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Longitudinal associations of intimate partner violence attitudes and perpetration: Dyadic couples data from a randomized controlled trial in rural India

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Abstract

We conducted longitudinal analyses examining the associations between intimate partner violence (IPV) attitudes and women's reported IPV in couples ($N = 762$) using 3 waves of data from a randomized controlled trial in Maharashtra, India. We found that, between Waves 1 and 2, men's and women's acceptance of IPV in the overall population decreased significantly while reports of IPV increased. These changes, we hypothesize, are evidence of an exogenous shock, possibly a high profile rape in Delhi in December 2012, that may have impacted the entire population. Cross-sectional associations between men's attitudes towards IPV and reported IPV were not significant in Wave 1, while positively and significantly associated in Waves 2 and 3. Longitudinal analysis showed that reduction in men's acceptance of IPV between Waves 1 and 2 was associated with a lower likelihood of reported IPV in Wave 3. Women's Wave 1 acceptance of IPV was positively associated with reported IPV in the Wave 1 cross-sectional analysis, while Wave 2 and Wave 3 measures of IPV acceptance were negatively associated with reported IPV in Waves 2 and 3 respectively. Longitudinal analyses of the change in women's attitudes towards IPV from Wave 1 to 2 and reported IPV in Wave 3 were insignificant. However, When women first reported IPV in Waves 2 or 3 they were less likely to report acceptance of IPV in that same wave. Findings suggest that changes in husbands' IPV acceptance is predictive of subsequent IPV, while newly experienced IPV predicts decreased IPV acceptance for women. Wave 2 and Wave 3 results were significant for the control group only, evidence that the intervention affected those associations, potentially changing attitudes more quickly than behavior. We recommend interventions that expose community opposition to IPV as a new social norm, and analysis of how the 2012 Delhi rape case may have affected these norms.

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Keywords

Intimate partner violence; Social norms; India; Randomized controlled trial; Attitudes; Couples level data

Men's perpetration of intimate partner violence (IPV) is relatively common across the globe with the World Health Organization estimating that 30.0% of ever-partnered women have been victims of sexual or physical violence by an intimate partner, with the prevalence much higher in certain regions (WHO, 2013). This violent behavior results from a complex combination of psychological, economic, and sociological factors (Heise, 1998). While societal level factors, such as gender inequalities and patriarchal family structures, facilitate a social environment that enables violence against women, not all men within gender unequal societies perpetrate violence, and thus individual risk-factors, such as alcohol use and exposure to family violence, also play a role in men's perpetration of IPV (WHO, 2013). Across many contexts, men who believe that IPV is acceptable are more likely to perpetrate IPV (Hindin et al, 2008), although some previous cross-sectional research with men in India has shown that the association between men's IPV attitudes and IPV perpetration may not be significant when controlling for other factors (Fleming et al., 2015). A shortcoming of most analyses that have investigated these associations is that they are cross-sectional, preventing estimation of the direction and possible causality of these relationships (Hindin et al., 2008).

Women, in general, tend to express equal or greater acceptance of IPV than do men. This has been found in countries all over the world including several countries in sub-Saharan Africa, north Africa, Vietnam, and Honduras (Hindin et al., 2008; Khawaja et al., 2008; Shakya et al., 2016; Uthman et al., 2009). A detailed analysis of 17 countries in sub-Saharan Africa revealed that women were more likely than men to accept IPV in communities with high rates of polygamy, lower literacy, and communities that are lower on gender and human development indices (Uthman et al., 2010). Importantly women who believe that IPV is acceptable are more likely to report experiencing IPV (Abramsky et al., 2011; Hindin et al., 2008; Khawaja et al., 2008; Sambisa et al., 2011). Again, most research demonstrating the strong and positive association between being a victim of IPV and reporting attitudes accepting of it is cross-sectional; without longitudinal data on the relationship between attitudes and victimization, it is impossible to untangle how these factors are temporally related (Hindin et al., 2008). Do women who experience IPV tend to accept it in order to justify their own experience, or does acceptance of IPV make a woman vulnerable to choosing relationships in which IPV is likely to occur, or potentially even tolerating it within their own relationships?

While women are more likely to accept IPV than men, concordance between spouses on attitudes towards IPV is common in many settings (Alio et al., 2011; Shakya et al., 2016). This is not surprising given that married couples tend towards concordance on attitudes around many issues, affective states, and even health outcomes (Meyler et al., 2007; Pachucki et al., 2011; Shakya, 2015). In the context of IPV behavior, in which attitudes accepting of IPV and perpetration of IPV both potentially cluster and are transmitted within families, identifying concordance around IPV attitudes between spouses, and tracking how

that concordance may change over time, can provide important insight into the means by which IPV attitudes within families can be changed.

Given that many IPV prevention interventions are predicated on the assumption that changing IPV attitudes will change behavior (Whitaker et al., 2006), and that a change in attitudes is a reasonable proxy for behavior change, it is crucial to use longitudinal data to more thoroughly understand the associations between individual acceptance of IPV within families and IPV perpetration as they change across time. In this paper, we use 3 waves of longitudinal data from a randomized controlled trial of married couples in rural India which tested CHARM, a family planning and gender equity counseling intervention tailored to husbands and couples in rural India (Yore et al., 2016). The trial successfully reduced men's acceptance of IPV in the intervention compared to the control, while there was an insignificant treatment effect on women's reports of physical IPV (Raj et al., 2016). By using longitudinal data from this study, we can begin to untangle whether attitudes of acceptance of physical IPV, for women and men, are associated with women's reports of physical IPV, cross-sectionally and over time, and whether these associations differ across treatment and control group. We also assessed concordance in male and female attitudes of acceptance of male perpetrated physical IPV against wives, again cross-sectionally and over time.

1. Methods

1.1. Data

Data for this study was collected as part of the CHARM intervention, a randomized controlled trial evaluating a family planning plus gender equity counseling intervention for husbands and couples which has been described in detail in a previous publication (Raj et al., 2016; Yore et al., 2016).

1.2. Participants

We collected data from men who were recruited from married couples (N = 1081) in rural areas of Thane district, Maharashtra, India from March to December 2012. Men were surveyed at baseline and at 9 and 18-month follow-ups. Of the 1081 men participating in the baseline assessment, 85.5% (n = 924) and 84.5% (n = 913) completed 9- and 18-month follow-up surveys, respectively.

1.3. CHARM intervention

The intervention involved three gender, culture and contextually-tailored family planning and gender equity (FP + GE) counseling sessions delivered by trained male village health care providers (VHPs) to married men (sessions 1 and 2) and couples (session 3) in a clinical setting, or if required, near or in the participant's home, and included counseling on gender equity-related issues (e.g., son preference), healthy and shared family planning decision-making, and respectful marital communication and interactions (inclusive of no spousal violence in the men's sessions). The three sessions were delivered over a three-month period, with at least 1 week between sessions (see online appendix for details on intervention, recruitment, and data collection).

1.4. Control condition

Men in the control condition were notified of available public health family planning services and their wives were referred to government health system FP services.

1.5. Measures

1.5.1. Physical IPV perpetration—Women were asked to report whether in the last 6 months her husband had ever slapped her; twisted her arm or pulled her hair; pulled her, shook her, or thrown something at her; kicked her, dragged her, or beat her up; choked her or tried to burn her on purpose; or threatened to attack her with a knife, gun, or any other weapon (India Demographic and Health Survey 2005-06, 2006). We coded physical IPV as a binary yes if the woman responded yes to any of these questions and no if she did not.

1.5.2. IPV attitudes—Men and women were both asked to report “In your opinion, is a husband/companion justified in hitting or beating his wife/companion in the following situations: (a) If she leaves the house without telling him? (b) Neglects the children? (c) Argues with him? (d) Burns the food? (e) Cheats on him? Answer choices were either yes or no. Consistent with previous research we coded a person as positive on IPV acceptance if they answered positively to any of the five questions (Shakya et al., 2016). Cronbach’s alpha for the women’s responses were 0.91 (WV1), 0.91 (WV2), 0.96 (WV3), and for the men’s response they were 0.81 (WV1), 0.83 (WV2), 0.81 (WV3).

1.5.3. Control variables—For sociodemographic controls we included continuous measures of *age and education* for both men and women, and categorical measures of *caste*—scheduled caste, scheduled tribe, other backwards caste, or other. We assessed family economic status using *household food insecurity* and *household room number*, both measures previously validated to predict household standard of living (Agarwal et al., 2009; Filmer and Pritchett, 2001). We assessed household food insecurity via a binary measure of whether anyone in the household “went to bed hungry” or “went the whole day without eating within the last month”; if either husband or wife reported “yes” on these items, we classified the household as food insecure. We also assessed *female employment* based on women’s response to a single “yes”/“no” item on whether they were engaged in “personal income producing activities.” To measure indicators of a traditional family we asked men whether their marriage had been *arranged* by their family, yes or no (Hall et al., 2008; Iyer, 2002). We included women’s reports on *number of living children* via items on number of living boys and girls, which we summed. Finally, we included a measure of women’s reports of familial IPV, which has been shown in many studies to be predictive of IPV reporting. Women were asked whether, as far as they know, their father had ever beat their mother.

1.6. Statistical methods

We first tested the cross-sectional association between men’s attitudes and women’s reported IPV, and women’s attitudes and women’s reported IPV for each of 3 waves of data using logistic regression on dyadic couple level observations. We then parsed that out further in longitudinal multivariate logistic regression models to see whether the differences in men’s and women’s IPV attitudes from Wave 1 to Wave 2 predicted women’s reports of IPV in Wave 3. For these models we subtracted Wave 2 attitudes from Wave 1 attitudes to create a

measure of change that preceded the Wave 3 measure of reported IPV, which was asked regarding IPV experienced in the 6 months preceding the survey. We then tested the bivariate cross-sectional associations of men's IPV attitudes on women's IPV attitudes at each wave, and finally used a multivariate logistic regression analysis to test the cross-sectional association of men's IPV attitudes on women's IPV attitudes at Wave 3 including all controls. We used logistic regression for all of our analyses, using R version 3.3.0, and stratified our analysis for intervention and control group. To adjust for the clustered sampling design we included cluster level fixed effects in our multivariate models.

2. Results

2.1. Descriptive statistics (Table 1)

We first calculated simple frequencies of IPV attitudes and reported IPV experience across all 3 waves for men and women, and for control and intervention (Table 1). Here we used both a binary score (accept IPV or not) as well as the summed total of all 5 responses to questions regarding the acceptability of IPV in different circumstances. While approximately the same proportion of women and men accepted IPV in one or more of the 5 situations (61% of men and 64% of women), overall women were more likely to endorse acceptability of IPV in a greater number of situations (mean number of situations for men 2.11 vs 2.85 for women). By comparison in the 2005–2006 DHS, 44% of women and 37% of men in Maharashtra reported accepting one or more justifications for partner violence, lower than our estimates for this specific rural population (International Institute for Population Sciences, 2007). Importantly we found a striking difference between Wave 1 and Waves 2 in the IPV acceptance scores for both men and women. IPV acceptance dropped by close to 40% for both men and women between Wave 1 and Wave 2, and while this drop was greater for the intervention group, it was significant in the control group as well (see (Raj et al., 2016) for more details on intervention versus control main effect). Notably, while the acceptability of IPV decreased across all groups between Wave 1 and Waves 2, the reported IPV almost doubled for both intervention and control (though the overall rate was significantly less for the intervention group). In Wave 2, 20% of women in the control group reported experiencing IPV within the last 6 months, up from 10% in Wave 1. For the intervention group, 14% reported IPV in Wave 2, vs 9% in Wave 1. By comparison in the 2005–2006 DHS, 17% of currently married women in Maharashtra had reported spousal physical violence in the last 12 months (compared to our measure of the last 6 months) (International Institute for Population Sciences, 2007).

2.2. Association between men's IPV acceptance and women's IPV reporting

SA Table 1 shows the cross-sectional association of men's IPV attitudes and women's report of IPV. Table 2 shows the breakdown of those who reported IPV by men's IPV acceptance for both treatment and control for each wave. In Wave 1 there is no association between men's IPV attitudes and women's IPV reports for either the treatment group or the control group. For instance, within control couples IPV reporting was 10% for couples in which men report acceptance of IPV, and 10% for couples in which men did not report acceptance of IPV. These breakdowns are very similar in the treatment group. In Waves 2 and 3, however, when men in the control group were accepting of IPV, their wives were more likely

to report having IPV perpetrated against them. Table 2 shows, for example, that for Wave 2, in control couples in which men report attitudes accepting of IPV, 28% of wives reported IPV, compared with 13% of couples in which men did not report IPV.

We next ran a set of longitudinal multivariate models in which we regressed the net change in men's IPV attitudes from Waves 1 to 2 with wives reported IPV experience at Wave 3, controlling for previous wave reported IPV, all sociodemographic controls, cluster level fixed effects, and stratified by treatment and control (Table 3). We calculated the IPV attitude change by subtracting Wave 2 values from Wave 1 values. Here we found that a change in men's IPV attitudes from Wave 1 to Wave 2 is strongly predictive of wife's reports of IPV in Wave 3, but only for the control group (Table 3 Model 3.2). A one standard deviation decrease in a man's IPV attitudes from Wave 1 to Wave 2 predicts a 30% decrease in likelihood that his wife will report IPV in Wave 3.

2.3. Association between women's IPV acceptance and women's IPV reporting

We next considered the cross-sectional association of women's IPV acceptance with women's reports of IPV (Table SA 1). In Wave 1, the association between women's IPV attitudes, and women's reports of IPV was strongly positive and did not differ between treatment and control. In complete contrast to Wave 1 findings, Wave 2 and Wave 3 associations were only significant for the control group, and the associations were strongly negative. For instance we see in Table 2 that in Wave 2, 24% of women who did not accept IPV reported having experienced it, while only 14% of those who did accept it reported having experienced it. The longitudinal change in women's IPV attitudes from Wave 1 to Wave 2 was, in contrast to the men's findings, *not significant for either control or treatment* (Table 3, Models 3.1 and 3.2). Fig. 1 depicts the likelihood of IPV reporting for men who did and did not accept IPV, stratified by wave, and treatment group, while Fig. 2 shows the same breakdown for women.

Given the robust evidence from prior cross-sectional research on the associations between women's IPV attitudes and their experience of IPV, the reversal of association we found after Wave 1, and the lack of such findings in our longitudinal attitude change analyses for women, we then conducted an exploratory analysis reversing the prior models to determine whether newly reported IPV predicts women's IPV attitudes (Table 4.). Our outcomes were Wave 2 IPV attitudes for women who did not report IPV in Wave 1, but did report IPV in Wave 2 (Models 4.3 and 4.4, N = 97), and Wave 3 IPV attitudes for women who did not report IPV in Waves 1 or 2, but did report in Wave 3 (Models 4.5 and 4.6, N = 63) controlling for previous waves men's and women's IPV attitudes, caste, and stratified by treatment and control. Because the predictive categories in these analyses were small, we used only those socio-demographic controls shown to be significant in bivariate models (SA Table 2), and omitted the use of cluster level fixed effects for these models. *Results were only significant for the control group.* The women who newly experienced IPV in Wave 2 (Model 4.4) were significantly more likely to oppose IPV in Wave 2 than those who reported no IPV in Waves 1 and 2, or those women who had previously reported IPV in Wave 1. Those who newly reported IPV in Wave 2 were 53% (95% CI 26%–88%) less likely to accept IPV in Wave 2 compared to all others. We tested this again in Wave 3, looking at the

likelihood of accepting IPV in Wave 3 for those who had newly reported IPV in Wave 3. The results were the same. Newly reported IPV in Wave 3 was associated with lower odds of accepting IPV amongst women in the control group. Models 4.1 and 4.2 show that those who newly reported IPV in Wave 2 reported no attitudinal difference from the rest of the sample in Wave 1, which negates the possibility of pre-existing attitudinal differences in that group. Fig. 3 illustrates these differences.

2.4. Association between men's acceptance of IPV and women's acceptance of IPV

Finally, we looked at the cross-sectional correlation between men's and women's reports of IPV acceptance within the population, stratified by treatment group. First running a simple bivariate model, we found that in Waves 1 and Wave 2 men's IPV acceptance scores did not significantly predict the IPV acceptance scores of the women in either group (SA Table 3). By Wave 3, however, men's and women's IPV acceptance scores were associated, though more significantly for control than for treatment. In our multivariate models, we found the same pattern, however while the direction of effect remained positive (Wave 3 men's and women's scores were positively correlated), the associations for those in the treatment group lost significance.

2.5. Differential associations between treatment and control

While Wave 1 associations were consistent between treatment and control, Wave 2 and Wave 3 results differed so much that we conducted additional exploratory analyses to understand why. SA Table 4 shows the transitions between reported IPV groups for the treatment and control. We found that of those men whose wives did not report IPV by Wave 1, fewer of those in the treatment group reported IPV in later waves compared to the control group (see Fig. 4). Of those whose wives reported IPV in Wave 1 or Wave 2; however, there was little if any difference in Wave 3 reporting between treatment and control, suggesting that much of the utility of the intervention was in preventing new IPV as opposed to reducing existing IPV. This may be why the significance of the main effect in reducing physical IPV was just slightly less than statistically significant (Raj et al., 2016). In SA Table 5, we look at the trend in men's IPV attitudes across waves, by treatment group, and IPV reporting category. We see here that while reduction in IPV in the control group seems to be matched by a relative decrease in IPV attitudes, those in the treatment group who continue IPV are also reporting reduced acceptance for it.

3. Discussion

In this study we looked at the couple level attitudinal predictors of IPV reporting in rural Maharashtra, India. We found a significant difference in both the reported acceptance of IPV and the experience of IPV between Waves 1 and Waves 2 and 3, and though these changes were greater in magnitude for the treatment group, there were still notable changes for the control group. The control group received no intervention related to gender equity or IPV education. Despite that, IPV acceptance scores in the control group dropped precipitously while IPV reporting scores increased by the same magnitude or more. Why did IPV reporting change so significantly among this group between the first and second waves? For the sharp changes in IPV attitudes, we hypothesize that an external event, an exogenous

shock to which the whole community was exposed, may have precipitated the changes. Based on our team's knowledge of the setting, the most likely possibility is that on December 16, 2012 – immediately after we finished baseline data collection - a young Indian woman was brutally raped by a group of men on a bus in New Delhi. This incident generated a national outrage over violence against women in India, and resulted in an onslaught of Indian media coverage over the issue of gender based violence, patriarchy, and gender inequity in Indian society for the months to follow (Belair-Gagnon et al., 2014) (Drache and Velagic, 2013). Though we do not have empirical data to test this hypothesis, we feel that the timing of the event and the large shift in IPV attitudes between waves 1 and 2 among the control group suggest the possibility of this exogenous shock. What is particularly interesting, however, is that IPV reporting increased as acceptance of IPV decreased. We have three hypotheses to explain this. First, it is likely that a portion of the increased reporting of IPV was due to a testing effect. Women were interviewed multiple times and may have been more willing to disclose this sensitive issue in later interviews after greater trust and rapport was established with the study team. While this is a reasonable possibility, the magnitude of the change seems to be greater than what one would expect from this sort of response bias. Second, the increase in awareness and change in IPV attitudes caused by the Delhi rape incident may have resulted in an increase in reporting of IPV. If this were the case, it is also important to consider that changes in men's attitudes towards IPV would not have necessarily changed their IPV behaviors. Behavior change is often triggered not only by individual attitude change, but by an understanding that the attitudes of others in the community have also changed (Bicchieri and Xiao, 2009; Hernlund and Shell-Duncan, 2007). When this occurs, the new collective attitude becomes a norm, and individuals understand that violation of that norm can result in sanctions such as disapproval or open castigation (Bicchieri and Muldoon, 2011). Thus, behavior change may be a slower process than attitude change. This possibility leads to our third hypothesis. There is evidence that social norms change around gender equity can be accompanied by a backlash in which men who do believe that IPV is acceptable and appropriate, rebel against the new norm in part by increasing their perpetration of violence (Dworkin et al., 2012; Dworkin et al, 2015). While our results provide some important new considerations for these dynamics, we do not have the data to empirically test the hypotheses we have described in this paragraph. Thus, further research is ultimately needed to untangle how and why these attitudes shift, and how they correspond with IPV behavior over time.

The between wave changes in IPV attitudes and behaviors could be seen not just in the response frequencies of IPV acceptance and reporting, but in the statistical associations between IPV attitudes and IPV reports. The Wave 1 data showed no correlation between a man's acceptance of IPV and a woman's report of it, but significant and positive correlations in Waves 2 and 3. It appears that as acceptance of IPV decreased within the community, due perhaps to the exogenous shock, those families in which men were most likely to accept IPV were those in which women were most likely to experience it, particularly in the control group. This suggests that these men were the most intransigent IPV accepters, and despite the reduction in IPV acceptance within their communities, were persistent in their IPV behaviors. In contexts in which social norms may shift, those who lag behind that shift may be those with the strongest personal attitudes in support of the previous behavior (Shell-

Duncan and Herniund, 2006). Importantly, the association between men's IPV attitudes and their wife's report of experience IPV was longitudinal. In the control group, a change in men's acceptance of IPV from Wave 1 to Wave 2 was predictive of their wife's IPV experience at a Wave 3, controlling for previous wave experience. While men's IPV acceptance in the treatment group declined more than it did in the control group, this decline at the aggregated group level was not consistent at the individual level with an associated decrease in IPV perpetration. Men in treatment group, as part of the intervention, were exposed to strong messages against IPV, and subsequently were less likely to report acceptance of it. This decrease in acceptance however, seemed to precede an actual full reduction in behavior, causing a discordance between reported attitudes and reported behaviors.

While our Wave 1 data showed, consistent with prior research, that women who report IPV are more likely to accept IPV, in Waves 2 and 3 this dynamic was reversed. Reported IPV experience for women was correlated with a significantly lower likelihood that she would report IPV as being acceptable, but only for women in the control group. Previous research, mostly cross-sectional, has shown that women who report IPV tend to report attitudes in acceptance of IPV, although it has been difficult to delineate the mechanism by which that occurs. Do women who experience IPV report acceptance of it as a means to justify what they have experienced? Are women who believe that IPV is acceptable more likely to tolerate it within their own relationships? Or are women who accept IPV, perhaps due to childhood exposures or transmitted family norms, more likely to enter relationships in which IPV is likely to occur? This question is not just academic. While we know that perpetration of IPV is intergenerational (Stith et al., 2000), there is growing evidence that norms around IPV may also be transmitted through families (Clark et al., 2010; Morse et al., 2012). The IPV acceptance attitudes of mothers may significantly impact the IPV acceptance attitudes of their sons, and people who live within the same household are likely to share IPV acceptance attitudes (Shakya et al., 2016). In patrilocal contexts such as India, in which married men and their wives are expected to live with the man's parents, this could be a particularly important consideration. In our analyses we provide some insight into this question by demonstrating that in the control group, women who report IPV for the first time, either in Wave 2 or 3, are far more likely to report disapproval of IPV. This suggests that at least within the short term, a newly reported experience of IPV is correlated with a significantly decreased acceptance of it. This was a clear reversal of associations found in previous data, but only in Waves 2 and 3, and is therefore strong evidence towards the possibility of an exogenous shock. The caveat is of course that if the increase in reported IPV at Wave 2 is in fact really an increase in IPV reporting, then some of those newly reported cases may in fact not be newly experienced IPV. To account for that, we tested the association between newly experienced IPV and negative acceptance of IPV for those who did not report IPV in Wave 1 or in Wave 2, but for those who newly reported IPV in Wave 3, after the point at which the IPV reporting within the general population had already increased. The results were the same. Women who reported IPV for the first time were significantly less likely to report acceptance of IPV for any reason. This suggests that newly experienced IPV is associated with a decrease in its acceptance amongst women, at least within the context of this potential exogenous shock. Furthermore, our longitudinal analyses

showed no difference in IPV reporting for women's whose attitudes changed from Wave 1 to Wave 2, suggesting that women's acceptance of IPV is responsive to a change in IPV experience, but that women's experience of IPV is not necessarily a response to their own changes in attitudes towards it. It is important to note that given the possible shift in IPV awareness across these communities and subsequent changes in acceptance and IPV reporting, these results may only be generalizable to contexts in which a community wide exposure has increased awareness of IPV throughout the population overall.

Finally, our results showed little correlation between the IPV acceptance of married men and women. This is an interesting finding, given that, in general, the attitudes and behaviors of married couples are correlated, and that previous research has shown correlations on IPV attitudes between spouses in general. The couples in this dataset, however, had not been married very long (mean years of marriage less than 4 year), and the marriages were for the most part arranged (~75%), so it is possible that time and familiarity may increase those associations. By Wave 3, couple level associations between IPV attitudes were significant for those in the control group. Furthermore, while the intervention men were significantly less likely to accept IPV than control men, *there was no difference between intervention and control women in their IPV acceptance*. The result is a strong indication that the intervention, while successful at decreasing IPV acceptance attitudes for men (Raj et al., 2016), did not create an attitudinal change amongst women. Furthermore, the fact that the association between men's and women's attitudes did not differ between control and treatment is an indication that there was no spillover-the change in men's attitudes did not spillover to cause a change in their wives' attitudes.

3.1. Limitations

These analyses have limitations. First, we do not know the cause of the overall population shift in IPV attitudes and IPV reporting which took place in the population between waves 1 and 2. While we can reasonably hypothesize that it is the result of the Delhi rape case, we cannot conclusively assert that. So we are left speculating regarding this shift, and what it means for the results of our analyses. Second, IPV reporting in our data was measured through women's self-report, so as is the case with any survey data based upon self-report, there is bound to be reporting bias. Third, while the questions that we used to measure IPV acceptance are the gold standard questions used in the DHS, there is evidence that these questions may introduce response bias, and as a result overestimate the degree to which women accept IPV (Schuler et al., 2012). If this is this the case, however, it is likely that the skew in responses would be consistent across women, and so the associations found as a result may not be impacted. Fourth, it is possible that the non-significance of effects in the intervention group after Wave 1 are the result of response bias: those in the intervention changed their reporting of attitudes and experience because of the intervention which, as a consequence, muddied the associations in the intervention group. This opportunity for comparison is a key strength of our analyses while also raising important questions regarding its mechanism. Qualitative research to further understand the effects of these sorts of interventions may be necessary to uncover the mechanisms behind these results. Fifth, our estimates for IPV attitudes and IPV reporting are slightly different than those found in the

last DHS for which data is available, which was 2005–2006. Finally, this study was conducted in a single Indian district in one state, which limits generalizability.

4. Conclusion

The results of our analysis showed a marked shift in the associations between IPV attitudes and IPV reporting in Waves 1 and 2, possibly as the result of an exogenous shock, which we hypothesize was the nationwide media coverage of gender issues, including violence against women, in India. We found that overall IPV attitudes and IPV reporting were associated but the direction of those associations differed by wave, by gender, and by treatment group. These results suggest that focusing interventions solely on decreasing acceptability of IPV amongst individuals may be insufficient. As suggested by findings related to the hypothesized exogenous shock, decreasing acceptability of IPV in conjunction with efforts to increase open conversations about these topics may help women disclose their IPV victimization. Furthermore, as an increasing proportion of a population begins to disapprove of violence against women, a forum for voicing that disapproval may help men understand the degree to which violence against women violates new community norms. While women's acceptance of IPV may not seem relevant given the obvious fact that women do not perpetrate IPV against themselves, the fact that IPV attitudes can be transmitted through families, and that IPV perpetration tends to cluster in families, is an important argument for working towards decreasing the acceptance of IPV amongst both women and men.

Recruitment procedure

Participating couples were recruited from 62 geographic clusters of approximately equal size mapped for the purpose of randomization. Clusters were created based on geographic boundaries, population density (approximately 300 households per cluster), and proximity to public and private health services. Fifty of the 62 clusters were selected based on ease of reach, then randomized to intervention (n=25) or control conditions (n=25) using computer-generated random numbers. Then, couples were randomly selected from within the clusters to participate.

Data collection procedures

Male-female research teams – trained in conduct of survey research on IPV - approached identified households for recruitment. Age-eligible couples indicating interest and willingness to participate provided written informed consent and were screened privately for eligibility. Eligible couples: 1) included husbands aged 18–30 years and their wives, 2) were fluent in Marathi (native language of Maharashtra), and 3) resided together for the past three months with no intent to relocate in the next 2 years. Couples reporting infertility, surgical sterilization, or exhibiting serious cognitive or health impairment were excluded. Both members of the couple had to provide consent and indicate eligibility and willingness to participate in this study. Once eligibility was ascertained, men and women participated in the baseline survey in a private location (men and women were interviewed separately by someone of the same sex).

With recognition of the high rates of spousal violence in India, World Health Organization guidelines for research on domestic violence were followed to help ensure that women participating in our study, which did include domestic violence assessments, were not at increased risk for violence due to their participation. Hence, in addition to separately and privately surveying husbands and wives, we only surveyed women on experiences of spousal violence. We also did not inform husbands of the pregnancy test or test results obtained through this study. All participants, subsequent to baseline assessment, were provided with basic information regarding family planning and local public health system family planning services. All female participants were also provided with information on how to contact police and the nearest domestic violence services, which unfortunately were not local (two hours away by car); transport was to be offered to any participants indicating interest in linkage to those services, but no interest was indicated.

All men, subsequent to baseline assessment, were provided with basic information regarding family planning and local public health system family planning services. Following the baseline assessment protocol, husbands from intervention clusters were linked to male village health care providers (VHPs) trained to implement the CHARM intervention. Follow-up surveys of all men were conducted again at 9 and 18-month follow-ups. No monetary incentive was provided for study or program participation. Reasons for loss to follow-up were predominantly inability to find participants due to relocation, or refusal due to time constraints. No one withdrew from the study. All available data were included in analyses. This paper reports analyses from a two-armed cluster randomized control trial to evaluate the impact of the CHARM intervention on men's gender ideology. This trial was registered at clinicaltrials.gov (ClinicalTrial.gov, NCT01593943).

All procedures were reviewed and approved by the Institutional Review Boards of University of California at San Diego, Population Council and India's National Institute for Research in Reproductive Health. Additionally, we followed World Health Organization guidelines for research on domestic violence to help ensure that women participating in our study, which did include domestic violence assessments, were not at increased risk for violence due to their participation (Who Department of Gender, 2001).

Intervention details

The portion of the CHARM intervention related to gender equity was informed by the Theory of Gender and Power (TGP) (Connell, 1987). Drawing upon this theory, counseling on gender equity and equitable decision-making, particularly if the counseling was delivered by a respected male, could be useful in transforming men's attitudes towards gender equity and household decision-making. Specific elements of the gender equity counseling were based on formative qualitative research and included normative expectations of pregnancy early in marriage, son preference, lack of male responsibility in family planning, and greater male control of family planning decision-making (Ghule *et al.*, 2015). For more information on the CHARM intervention generally, see Yore et al, 2016.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.socscimed.2017.02.032>.

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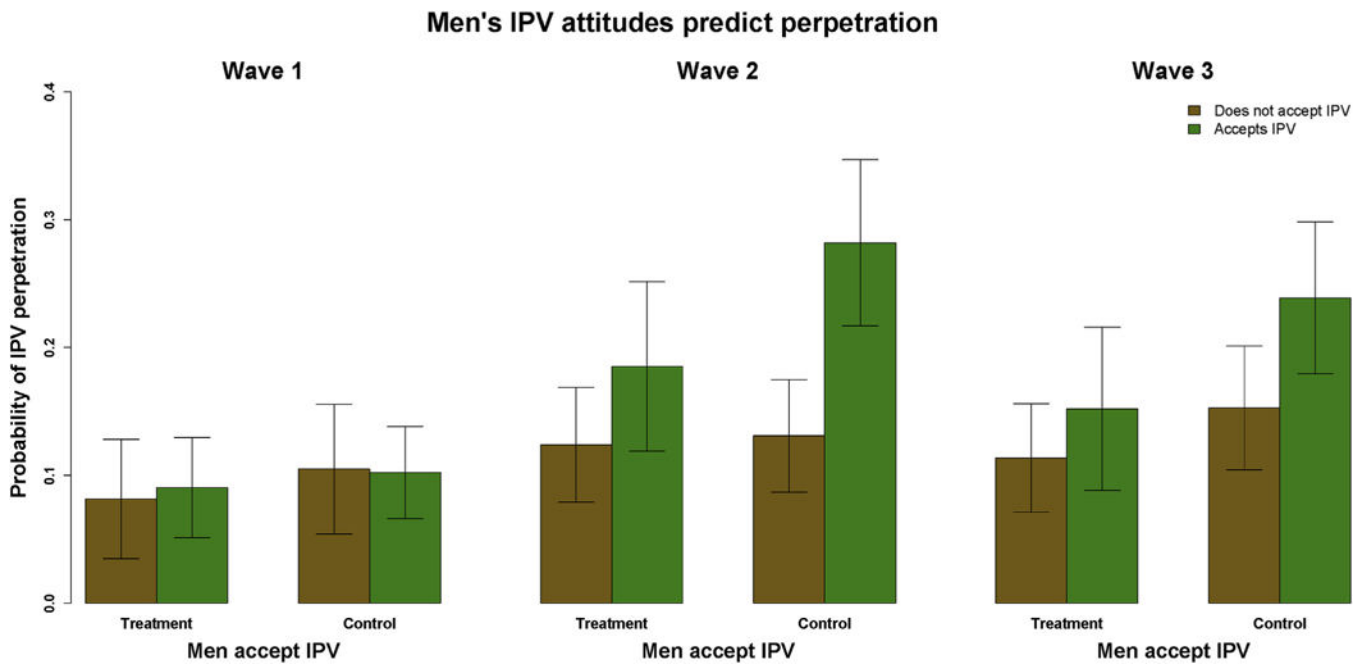


Fig. 1. A man's acceptance of IPV in Wave 1 was not correlated with the probability that his wife reported IPV, but was positively correlated in Waves 2 and 3, for those in the control group.

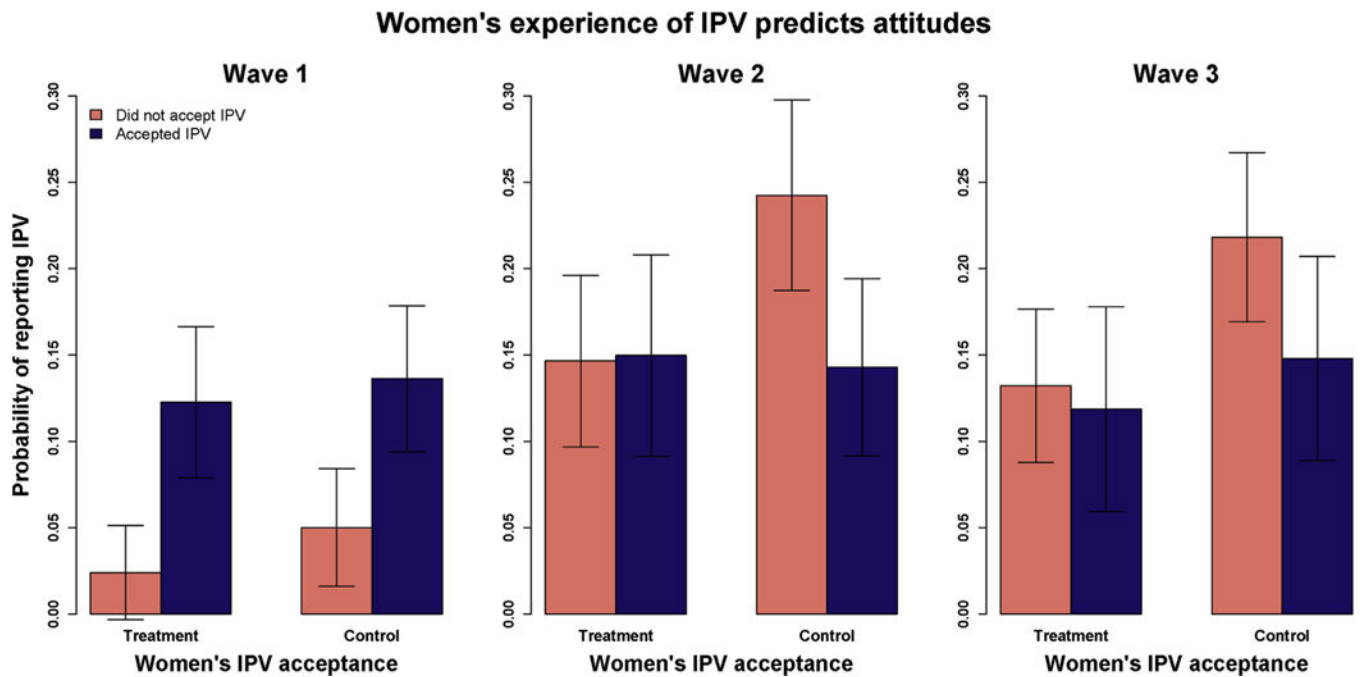


Fig. 2.

Here we see how the association between women's attitudes towards IPV and reporting IPV differs by wave, and treatment group. In Wave 1 a woman's acceptance of IPV was associated with an increased probability of reporting IPV for both treatment and control. This dynamic shifted in Waves 2 and 3 for the control group, for whom those who experienced IPV were less likely to report acceptance of it.

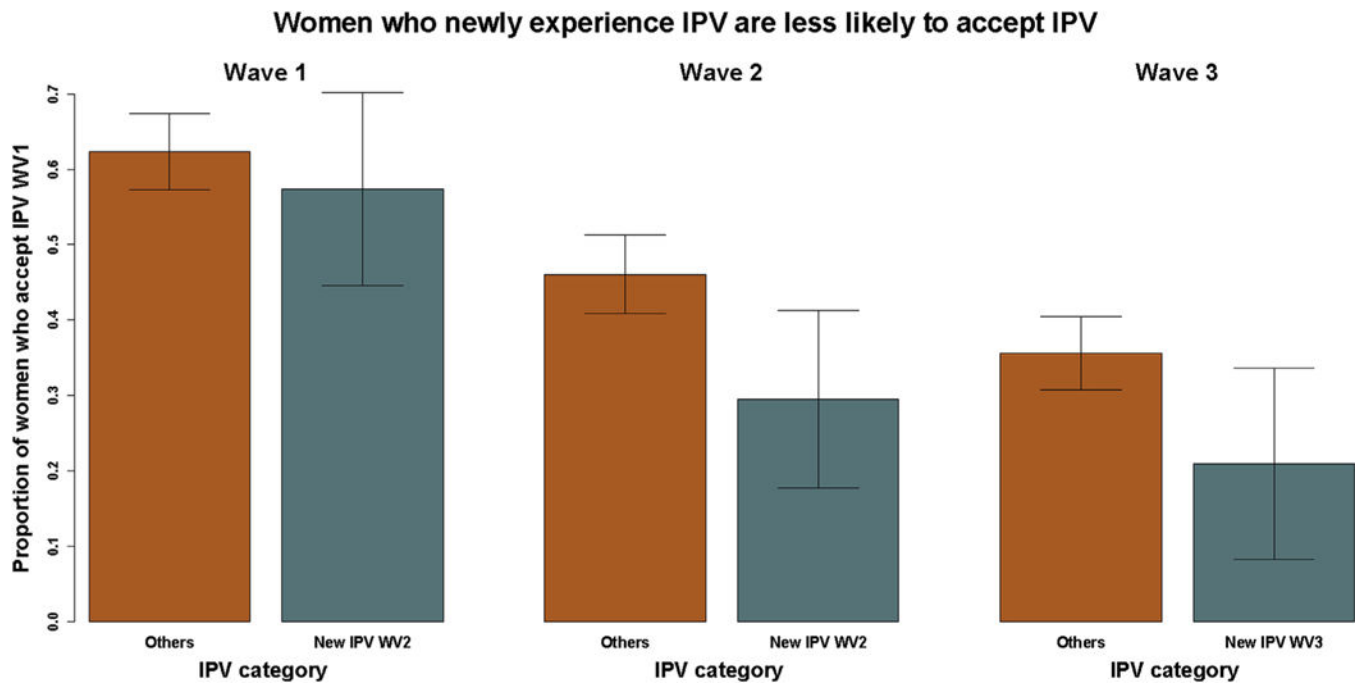


Fig. 3.

Those who newly experienced IPV in WV2 were significantly less likely to accept it in WV2 both in comparison to their WV1 IPV acceptance and in comparison to the WV2 reports of those who reported no IPV at all or those who had already reported it in WV1. This pattern holds for those who newly experienced IPV in Wave 3, who, in comparisons to the other members of the population, report lower acceptance of IPV in Wave 3.

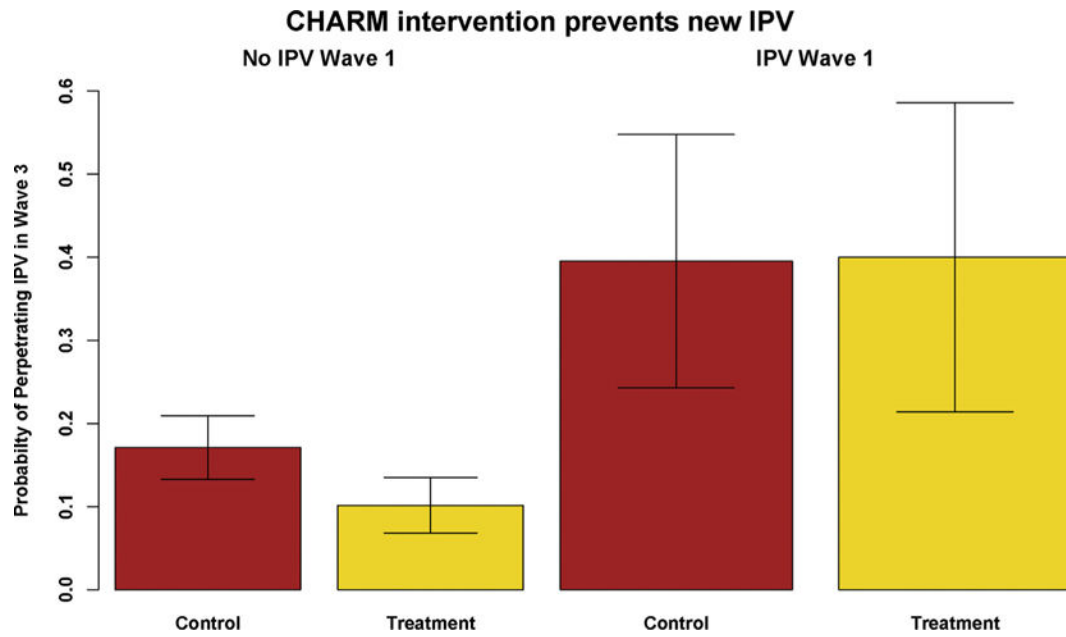


Fig. 4.

Of those participants whose wives did not report IPV in Wave 1, those in the treatment group were less likely to have their wives report experiencing IPV in Wave 3. Of those whose wives did report IPV in Wave 1, there is no difference between control and treatment reported IPV in Wave 3. ***This suggest that the intervention was successful at preventing new IPV but did not have an impact on already occurring IPV.***

Table 1
 Summary statistics of IPV acceptance and IPV reporting by wave, gender, and intervention group.

	Intervention group						Control					
	Men			Women			Men			Women		
	WV1	WV2	WV3	WV1	WV2	WV3	WV1	WV2	WV3	WV1	WV2	WV3
IPV accept score mean	1.94	0.98	0.92	2.74	1.78	1.70	2.11	1.39	1.38	2.85	1.71	1.64
IPV accept any %	61	39	36	64	42	34	66	46	48	61	44	34
Reported physical PV				8.7	14.8	12.8				10.3	19.9	19.4

Table 2
 Proportion of couples where woman has reported IPV by men's and women's acceptance of IPV.

	Treatment		Control		Treatment		Control	
	Man accepts IPV	Man does not Accept	Man accepts IPV	Man does not Accept	Woman accepts IPV	Woman does not Accept	Woman accepts IPV	Woman does not Accept
Proportion reporting WV 1	8%	9%	10%	10%	12%	2%	14%	5%
Proportion reporting WV 2	19%	12%	28%	13%	15%	15%	14%	24%
Proportion reporting WV 3	15%	11%	24%	15%	12%	13%	15%	22%

Table 3

Longitudinal multivariate association of change in men's IPV attitudes with IPV report WV3, controlling for IPV report WV1 and WV2, covariates, stratified by treatment group, and controlling for cluster level fixed effects.

	Wave 3 IPV					
	Model 3.1 treatment			Model 3.2 control		
	Beta	SE	P	Beta	SE	P
Men's attitude change from Wave 1 to Wave 2	0.35	0.43	0.42	-0.58	0.26	0.03
Women's attitude change from Wave 1 to Wave 2	0.13	0.38	0.74	-0.06	0.24	0.81
IPV reported WV 1	1.89	0.74	0.01	0.55	0.44	0.21
IPV reported WV 2	3.23	0.67	<0.01	1.12	0.33	<0.01
Father perpetrated IPV Women	-0.06	0.78	0.93	0.61	0.4	0.13
Number of children	0.64	0.43	0.14	0.08	0.25	0.77
Arranged Marriage	-1.02	0.5	0.04	-0.24	0.33	0.47
Married years	-0.3	0.18	0.1	-0.02	0.11	0.87
Women's income production	1.03	0.56	0.07	-0.12	0.39	0.76
Women's education	-0.17	0.09	0.04	-0.03	0.05	0.57
Women's age	0	0.15	0.99	-0.02	0.11	0.87
Men's education	0.4	0.11	<0.01	-0.02	0.05	0.67
Men's age	-0.31	0.15	0.03	-0.01	0.08	0.87
Scheduled caste	Ref			Ref		
Scheduled tribe	-0.56	1.38	0.69	0.15	0.95	0.88
Other Backwards Caste	-0.82	1.43	0.56	-0.82	1.03	0.43
Other	1.8	1.55	0.25	-1.42	1.53	0.35
Food insecurity	-1.07	0.86	0.21	0.26	0.43	0.54
House size	-0.13	0.47	0.45	0.02	0.13	0.88

Table 4

Longitudinal associations between newly experienced IPV and women's attitudes towards IPV.

	Wave 1 treatment Model 4.1			Wave 1 control Model 4.2			Wave 2 treatment Model 4.3			Wave 2 control Model 4.4			Wave 3 treatment Model 4.5			Wave 3 control Model 4.6			
	Beta	SE	P	Beta	SE	P	Beta	SE	P	Beta	SE	P	Beta	SE	P	Beta	SE	P	
New IPV 2	0.24	0.41	0.56	-0.34	0.29	0.25	-0.01	0.37	0.97	-0.74	0.31	0.02							
New IPV 3																			
Men's IPV acceptance WV1	-0.43	0.26	0.10	-0.17	0.23	0.46	-0.42	0.24	0.08	-0.01	0.22	0.98	0.19	0.26	0.47	0.31	0.22	0.17	
Women's IPV acceptance WV1				0.35	0.25	0.16	0.39	0.21	0.07				0.55	0.25	0.03	0.17	0.23	0.47	
Men's IPV acceptance WV2													0.08	0.27	0.76	0.73	0.24	<0.01	
Women's IPV acceptance WV2													0.44	0.28	0.12	0.28	0.24	0.25	
Father perpetrated IPV Women	1.12	0.4	0.01	1.27	0.34	<0.01	0.19	0.3	0.53	0.05	0.28	0.86	-0.17	0.33	0.61	0.51	0.29	0.08	
Number of children	0.44	0.22	0.04	-0.02	0.19	0.92	0.24	0.19	0.2	-0.04	0.18	0.81	0.13	0.2	0.52	-0.14	0.2	0.48	
Married years	-0.02	0.07	0.77	-0.02	0.06	0.78	0.03	0.06	0.68	0.00	0.06	0.96	-0.05	0.07	0.49	-0.05	0.07	0.45	
Women's income production	0.27	0.33	0.41	-0.04	0.26	0.87	-0.42	0.3	0.16	-0.41	0.25	0.11	-0.57	0.34	0.09	0.03	0.26	0.92	
Women's education	-0.04	0.04	0.26	0.01	0.03	0.69	0.00	0.04	0.95	-0.05	0.03	0.1	-0.16	0.04	<0.01	-0.04	0.03	0.25	
Scheduled caste	Ref			Ref			Ref			Ref			Ref			Ref			
Scheduled tribe	2.09	0.53	<0.01	0.63	0.43	0.15	-0.27	0.46	0.56	0.07	0.43	0.87	1.04	0.61	0.09	0.00	0.45	1.00	
Other Backwards Caste	1.8	0.57	<0.01	0.08	0.49	0.86	-0.4	0.51	0.43	-0.28	0.5	0.57	0.91	0.66	0.17	0.27	0.52	0.61	
Other	1.29	0.67	0.05	0.68	0.53	0.2	-0.15	0.61	0.81	0.36	0.52	0.49	1.5	0.74	0.04	-0.79	0.59	0.18	
House size	-0.04	0.08	0.61	-0.12	0.09	0.16	0.01	0.08	0.94	-0.04	0.09	0.66	-0.02	0.09	0.82	-0.01	0.09	0.88	

Table 5

Multivariate association between men's IPV acceptance and women's, WV3, controlling for cluster level fixed effects.

	Treatment			Control		
	B	B	P	B	B	P
Man accepts IPV WV3	0.19	0.28	0.49	0.5	0.27	0.06
Experienced IPV WV3	-0.16	0.43	0.7	-0.71	0.32	0.03
Father perpetrate IPV Women	-0.06	0.37	0.88	0.75	0.33	0.02
Number of children	0.25	0.22	0.25	-0.14	0.21	0.52
Arranged Marriage	0.18	0.32	0.58	0.29	0.29	0.3
Married years	-0.04	0.09	0.66	-0.05	0.09	0.57
Women's income production	-0.48	0.38	0.21	0.1	0.32	0.75
Women's education	-0.14	0.05	<0.01	-0.01	0.04	0.78
Women's age	-0.07	0.08	0.37	-0.04	0.08	0.67
Men's education	-0.06	0.05	0.18	-0.02	0.04	0.69
Men's age	0.03	0.08	0.68	-0.03	0.06	0.59
Scheduled caste	Ref			Ref		
Scheduled tribe	0.34	0.93	0.71	1.1	0.68	0.11
Other Backwards Caste	0.68	0.96	0.48	1.4	0.73	0.06
Other	-0.25	1.2	0.83	0.05	1.07	0.96
Food insecurity	0.49	0.47	0.29	0.4	0.39	0.31
House size	-0.01	0.1	0.93	-0.07	0.1	0.45