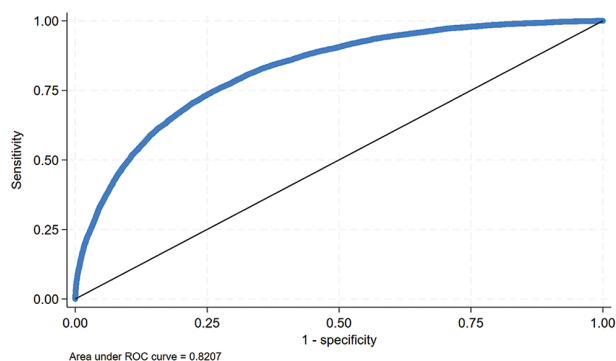


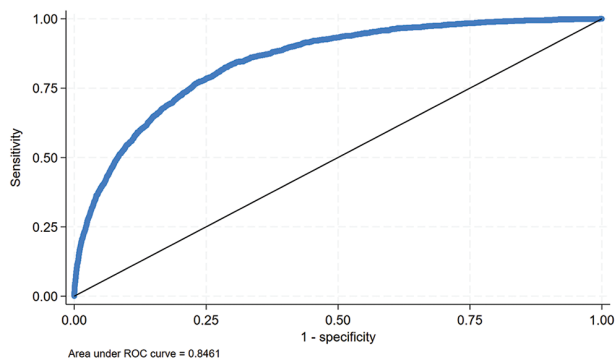
RESEARCH ARTICLE

Does drought increase intimate partner violence? Evidence from India

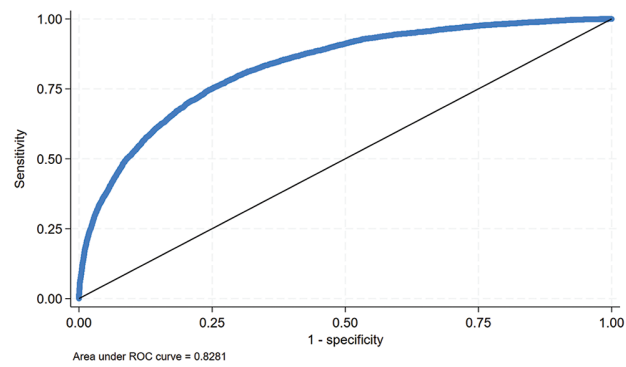
Supplementary File



**Figure S1.** ROC curve for PV model  
Abbreviation: ROC: Receiver operating characteristic; PV: Physical violence.



**Figure S2.** ROC curve for SV model  
Abbreviation: ROC: Receiver operating characteristic; SV: Sexual violence.



**Figure S3.** ROC curve for EV model  
Abbreviation: ROC: Receiver operating characteristic; EV: Emotional violence.

**Table S1.** Sample size

NFHS-4 (2015 – 2016)			NFHS-5 (2019 – 2021)		
Household	Men	Women	Household	Men	Women
601,509	112,122	699,686	636,699	101,839	714,115
Couples' recode			Couples' recode		
		63,696			57,535
Domestic violence module			Domestic violence module		
		47,514			46,353

Source: Compiled from NFHS-4 and NFHS-5 reports.  
Abbreviation: NFHS: National Family Health Survey.

**Table S2. Timeline of fieldwork in NFHS-5**

State/UT	Start of fieldwork		End of fieldwork	
	Month	Year	Month	Year
India	6	2019	4	2021
North				
Chandigarh	3	2021	4	2021
Delhi	1	2020	1	2021
Haryana	1	2020	4	2021
Himachal Pradesh*	7	2019	11	2019
Jammu and Kashmir	7	2019	1	2020
Ladakh <sup>§</sup>	8	2019	9	2019
Punjab	1	2020	3	2021
Rajasthan	1	2020	3	2021
Uttarakhand	1	2020	3	2021
Central				
Chhattisgarh	1	2020	3	2021
Madhya Pradesh	1	2020	4	2021
Uttar Pradesh	12	2019	4	2021
East				
Bihar	7	2019	2	2020
Jharkhand	1	2020	4	2021
Odisha	1	2020	3	2021
West Bengal*	6	2019	11	2019
North-East				
Arunachal Pradesh	1	2020	4	2021
Assam*	6	2019	12	2019
Manipur*	7	2019	1	2020
Meghalaya*	7	2019	11	2019
Mizoram*	7	2019	11	2019
Nagaland*	7	2019	12	2019
Sikkim*	8	2019	12	2019
Tripura*	7	2019	11	2019
West				
Dadra and Nagar Haveli*+Daman and Diu*	7	2019	11	2019
Goa*	8	2019	11	2019
Gujarat*	6	2019	11	2019
Maharashtra*	6	2019	12	2019
South				
Andaman and Nicobar Islands*	10	2019	2	2020
Andhra Pradesh*, <sup>‡</sup>	7	2019	11	2019
Karnataka*, <sup>‡</sup>	7	2019	12	2019
Kerala*	7	2019	12	2019
Lakshadweep*	12	2019	1	2020
Puducherry	1	2020	3	2021
Tamil Nadu	1	2020	3	2021
Telangana*	6	2019	11	2019

Notes: \*Included in analysis; <sup>‡</sup>Included in the analysis as treatment group; <sup>§</sup>Has to be dropped as it was not covered in NFHS-4.

Source: Adapted from Table 1.2 of NFHS-5 report (p. 15-16).

Abbreviations: NFHS: National Family Health Survey; UT: Union territory.

Table S3. Point-biserial correlation between the number of control issues reported and physical violence

	2015–2016		2019–2021	
	Comparison group	Treatment group	Comparison group	Treatment group
Pearson's point-biserial correlation coefficient	0.3253***	0.3727***	0.2797***	0.4290***
Number of observations	13,908	2,215	15,744	2,723

Note: \*\*\* $p < 0.1$ .

Source: Authors' computation using unit-level data from NFHS-4 and NFHS-5.

Table S4. Association between the number of control issues and physical violence

Number of control issues reported	No exposure to drought			Exposed to drought		
	Reported PV					
	No	Yes	Total	No	Yes	Total
0	14,582	2,648	17,230	2,329	524	2,853
	84.63	15.37	100	81.63	18.37	100
	66.18	34.76	58.11	71.51	31.17	57.78
1	3,424	1,555	4,979	517	345	862
	68.77	31.23	100	59.98	40.02	100
	15.54	20.41	16.79	15.87	20.52	17.46
2	1,928	1,211	3,139	174	221	395
	61.42	38.58	100	44.05	55.95	100
	8.75	15.9	10.59	5.34	13.15	8
3	1,015	898	1,913	116	215	331
	53.06	46.94	100	35.05	64.95	100
	4.61	11.79	6.45	3.56	12.79	6.7
4	635	632	1,267	52	139	191
	50.12	49.88	100	27.23	72.77	100
	2.88	8.3	4.27	1.6	8.27	3.87
5	264	380	644	31	75	106
	40.99	59.01	100	29.25	70.75	100
	1.2	4.99	2.17	0.95	4.46	2.15
6	187	293	480	38	162	200
	38.96	61.04	100	19	81	100
	0.85	3.85	1.62	1.17	9.64	4.05
Total	22,035	7,617	29,652	3,257	1,681	4,938
	74.31	25.69	100	65.96	34.04	100
	100	100	100	100	100	100
	Pearson Chi-square (6)=2800.00 $p < 0.001$			Pearson Chi-square (6)=938.9060 $p < 0.001$		
	Cramér's V=0.3097			Cramér's V=0.4360		
	Gamma=0.5025 ASE=0.008			Gamma=0.6403 ASE=0.015		
	Kendall's tau-b=0.2830 ASE=0.005			Kendall's tau-b=0.3974 ASE=0.012		

Note: For each control issue, the first row shows the frequency, the second row the row percentage, and the last row the column percentage.

Source: Authors' computation using unit-level data of NFHS-4 and NFHS-5.

Abbreviations: ASE: Asymptotic standard error; PV: Physical violence.

**Table S5. Association between the number of control issues and sexual violence**

Number of control issues reported	No exposure to drought			Exposed to drought		
	Reported SV					
	No	Yes	Total	No	Yes	Total
0	16,910	320	17,230	2,804	49	2,853
	98.14	1.86	100	98.28	1.72	100
	60.34	19.64	58.11	61.06	14.16	57.78
1	4,691	288	4,979	810	52	862
	94.22	5.78	100	93.97	6.03	100
	16.74	17.68	16.79	17.64	15.03	17.46
2	2,871	268	3,139	351	44	395
	91.46	8.54	100	88.86	11.14	100
	10.25	16.45	10.59	7.64	12.72	8
3	1,648	265	1,913	287	44	331
	86.15	13.85	100	86.71	13.29	100
	5.88	16.27	6.45	6.25	12.72	6.7
4	1,070	197	1,267	152	39	191
	84.45	15.55	100	79.58	20.42	100
	3.82	12.09	4.27	3.31	11.27	3.87
5	482	162	644	80	26	106
	74.84	25.16	100	75.47	24.53	100
	1.72	9.94	2.17	1.74	7.51	2.15
6	351	129	480	108	92	200
	73.13	26.88	100	54	46	100
	1.25	7.92	1.62	2.35	26.59	4.05
Total	28,023	1,629	29,652	4,592	346	4,938
	94.51	5.49	100	92.99	7.01	100
	100	100	100	100	100	100
	Pearson Chi-square (6)=1900.00 <i>p</i> <0.001			Pearson Chi-square (6)=938.9060 <i>p</i> <0.001		
	Cramér's V=0.2533			Cramér's V=0.4360		
	Gamma=0.6207 ASE=0.011			Gamma=0.6403 ASE=0.015		
	Kendall's tau-b=0.2085 ASE=0.006			Kendall's tau-b=0.3974 ASE=0.012		

Note: For each control issue, the first row shows the frequency, the second row the row percentage, and the last row column percentage.

Source: Authors' computation using unit-level data of NFHS-4 and NFHS-5.

Abbreviations: ASE: Asymptotic standard error; SV: Sexual violence.

**Table S6. Association between the number of control issues and emotional violence**

Number of control issues reported	No exposure to drought			Exposed to drought		
	Reported EV					
	No	Yes	Total	No	Yes	Total
0	16,450	780	17,230	2,721	132	2,853
	95.47	4.53	100	95.37	4.63	100
	63.01	21.99	58.11	66.97	15.09	57.78
1	4,324	655	4,979	720	142	862
	86.84	13.16	100	83.53	16.47	100
	16.56	18.47	16.79	17.72	16.23	17.46
2	2,511	628	3,139	278	117	395
	79.99	20.01	100	70.38	29.62	100
	9.62	17.71	10.59	6.84	13.37	8
3	1,411	502	1,913	175	156	331
	73.76	26.24	100	52.87	47.13	100
	5.41	14.15	6.45	4.31	17.83	6.7
4	858	409	1,267	90	101	191
	67.72	32.28	100	47.12	52.88	100
	3.29	11.53	4.27	2.22	11.54	3.87
5	346	298	644	40	66	106
	53.73	46.27	100	37.74	62.26	100
	1.33	8.4	2.17	0.98	7.54	2.15
6	205	275	480	39	161	200
	42.71	57.29	100	19.5	80.5	100
	0.79	7.75	1.62	0.96	18.4	4.05
Total	26,105	3,547	29,652	4,063	875	4,938
	88.04	11.96	100	82.28	17.72	100
	100	100	100	100	100	100
	Pearson Chi-square (6)=3600.00 $p < 0.001$			Pearson Chi-square (6)=1400.00 $p < 0.001$		
	Cramér's V=0.3498			Cramér's V=0.5359		
	Gamma=0.6280 ASE=0.008			Gamma=0.7728 ASE=0.013		
	Kendall's tau-b=0.2940 ASE=0.005			Kendall's tau-b=0.4491 ASE=0.012		

Note: For each control issue, the first row shows the frequency, the second row the row percentage, and the last row column percentage.  
Source: Authors' computation using unit-level data of NFHS-4 and NFHS-5.

Abbreviations: ASE: Asymptotic standard error; EV: Emotional violence.

Table S7. Falsification tests for robustness check

Variables	Switching the timeline			Slightly modifying the timeline		
	(1)	(2)	(3)	(4)	(5)	(6)
	PV	SV	EV	PV	SV	EV
Year_reverse	0.907 (0.0621)	1.176 (0.131)	0.982 (0.0818)	0.856* (0.0722)	1.132 (0.143)	0.860 (0.0824)
Drought: yes (Base: no)	2.761*** (0.339)	0.685*** (0.0981)	1.483*** (0.177)	2.683*** (0.337)	0.672*** (0.0983)	1.391*** (0.168)
Year_reverse*Drought	0.678** (0.130)	0.802 (0.159)	0.693*** (0.0977)	0.718* (0.142)	0.829 (0.171)	0.785 (0.116)
Respondent-level controls	Y	Y	Y	Y	Y	Y
Partner-level controls	Y	Y	Y	Y	Y	Y
Household-level controls	Y	Y	Y	Y	Y	Y
Constant	0.203** (0.144)	0.0173*** (0.007)	0.192*** (0.112)	0.208** (0.147)	0.0177*** (0.00722)	0.203*** (0.119)
Pseudo R <sup>2</sup>	0.2402	0.2274	0.2324	0.2404	0.2272	0.2326
Observations	30,100	28,635	29,597	30,100	28,635	29,597

Notes: Robust standard errors in parentheses. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

Source: Authors' computation using unit-level data from NFHS-4 and NFHS-5.

Table S8. Classification test: PV model

Classified	True		Total
	D	~D	
+	3807	1800	5607
-	4584	19909	24493
Total	8391	21709	30100
Classified+if predicted $Pr(D) \geq 0.5$			
True D defined as $SV \neq 0$			
Sensitivity	$Pr(+ D)$		45.37%
Specificity	$Pr(- \sim D)$		91.71%
Positive predictive value	$Pr(D +)$		67.90%
Negative predictive value	$Pr(\sim D -)$		81.28%
False + rate for true ~D	$Pr(+ \sim D)$		8.29%
False - rate for true D	$Pr(- D)$		54.63%
False + rate for classified +	$Pr(\sim D +)$		32.10%
False - rate for classified -	$Pr(D -)$		18.72%
Correctly classified			78.79%

Source: Authors' computation using unit-level data from NFHS-4 and NFHS-5.

**Table S9. Classification test: SV model**

Classified	True		Total
	<i>D</i>	$\sim D$	
+	186	133	319
-	1580	26736	28316
Total	1766	26869	28635
Classified+if predicted $Pr(D) \geq 0.5$ True D defined as $SV \neq 0$			
Sensitivity	$Pr(+ D)$		10.53%
Specificity	$Pr(- \sim D)$		99.51%
Positive predictive value	$Pr(D +)$		58.31%
Negative predictive value	$Pr(\sim D -)$		94.42%
False + rate for true $\sim D$	$Pr(+ \sim D)$		0.49%
False - rate for true D	$Pr(- D)$		89.47%
False + rate for classified +	$Pr(\sim D +)$		41.69%
False - rate for classified -	$Pr(D -)$		5.58%
Correctly classified			94.02%

Source: Authors' computation using unit-level data of NFHS-4 and NFHS-5.

**Table S10. Classification test: EV model**

Classified	True		Total
	<i>D</i>	$\sim D$	
+	1006	573	1579
-	2988	25030	28018
Total	3994	25603	29597
Classified+if predicted $Pr(D) \geq 0.5$ True D defined as $EV \neq 0$			
Sensitivity	$Pr(+ D)$		25.19%
Specificity	$Pr(- \sim D)$		97.76%
Positive predictive value	$Pr(D +)$		63.71%
Negative predictive value	$Pr(\sim D -)$		89.34%
False + rate for true $\sim D$	$Pr(+ \sim D)$		2.24%
False - rate for true D	$Pr(- D)$		74.81%
False + rate for classified +	$Pr(\sim D +)$		36.29%
False - rate for classified -	$Pr(D -)$		10.66%
Correctly classified			87.97%

Source: Authors' computation using unit-level data from NFHS-4 and NFHS-5.