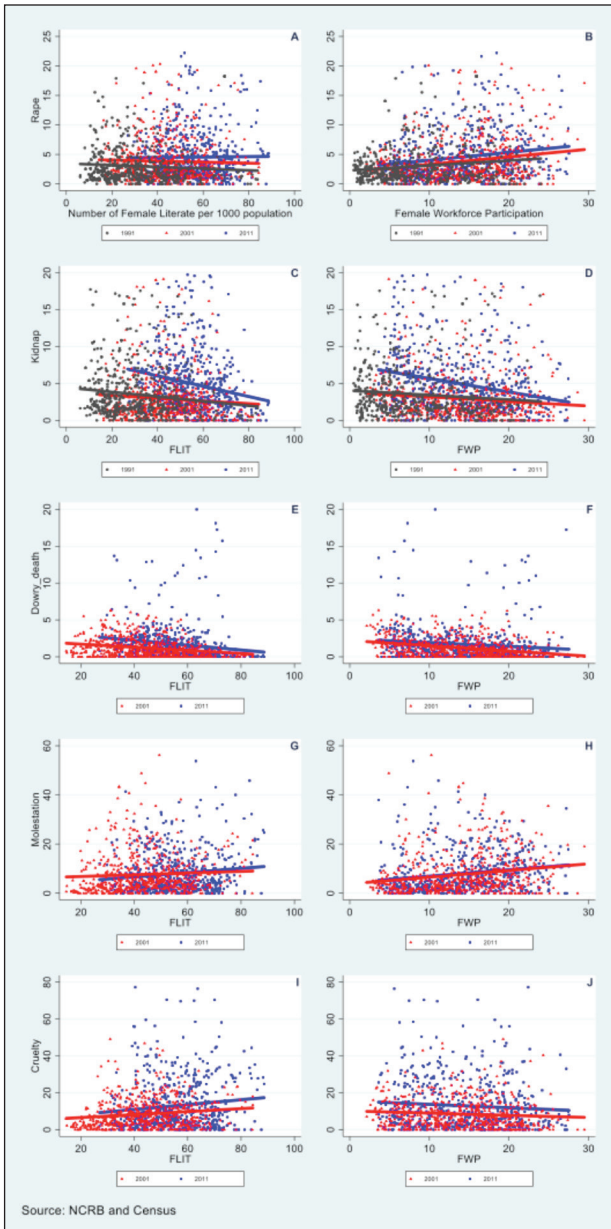


Figure 2. Scatter plot of CAW with respect to female literacy and female paid workforce participation.

Table 3. Regression Results of Panel Data Model with District Fixed-Effects and Robust Standard Errors.

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
	Rape	Kidnap	Dowry	Molestation	Cruelty
FLIT	-0.029	0.055**	0.05***	-0.23**	-0.36**
t-ratio	-1.39	2.59	4.49	-2.746	-3.04
FLIT_sq	0.0008***	0.0003	-	0.004**	0.007***
t-ratio	3.664	1.52	-	3.169	5.05
FWP	0.107**	-0.027	0.21***	0.72	0.29
t-ratio	1.98	-0.47	3.23	1.49	0.55
FWP_sq	-0.001	-0.004**	-	-0.01	0.004
t-ratio	-0.643	-2.17	-	-0.61	0.30
FMR	0.005*	0.001	-0.01**	-0.04**	0.033**
t-ratio	1.71	0.27	-2.33	-2.37	2.12
FMR_child	0.0002	0.001	0.003	0.009	-0.038**
t-ratio	0.05	0.38	1.04	0.65	-2.52
Constant	-3.15	-1.13	2.72	33.45*	7.94
t-ratio	-0.75	-0.21	0.72	2.09	0.42
N	1752	1752	1166	1166	1166
R-squared	0.79	0.71	0.66	0.81	0.82
R squared _adjusted	0.68	0.57	0.31	0.62	0.64
F	29.49	22.73	6.31	2.19	19.41

Note. * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Regression Results

We now report estimates of the panel data fixed effects model stated in equation 2 (Table 3). The results of each CAW are reported individually as we observe different impacts. All our regressions report an acceptable adjusted R-square value (0.31 to 0.68) and the F-statistic is significant in all the five regressions reported in this study.

Rape. Our results reveal that the coefficient of FLIT (indicating impact of FLIT on rape) is negative and jointly significant (absolute t-value is greater than 1). It is also positive and significant for FLIT_sq. This suggests that there is a nonlinear relation with a threshold effect—as FLIT increases, rape decreases initially but reaches a minimum and then starts rising. The FWP

has a significant positive level effect—rape rises as FWP rises but there is no nonlinear effect with respect to FWP. A rise in FMR increases rape but FMR_child has no significant effect.

Kidnap. With regard to kidnap, as FLIT rises, both the level effect and the square effect cause an increase in kidnap. The coefficient for FLIT is positive and significant. The coefficient is also positive and jointly significant for FLIT_sq. FWP has no level effect, but the coefficient of the square of FWP (FWP_sq) is negative and significant. FMR and FMR_child have no effect on kidnap.

Dowry. Like kidnap, the coefficient of FLIT is positive and significant, and like rape, and molest, the coefficient of FWP is positive and significant. Similarly, to molest, the coefficient of FMR is negative and unlike the other CAW, FMR_child has a positive effect on dowry and is jointly significant. This implies that a rise in FLIT and FWP will increase dowry. A rise in FMR would reduce dowry but may increase in future as FMR_child is positive. While estimating coefficients for dowry, we excluded the squares of FLIT and FWP as there was indication of multicollinearity.

Molest. Similar to rape and cruelty, molest declines as FLIT rises but there is a threshold effect as FLIT_sq has a positive and significant coefficient. Like rape, the coefficient of FWP is positive but jointly significant and the coefficient of FWP_sq is not significant (therefore there is no nonlinear effect with respect to FWP). Unlike rape and cruelty, an increase in FMR leads to a decline in molest.

Cruelty. Cruelty declines as FLIT rises but there is a threshold effect as FLIT_sq has a positive and significant coefficient. The level effect and the threshold effect of FWP on the cases of cruelty are found to be insignificant. FMR has a positive and significant effect on cruelty but FMR_child is negative and significant. This implies that as FMR rises now, cruelty also rises, but since co-efficient of FMR_child is negative, it is likely to decline in future.

Given the regional heterogeneity in India, it is helpful to visualize each type of crime spatially (district-level choropleth maps are presented in Figure 3). Each map is color coded into four quartiles (categories)—dark blue denotes the lowest quartile of CAW, and the color red denotes the highest rates of CAW. Districts with CAW below the highest quartile are in orange, while districts in light blue are the ones with CAW just above the lowest quartile. These spatial variations can be seen over three decades from 1991–2011 for rape and kidnap. For molest, cruelty, and dowry, we map for 2001 and 2011 for reasons discussed earlier.

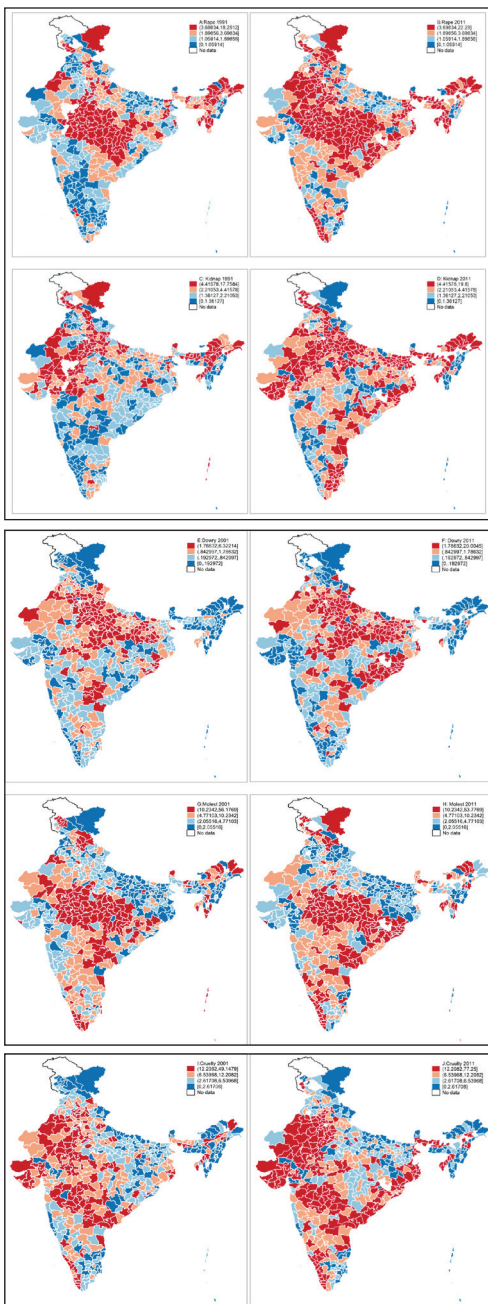


Figure 3. Spatial distribution of CAW by districts.

Rape. In 1991, the rape cases are spatially clustered, with districts located in central, north, and northeast India showing higher rates (red and orange areas in Figure 3, A–B), when compared with districts in the southern and western parts of India. Madhya Pradesh, Chhattisgarh, Rajasthan, Arunachal Pradesh, Assam, Mizoram, and Jammu & Kashmir exhibited the highest rates. However, by 2011, the red and orange areas are more widespread across all the states and UTs.

Kidnap. In 1991, districts in the north, northwest, and northeast had higher reported kidnap cases (red and orange areas in Figure 3, C–D), in comparison with the districts in the west, central and southern states. In 2011, there was a significant rise in kidnap; this is more prominent in the southern, eastern, and northeastern regions.

Dowry. The cases of dowry do not visually exhibit significant differences between 2001 and 2011 (Figure 3, E–F). However, Uttar Pradesh, Madhya Pradesh, Uttarakhand, Telangana, Bihar, and Rajasthan exhibit higher rates of dowry. In 2011, Andhra Pradesh, Odisha, Jharkhand, and West Bengal joined the previously named states with higher dowry cases.

Molest. In 2001, the highest rates of molest were reported in the central and southern parts of India (Figure 3, G–H). These include districts in Himachal Pradesh, Arunachal Pradesh, Assam, and Rajasthan. By 2011, districts in Odisha, Andhra Pradesh, Maharashtra, and Jammu & Kashmir report higher rates of molest.

Cruelty. In 2001, reported cases of cruelty were higher in the districts located in the western, northwestern, and some of the southern regions (Figure 3, I–J). Northeastern and eastern regions had low rates of cruelty. In 2011, there was an increase in areas reporting higher rates of cruelty in the southern and the southeastern regions.

We now briefly discuss some of the limitations which we encountered that need to be borne in mind.

Limitations

Our results need to be considered within the limitations of (a) the data generation process and (b) lack of more socioeconomic data of more covariates at a disaggregated level. It is well recognized that most women have faced some form of CAW at some point of time in their lives (García-Moreno & Riecher-Rössler, 2013). An overwhelming majority do not report it. If they do, it is to a friend or family member. Very few actually report it to the police or seek external assistance (Visaria, 2008). The victims whose complaints get recorded by an official agency gets reported in official databases such as the NCRB. Therefore, there is an apprehension that the extent of reported CAW

in India is much smaller than the actual incidence of CAW. This is not a limitation unique to this study but applies to all studies on crime using data from government agencies.

Another problem that we encountered was with using districts as units of observation. Districts are administrative areas with clearly defined boundaries. Over the last 30 years, there have been changes not only in the number of districts (new districts being carved out of existing ones) but also in the organization of the states. Three new states have come into existence in the period of our study. India moved from having 466 districts (in 1991) to 594 (in 2001) and then to 640 (in 2011). For example, Champawat district was created in 1997 by reorganizing the existing districts of Pithoragarh and Nainital in Uttarakhand state. This type of administrative reorganization poses a number of challenges for district-level analysis (Kumar & Somanathan, 2009, 2017). Since some of the older districts have been split into two or more districts over time, Banerjee and Iyer (2005) suggest that we can match current districts to older ones within reasonable bounds. The districts that were split after 2001 were merged back to their original districts (as in 2001) for our analysis of 2011 data. The districts that were created between 1991 and 2001 were tallied to match the district names of 2001. We thus maintained comparability by retaining the district status as available in 2001.

We also encountered a mismatch in the data frequency of crime reporting by the NCRB and socioeconomic data reporting by the Census of India. The crime data is collected and reported annually. Census, on the other hand, is conducted once every decade. We therefore had to restrict our analysis to those decadal years for which both crime and census data were available.

Discussion

We close with one final consideration. How do we make sense of the rise in CAW in a period when there have been increased empowerment efforts both socially and economically? This puzzle could be explained in five different ways:

1. There is greater awareness of women's rights from the perspective of female victims to report the crime (Verma et al., 2019)
2. There is greater sensitivity on the part of the law enforcement agencies to record CAW and the police are now more willing to register such cases which earlier they were hesitant to (Miller & Segal, 2019; Natarajan, 2008)
3. There are a larger number of police stations (including special women police stations) that provide greater access to report CAW (Amaral et al., 2019)

4. Law and order is declining in the last three decades (Sharma, 2015); and
5. The increased presence of women in economic, political, and socio-cultural spheres is challenging existing hierarchies and resulting in backlash (Chin, 2012; Eswaran & Malhotra, 2011; Iyer et al., 2012; Shrivastava, 2015)

Keeping these caveats in mind, we believe that our results provide a more nuanced understanding of the effect of empowerment on different types of CAW.

Conclusion

Our findings add to the literature in two significant ways. First, we find that the covariates vary in their magnitude and direction of impact on CAW. Therefore, it is difficult to sustain any universal claim that empowerment (through FLIT, FWP and FMR) increases or reduces CAW. We differ in a second significant way from the received literature which has treated covariates as having a linear relationship with CAW. By this we mean that the rate of change in crime due to any of the factors influencing it changes by a fixed proportion. We demonstrate that this may not be true, and there are nonlinearities and thresholds. The change in crime rate may not follow a fixed ratio and the direction of change with respect to the factors influencing it may also change over time. The threshold effect allows for a switch in direction of the relationship at some observable point (referred to as threshold). To our understanding, our study is the first to provide evidence for this. The detection of nonlinearities and the presence of thresholds could significantly change the way the debate on CAW has proceeded in India.

We now discuss the outcomes in terms of three different kinds of empowerment – education (FLIT), economic (FWP) and social (FMR). We find that an increase in FLIT reduces rape, cruelty, and molest but increases kidnap and dowry. We note the presence of nonlinearity with respect to rape, cruelty, and molest (positive coefficient of FLIT_sq) as well as kidnap (negative coefficient of FLIT_sq). With regard to the impact of FWP, rape, molest, and dowry increase, while kidnap declines as FWP rises. FWP has no significant influence on cruelty. Kidnap exhibits nonlinear effects with respect to FWP (negative coefficient of FWP_sq). As FMR rises, so does rape and cruelty but it reduces molest and dowry. A rise in FMR_child increases dowry but reduces cruelty.

We discuss our findings in the context of the three hypotheses proposed in the literature to explain CAW: (a) the ameliorative hypothesis—empowerment leads to reduced CAW, (b) the backlash hypothesis—empowerment

leads to increased CAW, and (c) the transitory phase hypothesis—the current increase will eventually see a decline in CAW. In the case of educational empowerment, we find evidence of the ameliorative hypothesis for rape, cruelty, and molest, and evidence of the backlash hypothesis for kidnap and dowry. However, this needs to be overlaid with the result that nonlinearities are present for these CAW and in the long run, increased educational empowerment will lead to an increase in rape, cruelty, and molest but a decline in kidnap. Therefore, there is evidence of a transitory phase here but they are not moving in the same direction. With reference to economic empowerment, we find evidence of backlash in rape, molest and dowry, but an ameliorative outcome for kidnap. There is no evidence of a transitory phase here. With reference to social empowerment, there is evidence to support the backlash hypothesis for rape and the ameliorative hypothesis for molest. There is some evidence of a transitory phase with respect to cruelty and dowry.

Achieving gender equality and empowerment of women and girls is Goal 5 of the UN SDGs (UN, 2015). Ending CAW are the first three (out of nine) targets, namely, ending all forms of discrimination, violence, and harmful practices. The remaining six targets focus on equal opportunity, economic and technological empowerment, and health of women. While all these targets are desirable, there is no clear mechanism that has been suggested to achieve these targets. We find that strategies to empower women through education and paid work have led to a rise in reported CAW. However, this is not a sign of disenfranchisement of women but probably an outcome of empowerment itself giving women the voice to report CAW (McDougal et al., 2018).

The pathway to end CAW may also have to direct its focus on the perpetrators rather than the victims alone (Blacklock, 2001). Further, every time a heinous CAW is reported, the first reaction of policymakers is to make punishment for the crime more stringent. What probably needs greater attention is to make justice easily and speedily accessible to victims of CAW (Neubauer & Ryan, 1982; Verma et al., 2013).

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