Power to choose? Examining the link between contraceptive use and domestic violence

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Abstract

Contraception is a crucial tool that empowers women to control their bodily autonomy. Concurrently, violence against women remains a pressing public-health issue depleting women's autonomy. We establish a causal link between the decision to use contraception and the occurrence of intimate partner violence. Utilizing newly available nationally representative data for India, we use an instrumental variable approach to estimate our causal effects. Using exogenous variation in the cluster average of women's exposure to family planning messages via radio, we find that if the decision to use contraceptives is solely taken by the woman, she is at a significantly higher risk of physical, sexual and emotional domestic violence. We estimate bounds of our effects by assuming the IV to be plausibly exogenous where we relax the exogeneity condition. Our findings underscore the importance of reproductive health in initiatives that reduce domestic violence and targeted policies towards men's understanding of family planning.

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1 Introduction

Every 11 minutes a woman or a girl is killed by an intimate partner or a family member making violence against women the most pervasive human rights violation in the world (UN, 2022). The most common form of domestic violence is intimate partner violence (IPV) which continues to be an abhorrent and pressing public health emergency with far-reaching consequences worldwide[1](WHO, 2021). Over the years, there has been extensive research on the causes and consequences of IPV. Today, the prevalence of IPV is of great concern to policymakers and administrators, with the concern heightened not only on account of the COVID-19 pandemic but also owing to its many demonstrated negative health consequences in general (Ravindran and Shah, 2020; Singh and Babbar, 2022).

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[1]IPV is defined as coercive and assaultive behaviours that can include physical assault of kicking, hitting, or beating; coercive sex; or psychological attacks of humiliation, belittling, and intimidation (C; et al., 2005; Ibrahim et al., 2014; Owoaje and OlaOlorun, 2012).

Domestic violence can lead to a myriad of long term as well as immediate adverse outcomes for women including physical injuries, permanent disability, reproductive health issues, mental health problems, and even death (Ackerson and Subramanian, 2008; Boy and Salihu, 2004; Campbell, 2002; Coker et al., 2002; Durevall and Lindskog, 2015; Ellsberg et al., 2008). IPV is also linked with unintended pregnancies, pre-term delivery, miscarriage, induced abortions, depression, and sexually transmitted infections (Boy and Salihu, 2004; Cools and Kotsadam, 2017; Durevall and Lindskog, 2015; Yount et al., 2011). In fact, the health burden associated with domestic violence documents that women who have faced IPV are twice as likely to have an abortion and one and a half times more likely to have a sexually transmitted infection compared to women who have not experienced partner violence (WHO, 2013). Needless to say, IPV has enormous social and economic costs with notable social multiplier effects for the society as a whole given that women are the primary caregivers in the family (Mookerjee et al., 2021b).

Evidently, there is a need to combat the negative consequences of IPV and in recent years numerous papers have examined the determinants of IPV. Most papers establish that factors contributing to women's empowerment such as intra-household bargaining power, labor force participation, education have an impact on IPV (Hidrobo and Fernald, 2013; Banerjee et al., 2019; Aizer, 2010; Alonso-Borrego and Carrasco, 2017; Eswaran and Malhotra, 2011; Chowdhury et al., 2018; Yilmaz, 2018). While some papers show that factors enhancing empowerment may lead to reduction in IPV (Bhattacharyya et al., 2011; Erten and Keskin, 2018; Heath, 2014; Rocca et al., 2009; Venning, 2010), others provide evidence in support of higher prevalence of IPV (Anderberg et al., 2016). Our study contributes to this growing body of literature by specifically examining the role of a woman decision-making about the use of contraceptives as a potential determinant of domestic violence.

In theory, a woman's sole decision to use contraceptives could indicate greater control of her bodily autonomy and fertility outcomes. This could imply that the woman holds greater bargaining power and a voice to advocate her preferences. As such, she may be able to resist domestic violence thus reducing the likelihood of IPV. However, her decision to use contraceptives alone and not jointly with her partner or otherwise may mean that it puts her at a higher risk of IPV. Being more resistive to domestic violence may result in a stronger backlash from her partner (Jewkes, 2002; Field et al., 2021). A priori, how the decision to use contraception affects IPV is ambiguous and merits empirical investigation. To this end, in this paper, we study: *if a woman chooses to use contraceptives solely, does it have a causal effect on her exposure to IPV? If so, what is the direction and extent of this effect?* Although physical domestic violence is the most common form of abuse experienced by women, we expand the scope of our question

to include the impact on sexual and emotional domestic violence as well.

While there are studies that examine the association between the two issues, most papers discuss the impact of domestic violence on contraceptive practices (Kupoluyi, 2020; Kusunoki et al., 2018; Maxwell et al., 2015; Mundhra et al., 2016). Besides, these studies fail to establish a causal linkage. Our paper stands apart in that we not only assert that the decision about contraceptive use being the woman's is an important determinant of IPV, but, to our knowledge, we also provide the first causal evidence of the impact of this decision on IPV.

The benefits of better family planning practices, access to contraceptives and informed contraceptive use are undisputed and widely accepted in the literature. Research cites improvements in health outcomes for both women and children (Luca et al., 2021; Lindo and Packham, 2017; Bhatia and Cleland, 1995; Cleland et al., 2012; Cleland and Sathar, 1984; Dehingia et al., 2020; Gipson et al., 2008; Miller, 1991; Miller and Karra, 2020; Molitoris, 2017; Mookerjee et al., 2022; Singh et al., 2012; Trussell and Pebley, 1984; Yeakey et al., 2009). Further, the use of contraceptives is linked with lower number of births, unintended and high-risk pregnancies in very young women or women at higher parities (Dills and Grecu, 2017; Kelly, 2020; Luca et al., 2021) and reduced risk of premature births through lengthened birth intervals (Ananat and Hungerman, 2012; Conde-Agudelo et al., 2006; Fink et al., 2014; Rutstein, 2005; WHO, 2013, 2011). Besides the improvements in health outcomes, impact of contraceptive use on enhancement of women's empowerment, assets, earnings, body mass indices have also been recorded in Canning (2012); Singh and Babbar (2022).

Typically, contraceptive behaviour is jointly determined by both the motivation to practice contraception and the costs of contraception (Biddlecom et al., 1997; Bongaarts and Bruce, 1995; Easterlin and Crimmins, 1985). Despite the general consensus on the benefits of family planning, costs associated with contraceptive use extend beyond the access to family planning services. These include social, psychological, and cultural factors that often act as barriers to contraceptive practices of men and women, especially in developing countries. Although challenging, assessing such barriers to contraceptive use is essential to understanding spousal beliefs and motivations to use contraceptives.[2] While assessing the differential perceptions and motivations of men and women is beyond the scope of our paper, we attempt to shed light on the importance of considering how the decision pertaining to contraceptive practices are made in the family. More specifically, whether the decisions to use contraceptives are joint decisions or sole decisions. To address this, we define our variable of interest, a woman's choice to use contraceptives such that it takes value 1 if the decision is solely hers and 0 if the decision is

[2] At present, numerous qualitative interviews and survey interviews about individuals' views of contraception attempt to unravel the perceptions and desirability of contraceptive methods.

jointly taken with her partner or otherwise. This is distinct from considering both joint and sole decisions in a similar manner as is done in Haque et al. (2021); Mutombo and Bakibinga (2014); Nazarbegian et al. (2022); Olakunde et al. (2020). We emphasize this distinction, given the notion that men and women may have different preferences and be driven by differential motivations concerning contraceptive practices. With this context in mind, we make a novel attempt to estimate the causal impact of whether or not a woman takes the decision to use contraceptives solely on the occurrence of IPV using the newly released fifth wave of the National Family Health Survey (NFHS-5) conducted in 2019-21 in India.

The main empirical challenge in identifying the causal effect of the decision to use contraception on the prevalence of IPV is that the choice to use contraceptives may be endogenous owing to omitted variables. Unobservable social norms, psychological and cultural factors that may dictate spousal choice of contraceptive practices may also affect IPV. In addition, expectedly, domestic violence also affects the decision to use contraceptives (Maxwell et al., 2015; Raj and McDougal, 2015; Wilson-Williams et al., 2008) leading to simultaneity bias. To address the issue of endogeneity and estimate the causal effect of women's decision to use contraceptives on the IPV, we employ an Instrumental Variable (IV) approach. We exploit the exogenous variation in the neighbourhood average of women's exposure to family planning messages through mass-media, in particular, radio, as our IV for her decision to use contraceptives.[3] Specifically, for each household, we define its neighbourhood to include all other households in the same survey cluster.[4]

Our results are noteworthy and ought to serve as a guide for future research.[5] Conditional for a comprehensive set of women and household level observable characteristics, we find robust evidence that choosing to use contraceptives solely puts the woman at a greater risk of IPV, physically, sexually, and emotionally. The ordinary least squares (OLS) estimates suggest that if the woman decides to use contraceptives, the occurrence of IPV increases by 4.2 percentage points (pp). While this is not a causal estimate, it provides useful insights into the direction of impact. Using Roodman (2011)'s conditional mixed process estimation for our IV approach, we distinguish correlations with causal effects and find that the likelihood of IPV increases by 10 pp if the decision to use contraceptives is the women's alone. In fact, we find larger effects

[3]Radio, with its wide reach and ability to address tabooed topics relating to sexual and reproductive health, serves as a superior medium in India, surpassing newspapers and TV, particularly in areas with limited internet access and intermittent electricity supply.

[4]The DHS sample is usually based on a two-stage cluster design. First, primary sampling units (PSUs) are drawn from Census Enumeration Areas. Second, out of all listed households within the PSU, a fixed number of households are selected that forms the cluster. In rural areas, a cluster is usually a village whereas in urban areas it is the surrounding locality or apartment complex.

[5]The relative demand (motivation to practice contraception) and supply (access to family planning services) factors in determining contraceptive behaviour is a major issue for research on family planning as suggested in Biddlecom et al. (1997).

for the incidence of sexual and emotional domestic violence if the decision to use contraceptives is the woman's decision. The marginal effects reveal that a woman is 12.5 pp more likely to face sexual domestic violence and 26.7 pp more likely to face emotional domestic violence if she decides to use contraceptives.

That said, we recognize that the instrument we use may not be fully exogenous given the concern that the IV may be correlated with unobserved cultural and social norms at the cluster level. Therefore, we allow departures from full exogeneity by utilizing the methodology introduced by Conley et al. (2012). We find that the second-stage estimate of the impact of woman's decision to use of contraception solely on physical domestic violence is bounded away from zero as long as the direct (endogenous) effect of the IV, cluster average of women's exposure to media on physical domestic violence is not more than 55% of the reduced form effect. Similarly, for emotional and sexual domestic violence, we note that as long as the direct effect of the IV is not more than 51% and 54% respectively, we find that the bounds for our second stage estimates exclude zero. We thus show that the positive effect of a woman's decision to use contraception on all three forms of IPV considered are robust even for departures from exogeneity conditions.

Our findings are also robust to alternative estimation techniques, the inclusion of additional controls pertaining to husband's characteristics, men's and women's patriarchal beliefs about IPV, and indicators of neighbourhood level cultural, social and gender norms that the IV may be correlated with. We also perform a falsification analysis and provide supporting evidence for the robustness of our baseline results. Finally, we document interesting heterogeneous results across sub-samples. We note that younger women are at a risk of domestic violence if they solely decide to use contraceptives but this effect is not seen for older women. While the effects are statistically significant regardless of the woman's employment status, we find that employed women are at high risk of IPV which can be interpreted as reflecting 'male backlash' since gender norms are destabilized (Dhanaraj and Mahambare, 2022; Finnoff, 2012). This result represents the idea that violence against women occurs more often when the normative support for husband's dominance is high, even though the structural status of women is relatively high as discussed in Yllo and Straus (2017). In addition, women with employed husbands are at a higher risk of IPV while no effect is seen for the sub-sample of unemployed husbands. Lastly, our effects seem to be largely driven by the rural areas.

2 Data

We utilize a nationally representative survey data from the fifth wave of the Indian version of the Demographic Health Survey, popularly known as National Family Health Surveys (NFHS)-5. The survey is conducted by International Institute of Population Studies (IIPS), under the administration of the Ministry of Health and Family Welfare. All the eligible women in the households between the ages of 15 to 49 are given a separate questionnaire to fill the data across a variety of topics. These topics include basic socio-economic indicators, menstrual health and hygiene, family planning, engagement with the health workers, fertility preferences, maternal and child health, women's employment, women's empowerment, and domestic violence among others. The NFHS-5 survey was conducted in two phases and gathered the data from 636,699 households comprising 724,115 women.[6]

We use the women's data file and restrict it to domestic violence module and currently married women who are living with their partner. This ensures that our data is restricted to the women's responses pertaining to her current marriage. Our final sample consists of 55,342 observations.[7]

2.1 Outcome variables

Physical domestic violence, sexual domestic violence and emotional domestic violence: NFHS-5 provides information on the presence and intensity of domestic violence. We use data on physical domestic violence as our measure for IPV. This includes information on whether the husband has ever done any of the following to his wife: (1) push, shake, or throw something at them; (2) slap, (3) punch with fist or with something that could hurt them; (4) kick, or drag; (5) strangle, or burn on purpose; and (6) twist arm or pull hair. We define DV_i as 1 if the respondent has ever been exposed to any of the above, and 0 otherwise.

We also document effects on two more outcomes viz. sexual and emotional domestic violence. First, we consider our outcome variable as sexual domestic violence, SDV_i. Incidence of sexual domestic violence is constructed using the information on if the husband ever did any of the following to his wife: (1) forced into unwanted sex, (2) unwanted sexual acts, (3) physically forced her to perform sexual acts she did not want. We recode these variables such that each of these takes the value 1 if the response is often, sometimes or yes, and 0 otherwise. Further, we define sexual domestic violence in household i, SDV_i as 1 if the respondent has ever been

[6]Data collection for Phase I was from June 2019 to January 2020 and for phase II, from January 2020 to April 2021.

[7]Data on domestic violence is limited to 72,320 women. The data on married women is further limited to 60,480 women. Out of these women, 55,342 women were living with their husband, which is the final sample of our study.

exposed to any of the above sexual acts of violence, and 0 otherwise, rendering our dependent variable as binary. On similar lines, we construct the outcome, emotional domestic violence, EDV_i. This includes information on if the husband has done any of the following to his wife: (1) humiliate, (2) insult, (3) threaten. We define emotional domestic violence, EDV_i as 1 if the respondent has ever been exposed to any of the above, and 0 otherwise.

2.2 Variable of interest and other controls

We define our variable of interest, a woman's choice to use contraceptives, $ContraDec_i$, such that it takes value 1 if the decision is solely hers and 0 if the decision is jointly taken with her partner or otherwise.

Individual characteristics include women's age, education, relational empowerment, and employment status. We consider relational empowerment as a multidimensional construct comprising two factors: women's freedom of movement and decision-making power. Here, we measure freedom of movement using 3 questions from NFHS survey, i.e., "Are you usually allowed to go to the following places (a) market (b) health facility (c) place outside the community" with options (1 = Alone, 2 = With someone else only, 3 = Not at all). We measure women's decision-making power using 4 questions from NFHS survey, i.e., "Who decides how your husband's earnings will be used?", "Who usually makes decisions about health care for yourself?", "Who usually makes decisions about making major household purchases?", "Who usually makes decisions about visits to your family or relatives?", with 4 responses (1= mainly you, 2 = mainly your husband, 3 = you and your husband jointly, 4 = someone else). Specifically, we measure relational empowerment as a continuous variable, which is the sum of the items for decision-making and freedom of movement variables. Women education is binary variable that takes value 1 if the woman has completed primary or secondary or higher education and 0 otherwise. Employment status is also a binary indicator variable such that it takes value 1 if the woman is currently working or has worked in the past one year and 0 otherwise.

Household controls include the wealth index, sex of the head of the household, age of the head of the household, household size, indicators for area of residence (rural/urban), religion and caste. Household Size is a continuous variable recording the number of people living in a household. Wealth Index are coded as poorest (1), poor (2), middle (3), rich (4), richest (5). Area of living takes value 1 for urban and 2 for rural. The caste variable is coded as scheduled caste (1); scheduled tribe (2); other backward classes (3); and general (4). Religion is coded as Hindu (1), Muslim (2); Sikh (3); Christian (4); and others (5).

2.3 Analytical sample

Table 1 presents the descriptive statistics for all the key variables. Our sample consists of 55,342 women in the age group of 15 to 49 who participated in the NFHS-5 survey. The mean age of women in our sample is 33 years. About 75% of our sample resides in the rural areas, whereas 25% from the urban areas. About three-forth of our sample is Hindu, followed by Muslim (12%), and remaining belong to Christian, Sikh, or other religions. Around 40% of our sample belong to Other Backward Classes (OBCs), while women belonging to the Scheduled Caste (SC) and Scheduled Tribes (ST) comprise 40% of the sample.

Approximately 29% of our sample have no formal education. Working women account for 29% of the sample, compared to 33% at the national level (NSS, 2022). The small difference could be explained by the fact that while these figures represent the entire country, our sample only includes married women living with their partner.

Around 7% women in our sample faced severe violence in one year preceding the survey. Similarly, around 5% and 10% of the women from our sample reported sexual and emotional violence, respectively. Only 6.6% of the women in our sample reported making sole decisions related to contraceptive decision making.

3 Empirical and identification strategy

We examine the causal effect of the woman's decision to use contraceptives on IPV using the following regression setup:

$$y_i = \beta_0 + \beta_1 ContraDec_i + \beta_2 \mathbb{X}_i + \lambda_s + \epsilon_i \quad (1)$$

where y_i is the incidence of DV, SDV, EDV against the woman in household i; $ContraDec_i$ denotes the decision to use of contraceptives such that it takes value 1 if the woman solely takes the decision to use contraceptives and 0 if the decision is taken jointly with her husband or otherwise. $\mathbb{X}_i$ is the vector of individual and household level characteristics and λ_s denotes state fixed-effects. Our parameters of interest is β_1 capturing the effects of the wife's sole decision to use contraceptives on the incidence of severe domestic violence, sexual domestic violence and emotional domestic violence against the woman in household i. All standard errors are clustered at cluster level.[8]

A causal interpretation of β_1 would require that, conditional on the controls, there are no omitted variables correlated with the woman's decision-making about use of contraceptives and

[8]Refer to DHS Cluster Design

that there is no reverse causality running from incidence of IPV to contraceptive use decision. Omitted variables like pre-existing social norms that likely dictate IPV and woman's decisions about contraceptive use or other decisions may serve as a source of potential endogeneity. As such, the problem of endogeneity limits the ability of OLS or Probit estimations to yield unbiased and consistent estimates. Therefore, we follow an IV approach, that utilizes information on family planning messages disseminated through radio to construct our IV. First, we define a binary variable that takes 1 if the woman has heard about family planning on the radio and 0 otherwise. This generates a binary indicator of radio exposure for every household in our sample. We then construct an average of radio exposure in the cluster to create our instrument. The average exposure of women to family planning information over the radio in a cluster is necessarily related with the woman's contraceptive use, as evidenced in Jah et al. (2014); Agha (2002); Gupta et al. (2003); Olenick (2000).[9] These papers document the effectiveness of information provided through mass-media programs in increasing family planning use and changing reproductive behaviour. Given the binary nature of our variable of interest and outcomes, we utilize Roodman (2011)'s well-suited conditional mixed-processes (CMP) framework as our preferred estimations to tease out our causal effect. In addition, we use state fixed-effects to account for state-level unobservables.

We believe the IVs are compelling to the extent that they are not only highly correlated with woman's decisions about contraceptive use, but also do not have a direct effect on the actual incidence of IPV, conditional on observable woman and household characteristics. Literature notes that exposure to family planning information over the radio in particular is inevitably correlated with a woman's contraceptive use decisions (Jah et al., 2014; Agha, 2002; Gupta et al., 2003; Olenick, 2000; Rogers et al., 1999; Smith et al., 2007; Valente et al., 1994). For our context, the Indian government runs multiple programs on 'All India Radio' to provide information on family planning (Suman, 2022) and the Ministry of Health and Family Welfare (MoHFW) sponsors radio program called "Ek Kadam Khushhal Zindagi Ki Aur" to discuss reproductive and child health issues (MHFW, 2015). Similarly, multiple other radio programmes have been conducted by the MoHFW to improve the contraceptive usage and family planning in India, details of which can be found in NHM (2022). Similar programmes are run in other LMICs including Bangladesh where radio has act as a important medium to address the taboos and myths around contraceptive usage (IPAS, 2020). In general, radio is a powerful tool over

[9]While the NFHS has information on hearing family planning messages over the television and newspaper as well, we believe that radio is a more powerful tool in spreading family planning messages. Radio is one of the most pervasive mediums of receiving and providing information in India (IIPS and MacroInternational, 2017, 2022). To this end, the National Health Mission has a campaign devoted specially to family planning messages over the radio NHM (2022). Radio has the capacity to reach a wider audience owing to the fact that it is affordable, easy to navigate, accessible and also available in local languages (TCI, 2002).

other media-tools like newspapers and TV, given that the coverage of internet and frequency of electricity in different parts of India are limited (IIPS and MacroInternational, 2017).[10] People can access radio using several distribution platforms and previous studies show that even after technological advancements in the various mass-media channels, radio plays an important role in advancing the health and social challenges (Adam and Harford, 1999). Evidence also suggests that radio can motivate people using oral traditions, thus making it more relatable compared to the other mass-media channels. As a medium, radio is inexpensive and widely available, and provides greater control to the government regarding where, when and whom to target the messages. For instance, government is able to reach the target audience who are unable to visit health facilities or are not comfortable in discussing contraception-related discussions with the health workers via radio.

That said, there is a concern that the instrument may not be not fully exogenous in the sense that it may have a direct effect on domestic violence that does not go through the woman's decision to use contraceptives. However, it is plausibly more exogenous than woman's own contraception decision, in particular it is less likely to be correlated with other uncontrolled characteristics of the woman or household norms or unobserved beliefs of the husbands. We exploit this idea by deriving bounds for the causal effect of contraception decision using the methodology developed by Conley et al. (2012).[11] Suppose that the instrument is not fully exogenous in the sense that it has a direct effect on IPV, with a coefficient of $\gamma \neq 0$. If we assume a range of values for γ between zero (perfectly exogenous) and the reduced form effect, we can derive an interval for the causal effect of woman's decision to use contraception solely that takes into account deviations from exogeneity ($\gamma = 0$). This procedure allows us to determine how big the direct effect of the instrument on IPV could be for the interval of the causal effect of $ContraDec$ on IPV to exclude zero.

One may also worry that exposure to family planning information over mass-media may not be completely random and be driven by state focus on limiting fertility, as well as gender based violence. To account for such channels, we include state fixed effects in our analysis. However, while inclusion of state fixed effects allays some concerns related to state level policies, given that our IV uses neighbourhood level variation, we further control for omitted variables that capture husband's characteristics, patriarchal beliefs of both men and women as well as social, cultural and gender norms at the neighbourhood level in the robustness analysis in section 5. Once we condition on these neighbourhood/cluster level characteristics along with our basic set of

[10] In the past, TV ads that have engaged in conversation around menstruation and reproductive health have faced serious backlash across the country (Babbar and Saluja, 2021).

[11] The Stata module for the plausibly exogenous methodology is developed by Clarke and Matta (2018) as the plausexog command.

controls, we posit that the only channel through which hearing about family planning methods specifically over the radio affects IPV is indeed through contraceptive practices, especially via the sole-decisions taken by the women for the contraceptive usage.

4 Results

Table 2 presents our baseline results for domestic violence (Panel A), sexual domestic violence (Panel B) and emotional domestic violence (Panel C).

Domestic violence: We report the OLS estimates in columns (1) - (3) for comparison with our preferred IV results in columns (4) - (6). In column (1) we regress the occurrence of domestic violence on the decision to use contraceptives without any controls and find a positive initial association between them. As we move to columns (2) and (3), we subsequently add the set of controls to include individual and household level characteristics in column (2) and state fixed-effects in column (3). Column (3) is the OLS specification with all relevant controls and we find that woman's decision to use contraceptives puts her at greater risk of domestic violence. The probability of incidence of domestic violence increases by 4.2 percentage points (pp). While these results are not causal, they provide an important insight into the associations between this decision and IPV and serve as useful benchmarks.

Given that both our outcome and explanatory variables are binary, a standard IV-Probit estimation is not feasible and hence we utilize a conditional mixed processes (CMP) estimation to implement the IV strategy. We present the IV results in the same progression as the OLS estimates. The marginal effect from the CMP estimations show a consistent and positive effect of a woman's decision to use contraceptives on the incidence of IPV. At the outset, we note that the estimates from the IV specifications are larger than the OLS estimates. This is likely driven by the fact that the effect of decision to use contraceptives by the woman is much larger for the subpopulation of those woman who take the decision solely owing to hearing about family planning information on the radio. From column (4), we note that the likelihood of occurrence of domestic violence increases by 23.6 pp if the woman solely decides to use contraceptives. This marginal effect (ME) of decision to use contraceptives falls as we include the controls in column (5) and further reduces as the state fixed-effects are included. Our most preferred specification, including comprehensive controls and state fixed-effects, is column (6). From column (6), the ME reveals that the likelihood of domestic violence increases by 10 pp if the the decision to use contraceptives is the woman's decision. We find these effects to be consistently statistically significant.

Sexual domestic violence: As before, in Panel B, columns (1) - (3) report the OLS estimates and columns (4) - (6) the IV results. Here, column (3) suggests the wife's decision to use contraceptives puts her at greater risk of sexual domestic violence by 4.4 pp. From the most preferred specification in column (6), we note that the likelihood of sexual domestic violence increases by 12.5 pp if the the decision to use contraceptives is the woman's decision. We find these effects to be consistently statistically significant.

Emotional domestic violence: We see a similar pattern for emotional violence to the previous sexual domestic violence and domestic violence results. The effects for emotional domestic violence are larger in magnitude. The OLS results from column (3) shows a positive association between the woman's decision to use contraceptives and emotional domestic violence by the order of 6.3 pp. The IV results report the ME of the woman's decision to use contraceptives. The ME reveals that women are at a higher risk of emotional violence by 26.7 pp if they decide to use contraceptives. The effects are statistically significant.

4.1 First stage results

We present the first stage results in Table 3. Columns (1) - (3) report the results with no controls, with individual and household characteristics and with state-fixed effects respectively. From all three columns, we note a positive relationship between the cluster average of women's exposure to family planning information on the radio and the woman i's decision to use contraceptives. The effect is largely similar across the specifications. Column (3) shows that the cluster average of women's exposure to family planning messages over radio leads to a marginal effect of 4.3 pp increase in woman i's decision to use contraception. All three specifications show that our model fairs remarkably well in terms of diagnostic tests to assess the efficiency and reliability of the IV. The First stage F-statistic is 31.14 in our preferred specification and above 10 across all specifications, implying that our instrument is strong. The Kleibergen Paap rk-LM statistic of 33.761 allows us to reject the null that the instrument is uncorrelated with the endogenous regressor. This indicates that hearing about neighbouring women's exposure to family planning messages over the radio is a relevant IV and is correlated with the endogenous regressor, woman's decision to use contraceptives.

4.2 Plausibly exogenous instrument

We recognize that the instrument may not be not fully exogenous, and we provide bounds on the second - stage effect of women's decision to use contraceptives solely on DV, SDV and EDV, assuming a degree of endogeneity in the instrument. First, we regress our outcomes on the IV and controls (Table 4), which gives us the reduced form effect of the instrument on DV, SDV, and EDV respectively. We then calculate the bounds for the second - stage effect of woman's decision to use contraception on our outcomes, assuming that the direct effect of the IV on our measures of IPV ranges from zero (perfectly exogenous) to the reduced form effect. We use Stata's *plausexog* command developed by Clarke and Matta (2018) and start with a simple specification in Column 1, then add our basic set of controls in Column 2, and finally add state fixed effects in Column 3 in all three panels. Panel A presents results for DV, Panel B for SDV and Panel C for EDV. When we include the controls and fixed effects, the second-stage effect of woman's decision to use contraceptives ranges between 0.006 and 0.961 for DV, 0.010 and 0.925 for SDV and 0.175 and 1.194 for EDV in Panels A, B and C respectively (Table 4, Column 3, β bounds). The bounds for the second-stage estimate exclude zero as long as the direct effect of the instrument is smaller than 0.016 for DV, 0.017 for SDV and 0.019 for EDV respectively (γ_{max} in Table 4, Column 3). This amounts to the direct effect of the IV being in the range of 51 to 55 percent of the reduced form effect. We conclude that the positive impact of a woman's decision to use contraceptives on her likelihood of IPV is robust to a fairly large degree of instrument endogeneity.

5 Robustness

5.1 Alternative estimation techniques

We implement several robustness checks to evaluate the sensitivity of our baseline CMP estimates. First, we repeat our analysis using a linear IV-TSLS strategy as an alternative estimation technique. Second, we utilize an IV-Probit estimation technique. Table 5 presents the results. For ease of comparison, we present the IV-TSLS for domestic violence, sexual domestic violence and emotional domestic violence in columns (1) - (3) respectively and IV-Probit results for the same outcomes in columns (4)-(6) respectively.

Similar to the baseline effects, from columns the IV-TSLS approach, we note that the probability of physical, sexual and emotional domestic violence increases statistically significantly if the woman solely takes the decision to use contraceptives in the household. Further, the marginal effects from the IV-Probit estimates also suggest statistically significant for all three

types of violence. Thus, our baseline results remain qualitatively unchanged and largely robust to these alternative estimation techniques. Overall, we note a positive statistically significant effect of a woman's sole decision to use contraceptives on the incidence of IPV.

5.2 Additional controls

5.2.1 Husband's characteristics

Our baseline set of regressions include individual women characteristics and the household characteristics as our covariates. Here, we assess the robustness of our results to inclusion of husband level characteristics as covariates as well. More specifically, we include information on the husband's age, employment status, education and alcohol consumption as additional controls. Inclusion of husband level characteristics alleviates any additional potential concerns of omitted variable bias in our estimates.

Table 6 presents the results from our baseline IV estimations using CMP technique for DV, SDV, EDV in columns (1), (2), and (3) respectively. We find that the likelihood of DV, SDV, and EDV increases by 13.7 pp, 13.1 pp and 26.3 pp respectively if the woman solely decides to use contraceptives. These effects are similar in magnitude to our baseline IV estimates in Table 2, 3 and 4 (column (3)), and continue to be statistically significant. Thus, the results are robust to addition of these controls and tell a similar story of greater risk of IPV if the woman in the household solely takes the decision to use contraceptives.

5.2.2 Spousal patriarchal beliefs

Here, we add some additional controls pertaining to spousal beliefs about IPV to our baseline set of controls. Men and women's inherent beliefs relating to women's freedom and whether IPV is (and is not) an acceptable behaviour pattern are high-risk factors for the increased prevalence of IPV, since the social costs of committing violence diminishes (Mookerjee et al., 2021a; Eckenrode, 2018). These beliefs specifically relate to whether beating the wife is justified in the following scenarios: (1) if the wife goes out without telling her husband, (2) neglects children, (3) argues with husband, (4) refuses sex, and (5) does not cook properly/burns the food. We code each of these scenarios as binary variables that equal 1 if their response is yes, and 0 otherwise. We then construct a variable capturing husband's and wife's beliefs, BJM_i and BJW_i as the sum-total of each of the binary variables corresponding to patriarchal beliefs.

Table 7 present the results in columns (1) - (3). We find that the incidence of domestic violence increases statistically significantly by 6.2 pp if the woman takes the decision to use contraceptives. The effects of the wife solely taking the decision to use contraceptives leads to

a statistically significant increase in the incidence of sexual and emotional domestic violence as well (see columns (2) and (3)). The magnitude of the effects are of the order of 8 pp and 18.1 pp for SDV and EDV respectively. This is evidence that the impact of a woman's decision to use contraceptives puts her at risk of IPV when such patriarchal attitudes and prevalent gender norms in household are controlled for.

5.2.3 Neighbourhood level cultural, social and gender norms

We extend the analysis in the previous section to further include additional controls that indicate cluster-level indicators of similar social, cultural and gender norms that may have a direct effect on IPV. We specifically include the average patriarchal attitudes in the neighbourhood as well as the average norms regarding women's freedom of movement. Inclusion of such neighbourhood characteristics alleviates the concern that such factors may be correlated with radio messages aired in neighbourhoods regarding family planning, and may impact women's IPV exposure, instead of all of the effect being mediated by decisions to use contraceptives. For these indicators, we specifically consider the cluster/neighbourhood average over the beliefs regarding whether IPV is justified as well as cluster average of women's freedom of movement.

Table 8 present the results. The likelihood of DV, SDV, and EDV increases by 5.8 pp, 8.2 pp and 16.9 pp if the woman takes the decision to use contraception solely. While the magnitudes are smaller in magnitude than the baseline results in Tables 2, 3 and 4, the direction of effects remain the same and are statistically significant. In summary, with this analysis, we show that our results remain robust to the inclusion of both household level patriarchal attitudes as well as neighbourhood level social norms while alleviating concerns of omission of variables and violation of exclusion restriction of the IV.

5.3 Falsification test

All our results in the baseline and robustness so far, point to a consistently positive and statistically significant effect of the wife's decision to use contraceptives on the incidence of IPV. Now, we show that such a result is not obtained if we consider any randomly assigned IPV outcome in our model. For this exercise, we keep the first stage relationship between our endogenous regressor, woman's decision about contraceptive use and our instrument, cluster average of women's exposure to family planning messages on the radio intact, and randomly shuffle our outcome variables. In other words, we associate a random woman j's instance of domestic violence to the decision to use of contraception by woman i instrumented by the average exposure to family planning through radio of women residing in a cluster. All things

equal, this makes the association between our dependent variables and the regressors in our estimation random. With this test, we can provide support to the validity of our results.

We replicate this analysis 100 times and show that 89 of the times there is no significant impact of a woman's decision to use contraceptives on the randomly assigned domestic violence outcome. Similarly, 85 (87) of times, we do not find significant effects of decision on the incidence of sexual domestic violence (emotional domestic violence). To be precise, we are unable to reject the null that the effect of contraceptive usage is equal to zero 11 out of 100 times for likelihood of DV, 15 out of 100 times for SDV and 13 out of 100 times for EDV respectively. Figure 1, 2 and 3 plot the t-statistics obtained corresponding to the ME of contraceptive use decision of woman for DV, SDV and EDV respectively models from each of the 100 replications. This falsification test shows that repeated estimations with random assignments of outcomes of violence against woman do not produce significant results and hence we are unable to falsify our baseline CMP results.

5.4 Decision to use contraceptives as a categorical variable

Our baseline analysis considers the variable of interest, $ContraDec_i$ as a binary variable that captures whether or not the decision to use contraceptives is the woman's alone. Here, we re-define this variable as a categorical variable to capture the effect of whether the decision is taken solely by the woman, jointly with her husband or whether she has no role to play in the decision. Specifically, we re-define $ContraDec_i$ such that it takes value 5 if the decision is the woman's alone, value 3 if the decision is jointly taken with her husband, and 1 if the decision is taken by her husband or otherwise. Table 9 presents the results. Using the CMP estimation, we note that as her say in the decision to use contraceptives increases, she is at a greater risk of physical, sexual as well as emotional domestic violence. We find statistically significant effect for DV, SDV, of the order of 0.9 and 0.8 pp, as shown in columns (1) and (2) respectively. The effect is not precisely estimated for EDV in column (3). The marginal effects indicate that the likelihood of IPV increases regardless of whether our variable of interest is defined as a binary or a categorical variable.

5.5 Using NFHS-4 sample

We conduct an additional robustness check of our analysis by changing the sample from NFHS-5 to NFHS-4, conducted for the year 2015-16 for India. Constructing the sample in the same manner as in our analysis for NFHS-5, we estimate the effect of a woman's decision to use contraceptives on the likelihood of her being exposed to physical domestic violence, sexual

domestic and emotional domestic violence.

We present our results in Table 10. Columns (1) - (3) present the IV results using CMP estimation and the marginal effects for DV, SDV and EDV respectively. While we do not find an effect on the incidence of physical domestic violence of a woman's decision to use contraceptives, we find that it puts her at a greater risk of both sexual and emotional domestic violence. From columns (2) and (3), we note that if the woman decides to use contraceptives, the probability of being exposed to SDV and EDV increases statistically significantly by approximately 6.4 and 18.9 pp respectively. These estimates suggest that the link between a woman's decision to use contraception has persisted in putting her at higher risk of both sexual and emotional abuse over time.

6 Heterogeneity Analysis

Thus far, we have documented the average effects of a woman's decision to use contraceptives on the incidence of IPV, measured by DV. As such, our results may mask interesting heterogenous effects. To evaluate whether our main results vary across different sub-samples, we cut our sample based on - (a) *woman's age* (b) *spousal employment status*, (c) *caste* and (d) *area of residence*.

We present the estimates in Table 9 and 10 respectively. First, we discuss the results in Table 11. Panel A presents the results by woman's age. We find a statistically significant effect of taking contraception decision alone on the incidence of domestic violence for younger women of the order of 15.2 pp. We do not find this to be true for older women. Panel B shows the results by spousal employment status. Columns (1) and (2) suggest that both employed and unemployed women are at greater risks of DV if the decision to use contraceptives are sole decisions. The effect is greater in magnitude for the sample employed women. This could be interpreted as evidence in support of theories of male backlash which suggest the idea that men might resort to violence when their partners' outside options improve in order to reinstate a culture of male authority and control over women (Jewkes, 2002; Dhanaraj and Mahambare, 2022; Finnoff, 2012). Further, we find a statistically significant effect of a woman's decision to use contraceptive on the incidence of domestic violence for the sub-sample of employed husbands. We do not see an effect for the sub-sample of unemployed husbands. These effects can be interpreted to reflect that the balance of power between couples is an important predictor of violence.

Table 12, Panel A shows the heterogenous effects by area of residence. We only find a statistically significant increase in the likelihood of DV by 10 pp if a woman decided to use

contraception solely in the rural sample perhaps suggesting that our baseline results are driven by the rural areas. Panel B presents the results by caste. We note that the results are statistically significant across the backward and upper castes, indicating a pervasive effect of woman's decision about contraception use on her risk of IPV.

7 Conclusion

In this paper, we attempt to estimate the causal effect of the decision to use contraceptives on the occurrence of intimate partner violence (IPV) within the household. While previous studies examine the link between IPV and fertility choices, in particular, the effect of domestic violence on contraceptive practices (Kupoluyi, 2020; Kusunoki et al., 2018; Maxwell et al., 2015; Mundhra et al., 2016), these studies find associations or correlations. We, on the other hand, posit that contraceptive practices within a household are themselves important determinants of incidence of domestic violence. To be more specific, we elicit whether the effect of a woman's decision to use contraceptives, whether taken solely or jointly with her husband, affects the incidence of intimate partner violence and the extent thereof. Considering the simultaneity issues in the relationship between contraceptive practices and IPV, resulting in endogeneity in the simple ordinary least squares estimates, we utilize an IV approach to address the question. By exploiting the average exposure of women in a cluster to family planning messages over the radio, we find novel estimates of the causal impact of woman i's decision to use contraceptives solely on the likelihood of IPV in her household.

Our findings document that contraceptive practices indeed emerge as important factors leading to occurrence of IPV. We find that the women's sole decisions to use contraceptives puts her at a greater risk of physical, sexual as well as emotional domestic violence. The magnitude of impact on physical domestic violence is as high as 10 percentage points if the decision is hers alone. In addition, we provide evidence that the effects are larger for sexual and emotional domestic violence, of the order of 12.5 and 26.7 percentage points respectively. Finally, we also note some interesting heterogenous effects of the woman's choice to use contraceptives on IPV. In line with the male backlash theory, we document that employed women, who solely take the decision to use contraceptives, are at a greater risk of violence (Dhanaraj and Mahambare, 2022; Jewkes, 2002). We also note that women with employed husbands are at greater risk of IPV and our effects are driven by those residing in the rural areas.

The issue addressed in the paper is timely and relevant with the latest figures from UN Women confirming that the levels of violence against women and girls increased during the COVID-19 pandemic (UN, 2022). In general, with nearly one in three women worldwide ex-

periencing some physical and/or sexual abuse by their husbands or intimate partners in their lifetime (WHO, 2021), IPV remains important from a policy standpoint. The results in our paper call for more comprehensive women empowerment initiatives with a greater focus on sexual and reproductive health on the lines of family planning and contraceptive use. In addition, our findings suggest expansion of government programs that aim at targeting men's understanding of contraceptive use in fertility practices given the interesting result we note for households with employed husbands.

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Tables & Figures

Table 1. Descriptive Statistics

Variable	Observations	%	Mean	Std Dev
Key Variables				
Severe Violence	55342	7		
Sexual Violence	55342	5.1		
Emotional Violence	55342	10.6		
Contraceptive Decision Making	55342	6.6		
Family Planning Messages via Radio	55342	14.8		
Relational Empowerment	54535		22.89	5.01
Socio-Demographic Characteristics				
Wealth Index				
Poorest	11880	21.47		
Poorer	12365	22.34		
Middle	11474	20.73		
Richer	10502	18.98		
Richest	9121	16.48		
Education Level				
No Education	15769	28.49		
Primary	8064	14.57		
Secondary	25614	46.28		
Higher	5895	10.65		
Working Status				
No	39165	70.77		
Yes	16177	29.23		
Religion				
Hindu	41952	75.8		
Muslim	6605	11.93		
Others	6785	12.27		
Area of Living				
Urban	13767	24.88		
Rural	41575	75.12		
Household Size	55342		4.962	1.934
Women's Age	55342		33.863	7.949
Husband Characteristics				
Education Level				
No Education	9415	17.01		
Primary	8209	14.83		
Secondary	29741	53.74		
Higher	7818	14.13		
Don't Know	159	0.29		
Working Status				
No	8419	15.21		
Yes	46923	84.79		
Drinks Alcohol				
No	40486	73.16		
Yes	14856	26.84		

Table 2. Effect of contraceptive decision making on physical, sexual and emotional domestic violence

Outcome:	OLS			IV		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: DV						
Contraceptive Decision Making	0.049***	0.045***	0.042***	1.677***	1.073***	0.788***
	(0.006)	(0.006)	(0.006)	(0.365)	(0.235)	(0.289)
Marginal Effects				*0.236****	*0.143****	*0.100****
				(0.049)	*(0.033)*	*(0.038)*
Panel B: SDV						
Contraceptive Decision Making	0.047***	0.047***	0.044***	1.863***	1.496***	1.168***
	(0.006)	(0.006)	(0.006)	(0.455)	(0.269)	(0.287)
Marginal Effects				*0.214****	*0.167****	*0.125****
				(0.048)	*(0.032)*	*(0.034)*
Panel C: EDV						
Contraceptive Decision Making	0.070***	0.066***	0.063***	1.920***	1.314***	1.513***
	(0.007)	(0.007)	(0.007)	(0.327)	(0.255)	(0.283)
Marginal Effects				*0.344****	*0.236****	*0.267****
				(0.050)	*(0.045)*	*(0.048)*
Observations	55,342	54,535	54,535	55,342	54,535	54,535
Individual Characteristics	No	Yes	Yes	No	Yes	Yes
HH Characteristics	No	Yes	Yes	No	Yes	Yes
State FE	No	No	Yes	No	No	Yes

Col (1) – (3) present OLS estimates of the effect of contraceptive decision making on IPV outcomes. Col (4) – (6) present the IV results estimated using CMP and the corresponding marginal effects. Panel A presents results for physical domestic violence *(DV)*, Panel B for sexual domestic violence *(SDV)* and Panel C for emotional domestic violence *(EDV)*. The outcome variable is a binary indicator for the likelihood of the physical, sexual and emotional domestic violence respectively. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.

Table 3. First-stage estimates – Effect of contraceptive decision making on IPV

Outcome:	IV		
	(1)	(2)	(3)
Family Planning Message via Radio	0.380***	0.382***	0.345***
	(0.044)	(0.045)	(0.048)
Marginal Effects	*0.049****	*0.048****	*0.043****
	(0.006)	*(0.006)*	*(0.006)*
Observations	55,342	54,535	54,535
Individual Characteristics	No	Yes	Yes
HH Characteristics	No	Yes	Yes
State FE	No	No	Yes
First Stage F Statistic	46.067	42.828	31.14
Kleibergen-Paap rK-LM Statistic	51.617	47.763	33.761
Endogeneity Test P-Value	0.000	0.000	0.000

Col (1)-(3) present the first stage estimates corresponding to our preferred CMP specifications reported in Col (4)-(6) in Table 2 and Table 3. Our instrument, family planning messages via radio, takes the value 1 if the respondent has heard family planning messages via radio and 0 otherwise. Since the first stage also evaluates a binary on-binary relationship, we estimate it using a CMP technique. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.

Table 4. Effect of contraceptive decision making on IPV – Plausibly exogenous IV regressions

	Outcome: IPV outcomes		
	(1)	(2)	(3)
	Panel A: Physical domestic violence		
$\hat{\gamma}$	0.032***	0.036***	0.030***
	(0.007)	(0.007)	(0.007)
β (Lower bound)	0.016	0.004	0.006
β (Upper bound)	0.870	0.974	0.961
γ_{max}	0.017	0.022	0.016
	Panel B: Sexual domestic violence		
$\hat{\gamma}$	0.029***	0.031***	0.030***
	(0.006)	(0.006)	(0.006)
β (Lower bound)	0.017	0.007	0.010
β (Upper bound)	0.773	0.836	0.925
γ_{max}	0.016	0.019	0.017
	Panel C: Emotional domestic violence		
$\hat{\gamma}$	0.036***	0.039***	0.037***
	(0.009)	(0.009)	(0.009)
β (Lower bound)	0.005	0.139	0.175
β (Upper bound)	1.003	1.077	1.194
γ_{max}	0.019	0.021	0.019
Observations	55342	54535	54535
Individual Characteristics	No	Yes	Yes
HH Characteristics	No	Yes	Yes
State FE	No	No	Yes

Notes: Col (1)-(3) present the estimates corresponding to plausibly exogenous regression methodology for our IPV outcomes with controls added sequentially. Panel A, B and C present the results for physical domestic violence, sexual and emotional domestic violence respectively. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. We implement the plausibly exogenous instrument regression methodology as follows. We start by running reduced form OLS regressions analogous to our IV specifications, but including the instrument directly in the second stage instead of *ContraDec*. The value of $\hat{\gamma}$ in the table refers to the coefficient of the instrument in this regression. We take $\hat{\gamma}$ as the upper bound for the range of γ, zero as the lower bound, and then compute bounds for the coefficient on *ContraDec* using the plausibly exogenous regression methodology of Conley et al (2010), utilizing the plausexog command in Stata developed by Clarke (2017). Standard errors are clustered at cluster level. *p<0.1, **p<0.05, ***p<0.01.

Table 5. Robustness – Effect of contraceptive decision making on IPV: Alternative estimation techniques

Outcome:	IV-TSLS			IV Probit		
	(1)	(2)	(3)	(4)	(5)	(6)
	Physical Violence	Sexual Violence	Emotional Violence	Physical Violence	Sexual Violence	Emotional Violence
Contraceptive Decision Making	0.629***	0.626***	0.785***	3.227***	3.429***	3.018***
	(0.170)	(0.153)	(0.209)	(0.323)	(0.265)	(0.380)
Marginal Effects				*0.563****	*0.593****	*0.605****
				(0.132)	*(0.141)*	*(0.129)*
Observations	54,535	54,535	54,535	54,471	54,467	54,471
Individual Characteristics	No	Yes	Yes	No	Yes	Yes
HH Characteristics	No	Yes	Yes	No	Yes	Yes
State FE	No	No	Yes	No	No	Yes
First Stage F Statistic	41.27	41.27	41.27			
Kleibergen-Paap rK-LM Statistic	39.97	39.97	39.97			
Endogeneity Test P-Value	0.000	0.000	0.000			

Outcome variable in Col (1)-(6) is a binary indicator for the likelihood of the physical, sexual, and emotional domestic violence, respectively. Col (1)-(3) reports estimate from IV-TSLS model and Col (4)-(6), from IV-Probit model and the corresponding marginal effects respectively. All demographic and household controls as well as state fixed effects are controlled. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.

Table 6. Robustness - Effect of contraceptive decision making on IPV: Inclusion of husband's characteristics.

Outcome:	IV		
	(1) Physical Violence	(2) Sexual Violence	(3) Emotional Violence
Contraceptive Decision Making	1.109***	1.262***	1.529***
	(0.264)	(0.250)	(0.203)
Marginal Effects	*0.137****	*0.131****	*0.263****
	(0.035)	*(0.029)*	*(0.034)*
Observations	54,535	54,535	54,535
Individual Characteristics	Yes	Yes	Yes
HH Characteristics	Yes	Yes	Yes
Husband's Characteristics	Yes	Yes	Yes
State FE	Yes	Yes	Yes

Col (1)-(3) represents the CMP estimates and the corresponding marginal effects for the physical, sexual, and emotional violence, respectively, after accounting for husband characteristics including husband's age, employment status, education, and alcohol consumption as additional controls. All demographic and household controls as well as state fixed effects are controlled. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.

Table 7. Robustness - Effect of contraceptive decision making on IPV: Inclusion of patriarchal attitudes

Outcome:	IV		
	(1) Physical Violence	(2) Sexual Violence	(3) Emotional Violence
Contraceptive Decision Making	0.507*	0.788***	1.032***
	(0.281)	(0.291)	(0.339)
Marginal Effects	*0.062**	*0.080***	*0.181****
	(0.035)	*(0.032)*	*(0.060)*
Observations	45,739	45,739	45,739
Individual Characteristics	Yes	Yes	Yes
HH Characteristics	Yes	Yes	Yes
Social Norms and Attitudes	Yes	Yes	Yes
State FE	Yes	Yes	Yes

Col (1)-(3) represents the CMP estimates and the corresponding marginal effects for the physical, sexual, and emotional violence, respectively, after accounting for patriarchal attitudes of men and women about wife-beating being a justified behaviour as additional controls. All demographic and household controls as well as state fixed effects are controlled. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.

Table 8. Robustness- Effect of contraceptive decision making on IPV: Inclusion of neighbourhood characteristics

Outcome:	IV		
	(1) Physical Violence	(2) Sexual Violence	(3) Emotional Violence
Contraceptive Decision Making	0.473*	0.803***	0.966***
	(0.260)	(0.289)	(0.346)
Marginal Effects	*0.058**	*0.082****	*0.169****
	(0.032)	*(0.032)*	*(0.061)*
Observations	45,739	45,739	45,739
Individual Characteristics	Yes	Yes	Yes
HH Characteristics	Yes	Yes	Yes
Social Norms and Attitudes	Yes	Yes	Yes
Neighbourhood Characteristics	Yes	Yes	Yes
State FE	Yes	Yes	Yes

Col (1)-(3) represents the CMP estimates and the corresponding marginal effects for the physical, sexual, and emotional violence, respectively, after inclusion of neighbourhood characteristics relating to patriarchal attitudes and social norms about women's freedom of movement in addition to controls in Table 8. All demographic and household controls as well as state fixed effects are controlled. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.

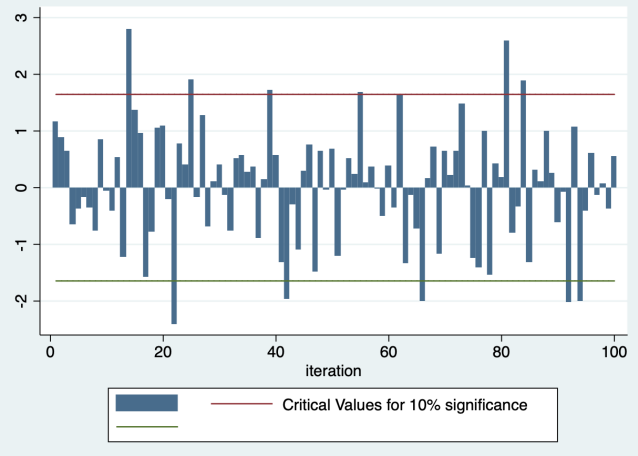

Fig. 1. Falsification test: Physical domestic violence (DV)

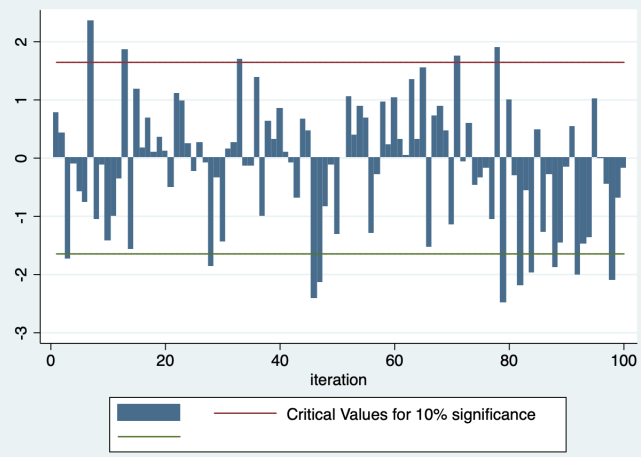

Fig. 2. Falsification test: Sexual domestic violence (SDV)

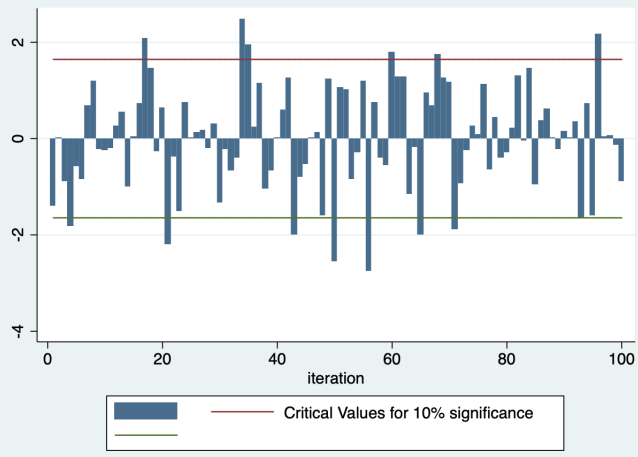

Fig. 3. Falsification test: Emotional domestic violence (EDV)

Notes: Fig. 1 presents the t-statistics of the effect of woman's decision to use contraception on the likelihood of physical domestic violence. Fig. 2. presents the same for the likelihood of sexual domestic violence. Fig. 3. presents the t-statistics for the effect of contraception decision on probability of emotional domestic violence. These test statistics are obtained from 100 iterations of our preferred two-stage least squares estimation, but using randomly assigned incidence of IPV outcomes.

Table 9. Robustness- Effect of contraceptive decision making (categorical) on IPV

Outcome:	IV		
	(1)	(2)	(3)
	Physical Violence	Sexual Violence	Emotional Violence
Contraceptive Decision Making	0.072**	0.073***	0.040
	(0.032)	(0.027)	(0.028)
Marginal Effects	*0.009***	*0.008****	*0.007*
	(0.004)	*(0.003)*	*(0.005)*
Observations	38,140	38,140	38,140
Individual Characteristics	Yes	Yes	Yes
HH Characteristics	Yes	Yes	Yes
State FE	Yes	Yes	Yes

Col (1)-(3) represents the CMP estimates and the corresponding marginal effects for the physical, sexual, and emotional violence, respectively. Contraceptive decision making has been modified as a categorical variable and it takes value 5 if the decision is the woman's alone, value 3 if the decision is jointly taken with her husband, and 1 if the decision is taken by her husband or otherwise. All demographic and household controls as well as state fixed effects are controlled. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.

Table 10. Robustness- Effect of contraceptive decision making on IPV using NFHS-4 data

Outcome:	IV		
	(1) Physical Violence	(2) Sexual Violence	(3) Emotional Violence
Contraceptive Decision Making	0.359	0.539*	0.991***
	(0.232)	(0.277)	(0.299)
Marginal Effects	*0.047*	*0.064**	*0.189****
	(0.031)	*(0.033)*	*(0.057)*
Observations	62,252	62,252	62,252
Individual Characteristics	Yes	Yes	Yes
HH Characteristics	Yes	Yes	Yes
State FE	Yes	Yes	Yes

Col (1)-(3) represents the CMP estimates and the corresponding marginal effects for the physical, sexual, and emotional violence, respectively, using the NFHS-4 data. All demographic and household controls as well as state fixed effects are controlled. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.

Table 11. Heterogeneity Analysis - Effect of contraceptive decision making on physical domestic violence - by women's age and spousal employment status

Outcome:	Panel A: Women's Age		Panel B: Spousal Employment Status			
	(1)	(2)	(3)	(4)	(5)	(6)
	Below 35	Above 35	Wife Unemployed	Wife Employed	Husband Unemployed	Husband Employed
Contraceptive Decision Making	1.250***	0.489	0.790**	0.976**	-0.050	0.879***
	(0.402)	(0.441)	(0.380)	(0.422)	(0.504)	(0.327)
Marginal Effects	*0.152****	*0.065*	*0.089**	*0.158***	*-0.006*	*0.113***
	(0.052)	*(0.060)*	*(0.045)*	*(0.070)*	*(0.059)*	*(0.044)*
Observations	29,186	25,349	39,020	15,515	8,254	46,281
Individual Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
HH Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes

Panel A and B presents the CMP estimates and the corresponding marginal effects for the effect of contraceptive decision making on physical violence by women's age and spousal employment status, respectively. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.

Table 12. Heterogeneity Analysis - Effect of contraceptive decision making on physical domestic violence - by area of living and caste.

Outcome:	Panel A: Area of Living		Panel B: Caste	
	(1)	(2)	(3)	(4)
	Urban	Rural	Backward	Upper Caste
Contraceptive Decision Making	0.999	0.760**	0.600*	1.560***
	(0.730)	(0.329)	(0.337)	(0.560)
Marginal Effects	*0.107*	*0.101***	*0.081**	*0.155***
	(0.085)	*(0.046)*	*(0.047)*	*(0.060)*
Observations	13,585	40,950	41,667	12,558
Individual Characteristics	Yes	Yes	Yes	Yes
HH Characteristics	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes

Panel A and B presents the CMP estimates and the corresponding marginal effects for the effect of contraceptive decision making on physical violence by respondent's area of living and caste, respectively. The sample is restricted to the women who participated in domestic violence module and are currently married women and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.

Appendix

Power to choose? Examining the link between contraceptive use and domestic violence

July 12, 2023

1 Robustness

1.1 Alternative estimation techniques

We implement several robustness checks to evaluate the sensitivity of our baseline CMP estimates. First, we repeat our analysis using a linear IV-TSLS strategy as an alternative estimation technique. Second, we utilize an IV-Probit estimation technique. Table A.1. presents the results. For ease of comparison, we present the IV-TSLS for domestic violence, sexual domestic violence and emotional domestic violence in columns (1) - (3) respectively and IV-Probit results for the same outcomes in columns (4)-(6) respectively.

Similar to the baseline effects, from columns the IV-TSLS approach, we note that the probability of physical, sexual and emotional domestic violence increases statistically significantly if the woman solely takes the decision to use contraceptives in the household. Further, the marginal effects from the IV-Probit estimates also suggest statistically significant for all three types of violence. Thus, our baseline results remain qualitatively unchanged and largely robust to these alternative estimation techniques. Overall, we note a positive statistically significant effect of a woman's sole decision to use contraceptives on the incidence of IPV.

1.2 Decision to use contraceptives as a categorical variable

Our baseline analysis considers the variable of interest, $ContraDec_i$ as a binary variable that captures whether or not the decision to use contraceptives is the woman's alone. Here, we re-define this variable as a categorical variable to capture the effect of whether the decision is taken solely by the woman, jointly with her husband or whether she has no role to play in the decision. Specifically, we re-define $ContraDec_i$ such that it takes value 5 if the decision is the woman's alone, value 3 if the decision is jointly taken with her husband, and 1 if the decision is taken by her husband or otherwise. Table A.2. presents the results. Using the CMP estimation, we note that as her say in the decision to use contraceptives increases, she is at a greater risk of physical, sexual as well as emotional domestic violence. We find statistically significant effect for DV, SDV, of the order of 0.9 and 0.8 pp, as shown in columns (1) and (2) respectively. The effect is not precisely estimated for EDV in column (3). The marginal effects indicate that the likelihood of IPV increases regardless of whether our variable of interest is defined as a binary or a categorical variable.

Table A.1. Robustness – Effect of contraceptive decision making on IPV: Alternative estimation techniques

Outcome:	IV-TSLS			IV Probit		
	(1)	(2)	(3)	(4)	(5)	(6)
	Physical Violence	Sexual Violence	Emotional Violence	Physical Violence	Sexual Violence	Emotional Violence
Contraceptive Decision Making	0.629***	0.626***	0.785***	3.227***	3.429***	3.018***
	(0.170)	(0.153)	(0.209)	(0.323)	(0.265)	(0.380)
Marginal Effects				*0.563****	*0.593****	*0.605****
				(0.132)	*(0.141)*	*(0.129)*
Observations	54,535	54,535	54,535	54,471	54,467	54,471
Individual Characteristics	No	Yes	Yes	No	Yes	Yes
HH Characteristics	No	Yes	Yes	No	Yes	Yes
State FE	No	No	Yes	No	No	Yes
First Stage F Statistic	41.27	41.27	41.27			
Kleibergen-Paap rK-LM Statistic	39.97	39.97	39.97			
Endogeneity Test P-Value	0.000	0.000	0.000			

Outcome variable in Col (1)-(6) is a binary indicator for the likelihood of the physical, sexual, and emotional domestic violence, respectively. Col (1)-(3) reports estimate from IV-TSLS model and Col (4)-(6), from IV-Probit model and the corresponding marginal effects respectively. All demographic and household controls as well as state fixed effects are controlled. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.

Table A.2. Robustness- Effect of contraceptive decision making (categorical) on IPV

Outcome:	IV		
	(1)	(2)	(3)
	Physical Violence	Sexual Violence	Emotional Violence
Contraceptive Decision Making	0.072**	0.073***	0.040
	(0.032)	(0.027)	(0.028)
Marginal Effects	*0.009***	*0.008****	*0.007*
	(0.004)	*(0.003)*	*(0.005)*
Observations	38,140	38,140	38,140
Individual Characteristics	Yes	Yes	Yes
HH Characteristics	Yes	Yes	Yes
State FE	Yes	Yes	Yes

Col (1)-(3) represents the CMP estimates and the corresponding marginal effects for the physical, sexual, and emotional violence, respectively. Contraceptive decision making has been modified as a categorical variable and it takes value 5 if the decision is the woman's alone, value 3 if the decision is jointly taken with her husband, and 1 if the decision is taken by her husband or otherwise. All demographic and household controls as well as state fixed effects are controlled. The sample is restricted to the women who participated in (a) domestic violence module and (b) are currently married and living with the partner. Standard errors (in parentheses) are clustered at the district level. ***, **, and * represent significance at 1%, 5% and 10%, respectively.