Can Psychological Interventions Provide Resilience to Negative Shocks? Evidence from a Randomized Control Trial and the COVID-19 Pandemic

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Abstract

The COVID-19 pandemic and the government policies designed to contain it have created severe economic and mental health challenges in many low-income countries. In this study, we examine whether a maternal mental health intervention, delivered from pregnancy through 3 years postpartum, provided resilience amidst COVID-19 restrictions in rural Pakistan. Our findings show that women who were randomized into receiving therapy experienced 0.26 standard deviations fewer common mental disorders such as anxiety and depression. They also reported improved spousal relationships, fewer marital problems and a lower frequency of intimate partner violence during periods of more stringent government restrictions, as compared to women who did not receive the intervention. Our results suggest that these effects may be the result of an improved ability to manage stress and worry, rather than from differing experiences of economic shocks among the treatment arm.

Keywords: COVID-19, mental health, spousal conflict, intimate partner violence, restrictions, Pakistan

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1. Introduction

The COVID-19 pandemic was a significant health and economic shock that upended people's lives and livelihoods. Its economic effects were particularly devastating in low- and middle-income countries (LMICs) (Josephson et al., 2021). High baseline prevalence of mental illness and intimate partner violence (IPV), poor access to healthcare and basic services and weak social safety nets, made residents of LMICs particularly vulnerable during the pandemic (Egger et al., 2021; Gelaye et al., 2016; Ma et al., 2023; Miguel & Mobarak, 2022). In fact, global inequality and poverty increased for the first time in a generation (Mahler et al., 2022). Public health restrictions implemented to slow contagion achieved their purpose (Hsiang et al., 2020), but also exacerbated these effects by further disrupting economic activity, access to basic services and people's time allocation (Bundervoet et al., 2022; Giuntella et al., 2021).

As a result, the pandemic triggered an unprecedented mental health crisis (Quintana-Domeque & Zeng, 2023) and an epidemic of intimate partner violence (UN Women, 2021). While the effects on the former have now been extensively investigated, much less is known about cost-effective strategies aimed at building psychological resilience against these shocks. To advance this question, we leverage a unique psychological intervention that randomly assigned perinatally depressed women in rural Pakistan to receive cognitive behavioral therapy (CBT) from pregnancy through 3 years postpartum (Maselko et al., 2020). The Thinking Healthy Program, Peer-delivered Plus (THPP+) was delivered to women aged 18 years or older, in their 3rd trimester of pregnancy, who screened positive for depression between October 2014 and February 2016 (Sikander et al., 2019). The sessions were delivered by volunteer peer women from the same community as the mothers.

By the time when the first wave of the COVID-19 pandemic was declared in Pakistan, in March of 2020, the intervention had concluded and our team had collected seven pre-pandemic household survey rounds: baseline, three- and six-months post-partum, followed by yearly rounds from year one through four after birth. While year

five of data collection was suspended due to the pandemic onset, by year six we rolled out a new round of surveys which allowed us to measure multiple indicators of maternal mental health, marital conflict, intimate partner violence, and exposure to COVID-related economic and health shocks during the three deadliest waves of the pandemic in Pakistan.

We exploit this setup to estimate whether the psychological intervention was effective at building resilience against the deleterious mental health and IPV effects of the restrictions imposed to contain the virus. To this end, we implement a Difference-in-Differences strategy, where the first difference arises from assignment to treatment versus control, and the second difference from the temporal variation of COVID restrictions set at the national level when year six of follow-up was taking place. The former is random by design, and the timing of the latter is driven by the survey rollout, making it significantly more exogenous than self-reported COVID-related shocks. Our data also allow us to include a rich set of covariates such as indicators of pre-pandemic mental health and intimate partner violence.

Our findings show that women who were randomized into receiving therapy experienced 0.26 standard deviations fewer common mental disorders, specifically lower depression (21%) and anxiety (27%) scores, during periods of more stringent government restrictions, as compared to women who did not receive the intervention. We also show that more stringent restrictions significantly contributed to the breakdown of spousal relationships by decreasing the quality of the relationship between spouses, increasing marital problems and the frequency of sexual violence. However, results suggest that the intervention was able to fully offset these effects, improving relationship scores by 11.3%, decreasing marital problems by 92% and reducing the frequency of any form of IPV by 68.7%.

Next, we explore a series of potential mechanisms through which the intervention may have moderated the effects of the restrictions on mental health and intimate partner violence. Our data allow us to explore the relationship between the restrictions, their interaction with the intervention indicator, and household economic

shocks induced by the pandemic, stress, uncertainty, social support and governmental financial assistance.

Our data reveal that the protective effects of the intervention on women's mental health and intimate partner violence may be the result of an improved ability to manage stress and worry. The intervention did not appear to have led to differing experiences of economic shocks among women in the treatment arm when COVID restrictions were high. However, psychotherapy appears to have improved women's ability to concentrate in the situation at hand and maintain interest in the present instead of mentally absconding from the circumstances they were experiencing.

Our unique setting allows us to contribute and improve upon several bodies of evidence. First, we contribute to the literature on the effects of the COVID-19 pandemic on mental health. For example, studies have shown that lockdown measures and COVID-related economic shocks significantly lowered mental health among vulnerable populations in both developed (Adams-Prassl et al., 2022; Anderes & Pichler, 2023; Brodeur et al., 2021; Etheridge & Spantig, 2022; Giuntella et al., 2021) and less-developed countries (Aksunger et al., 2023; Altindag et al., 2022; Baranov, Grosjean, et al., 2022; Bau et al., 2022; Dong & Bouey, 2020; W. Li et al., 2020; X. Li et al., 2020; Z. Li et al., 2020). While most of these studies focus on the earliest wave of the pandemic in 2020, we focus on the last three waves recorded in Pakistan in 2021 and 2022. This allows us to explore the lasting effects of the pandemic beyond the first few months.

Secondly, we contribute to the literature documenting the effects of the pandemic on spousal relationships and IPV. For instance, Agüero (2021) finds that stay-at-home orders at the start of the pandemic in Peru, led to a 48% increase in the incidence rate of calls to domestic violence (DV) hotlines. Others have found that while calls to DV hotlines increased during the initial shutdown period, arrests and crime reports decreased, suggesting that the cost of reporting crimes to authorities or leaving the household may have also increased (Miller et al., 2021). For recent reviews on this

literature refer to McNeil et al. (2023), Piquero et al (2021), Panchal et al. (2021) and Uzoho et al. (2023).

We also expand the emerging literature on the effects of psychological interventions in low- and middle-income countries. Recent studies include Baranov et al. (2020), who study an earlier version of the THPP+ intervention among perinatally depressed women in Pakistan; Bhat et al. (2022), who studied two RCTs providing psychotherapy in Goa, India; Angelucci & Bennett (2023), studying a pharmacotherapy intervention in India; and McKelway et al. (2023), who studied the impacts of CBT and cash transfers in a factorial design on the elderly, also in India.

Lastly, we contribute to the literature on interventions aimed at building resilience to shocks and preventing IPV. Most of the previous worked has focused on cash transfers (Aizer et al., 2023; Christian et al., 2019; Hidrobo & Fernald, 2013). However, cash transfers can be costly to implement once we account for the value of the transfer itself. For example, CT programs can cost between 0.2% and 0.4% of a country's GDP (Caldés & Maluccio, 2005). Meanwhile, CBT can cost as little as $10 dollars per person (Baranov et al., 2020).

The rest of the paper is organized as follows. Section 2 describes the development of the COVID-19 pandemic in Pakistan. Section 3 provides details of the intervention, the longitudinal dataset and the outcomes, and discusses our measures of COVID-related restrictions. Section 4 discusses the empirical strategy and the assumptions that underline it. Section 5 presents the main results on the protective intervention effects on maternal mental health and on intimate partner violence. Section 6 discusses potential mechanisms at play, and Section 7 concludes.

2. Covid-19 in Pakistan

Pakistan recorded its first two COVID-19 cases on February 26th of 2020. The country experienced five distinct COVID-19 waves (Ahmad et al., 2023), as shown in Table 1. Wave one, lasted from March to October 2020. On March 13th, the government pre-emptively closed its borders and imposed a nationwide lockdown. The lockdown

included the closing of educational institutions, government offices, markets and business centres as well as the halting of elective health services, a 2-week ban on public gatherings and the cancellation of the Pakistan Day Parade (Imran et al., 2021). After reaching its peak in June 2020, restrictions were gradually eased and smart lockdowns were imposed to prevent a major economic collapse (Rahim et al., 2022). Large gatherings, political and religious, resumed in July of 2020 across the country (Khan, 2020). Shortly after, a second wave was observed from mid-October 2020 to mid-February 2021. During this time, only localities with high positivity rates were placed under smart or partial lockdowns.

The third wave of the pandemic took place between mid-February and mid-June of 2021. Its onset coincided with the start of our year-6 survey rollout. In response, the government ordered the closure of educational institutions in high-risk districts across the provinces of Punjab and Khyber-Pakhtunkhwa, and the national capital, Islamabad, until April 11. More stringent restrictions on public gatherings were also set in place (Gul, 2021).

The first vaccines for adults aged 65 and older were made available on February 15th, 2021 (Emmanuel et al., 2023). While eligibility was expanded reasonably quickly, the initial vaccination process was slow. This, combined with a high positivity rate of 6.8%, and the introduction of the Alpha and Delta variants, explain why the highest average number of daily cases (3,147) were observed during this period (Ahmad et al., 2023). This was also the deadliest wave with a case fatality rate of 2.35% and 9,448 confirmed COVID-19 deaths (Emmanuel et al., 2023).

A fourth wave was declared mid-June 2021 and lasted until September 2021. COVID-19 restrictions were once again expanded across the country, suspending all commercial activities except essential services and with public transport only allowed to operate at 50% capacity. Educational activities in schools were only allowed three

days per week, also at 50% capacity (The Times of India, 2021).[2] A fifth, much shorter wave took place between January 2022 and March 2022 (Sayeed, 2022).

3. Study Design and Data

3.1. The Intervention

The Thinking Healthy Program, Peer-delivered Plus (THPP+) was a cluster Randomized Controlled Trial (RCT) addressing perinatal depression in rural Pakistan (Maselko et al., 2020). Kallar Syedan, the rural subdistrict of Rawalpindi, Punjab chosen for the intervention is a socio-economically deprived area with a poverty rate of about 50%, a high prevalence of maternal depression and little access to clinical mental health care (NIPS & ICF, 2013).

Randomization. The trial was randomized across 40 village clusters: 20 clusters were assigned to receive the intervention and 20 to the control arm. The clusters were geographically separate to minimise contamination risk. Eligible participants were women aged 18 years or older, in their 3rd trimester of pregnancy, married and registered with a village-based health worker (also known as Lady Health Workers [LHWs]) (Sikander et al., 2019).

Between October 2014 and February 2016, eligible women were approached and screened for depression using the Urdu version of Patient Health Questionnaire (PHQ-9). The tool includes questions about the frequency of depressive symptoms in the last two weeks such as ability to concentrate, sleeping or eating problems and suicidal thoughts. It has been extensively used in the study setting and has an acceptable criterion validity and reliability for this population (Gallis et al., 2018). Women who scored 10 or greater on the PHQ-9 tool, screened positive for depression, and were invited to participate in the trial (Sikander et al., 2019).

[2] The restrictions were imposed in the country's two largest cities, Karachi and Lahore, the national capital, Islamabad, and other cities like Rawalpindi, Multan, Faisalabad, Peshawar, Hyderabad, Abbottabad, among others (Manral Karan, 2021).

Out of the 1731 women screened, 572 (33%) were identified as depressed. Among them, 287 mothers were in clusters randomized to the intervention, 283 in the control arm, with only two mothers refusing to participate before the baseline assessment. Of the 1159 pregnant women who were screened as non-depressed, 584 were randomly selected to be part of the non-depressed arm of the study. They would represent a natural reference group to understand the evolution of maternal and child outcomes.

The THPP+ Intervention. The Thinking Healthy Program, Peer-delivered Plus (THPP+) is a low-intensity psychosocial intervention delivered by non-specialist, volunteer peer women from the same community as the mother. Peers were trained in a 5-day classroom-based workshop, followed by a 2-month internship during which they practiced the content of the intervention on non-trial participants. They also received monthly group supervision throughout the trial (Turner et al., 2016).

THPP+ consisted of ten individual and four group sessions delivered from the third trimester of pregnancy until six months after child-birth. From seven months to 36 months postnatal, 18 group-based booster sessions were delivered. The first six were delivered monthly, and the rest every two months. The first 14 sessions focused on identifying unhealthy behaviors and inducing behavioral activation. The boosters focused on self-care and infant development by encouraging mother-infant interaction and play. The group sessions also provided a safe environment for women to voice their problems, share experiences and support each other.

Perinatally depressed women in the treatment arm received the THPP+ intervention. In addition to this, both intervention and control groups received enhanced usual care (EUC). The latter consisted of informing participants about their depression status, ways to seek help for it during and after pregnancy. Women without prenatal depression were not offered treatment.

Study sample and follow-up. Our sample consists of the experimental groups of depressed mothers in the treatment and control arms, and the group of mothers who were not depressed at baseline. While data collection on the mother-child dyads has

taken place nine times since the trial (3rd trimester of pregnancy, 3, 6, 12, 24, 36, 48, 72, 73), our study primarily focuses on year six (72 months) when waves three through five of the pandemic took place in Pakistan.[3] The effectiveness of the intervention on maternal depression and child development at three years postnatal has been evaluated in previous studies (Maselko et al., 2020).

Balance and Attrition. The experimental sample was slightly imbalanced at baseline, as shown in Table 2. For example, women in the treatment arm were approximately 1.1 cms taller, had a smaller waist circumference by 0.7 inches, and lived in households with 0.32 more people. They also suffered from slightly higher, albeit statistically insignificant, depression scores, as well as psychological, sexual and physical IPV. A joint F-test rejects the balance of baseline characteristics (p-value = 0.055). However, by year 6 post intervention we cannot reject balance of baseline characteristics of the women that remained in the sample (p-value = 0.217).

As Figure 1 shows, lost to follow-up in year six was 22.2%. The main reason was the loss of the index child (40% of the attritors), which was balanced across study arms. Attritors at 72 months were statistically different in terms of nuclear family structure, lower presence of the grandmother and whether the index child was her first. They also had higher PHQ-9 scores, greater WHODAS (disability) scores and a lower likelihood of experienced psychological and sexual IPV, though none of these differences were statistically significant (Appendix Table 1). Jointly testing for the difference in attritor characteristics by treatment arms yields balance (p-value = 0.114).

3.2. Outcomes

Mental health. To measure maternal mental health, we use the Patient Health Questionnaire (PHQ-9), the Generalized Anxiety Disorder 7-item scale (GAD-7), and nine items from the Structured Clinical Interview for DSM-IV disorders (SCID) (Gorman et al., 2004). These are employed in a principal components analysis to

[3] The year 5 (60 months post birth) survey rollout did not take place due to the COVID-19 pandemic.

construct a latent measure of common mental disorders. The PHQ-9 is a 9-item scale used to assess severity of depression symptoms in the last two weeks and it ranges from 0-27 (Kroenke et al., 2001). The GAD-7 scale is used to assess the severity of generalized anxiety disorder over the past two weeks, and it produces a score ranging from 0-21 (Spitzer et al., 2006). For both, response options include "not at all", "several days", "more than half the days" and "nearly every day". In all measures, a higher score is indicative of greater mental health problems.

Spousal Conflict. We measure various dimensions of spousal conflict. First, we employ the 6-item Relationship with Father/Husband (RFH) questionnaire which asks respondents: how often (i) does her husband looks after her basic needs, (ii) does she get pocket money for her personal needs, (iii) does she feel that her husband understands her feelings, (iv) does her husband support her in difficult situations, (v) is she happy with her husband's behavior towards her, and (vi) how would she describe her relationship with her husband. These are then aggregated to construct the RFH score. Next, to measure marital unrest we ask women whether or not her marital relations with her spouse have had problems in the last year. Lastly, we measure the occurrence and frequency of intimate partner violence (psychological, physical and sexual).

We measure the experience of IPV and its frequency using a slightly modified version of the WHO Violence Against Women Instrument (WHO, 2005). Psychological violence in the past year was ascertained from nine items (e.g., husband belittled or humiliated wife; threatened to hurt, etc.). Physical violence in the past year was ascertained from four items (e.g., husband slapped, threw something that could hurt, pushed or shoved; choked or burned on purpose, etc.). Past year sexual violence was ascertained from three items (e.g., husband physically forced wife to have sexual intercourse when she did not want to, etc.).

Respondents were then asked about the frequency of each act in the last year. Response options included "1-2 times", "3-5 times", "6-10 times", "11-20 times" and "more than 20 times". Severity of each form of IPV was then calculated in two steps.

First, by recoding frequency categories to the value of the midpoint. Second, by summing the frequencies of each act and dividing the sum by the number of items. Scores for all IPV items range from 0-20, where zero is no IPV of each type. See Haight et al. (2022) for a complete list of all the items. Lastly, all three frequency scores were added to measure the frequency/intensity of all forms of IPV, which will serve as our primary measure of intimate partner violence in the past year.

Stress, Social Support and Life Events. To assess some of the possible mechanisms through which COVID-19 restrictions might affect mental health and IPV, we also study maternal stress, perceptions of uncertainty, perceived social support and the experience of traumatic life events. We measure stress through the short Stress Overload Scale (SOS). The SOS is a 10-item questionnaire in which respondents use a 5-point Likert scale to indicate subjective feelings and thoughts experienced over the prior week (e.g., feeling like nothing was going right; there was no escape, etc.) (Amirkhan, 2018). The scale ranges from 10-50 points, with a higher score indicating higher levels of stress overload.

We also apply the Multidimensional Scale of Perceived Social Support (MSPSS), a 12-item instrument designed to measure an individual's perceived adequacy of support from 3 sources: family, friends, and their significant other (Zimet et al., 1990). Each sub-scale ranges from 1-7. Next, we asked respondents about stressful events experienced in the past year using a combination of a modified version of the Life Events and Difficulties Schedule and a list of household economic shocks (Brown & Harris, 1989; Rahman et al., 2003).

Self-reported COVID-related shocks. Lastly, we asked respondents about their experience of economic stressors due to the COVID pandemic and about their expectations about their risk of getting sick from the virus and about their family's economic prospects for the following year. We use these to assess the relationship between the restrictions and economic difficulties.

3.3. Data on COVID-19 Restrictions

Our data on COVID-19 restrictions in Pakistan comes from the Oxford COVID-19 Government Response Tracker (OxCGRT). The OxCGRT dataset captures eight containment and closure government policies from over 180 countries, including Pakistan. They include school closures, workplace closures, cancelling public events, restrictions on gathering size, closure of public transport, stay-at-home requirements, restrictions on internal movements and on international travel (Hale et al., 2021). These are reported in ordinal scales ranging from 0-2, 3 or 4, with a higher value indicating a more stringent policy.

In Pakistan, these measures are available daily, at the national level, from the 1st of January 2020 until December of 2022. National policies were not always indicative of the restrictions implemented in the villages that took part of the THPP+ intervention. Therefore, in this study, we focus on the three restrictions which were most relevant to our setting: workplace closures, stay-at-home restrictions and restrictions on gathering size. Using these ordinal measures, we create two composite measures of pandemic restrictions. Our primary measure captures the number of mandatory restrictions that were in place during the time of the surveys, for at least part of the population. Its variation with respect to the survey rollout is presented in Figure 2, and its overall distribution is depicted in Figure 3.[4] We also create an alternative measure which sums the ordinal values to capture the intensity of restrictions during the year-6 surveys.

At the start of the year-six survey rollout, households were under the most stringent level of restrictions, as it coincides with the onset of the third and deadliest pandemic wave in Pakistan. As Figure 2 shows, as the rollout progressed, infections decreased, and restrictions were relaxed only to be ramped up a few months later for the fourth and fifth pandemic waves.

[4] Appendix Figure 1 shows these figures for the individual restrictions.

4. Empirical Strategy

4.1. Empirical Specification

Although assignment to treatment was random by design, who was surveyed during a period of more stringent COVID-19 restrictions might not be. We investigate this in Appendix Table 2. Preliminary analyses show that women with lower baseline PHQ-9 scores, lower blood pressure and fewer years of schooling were more likely to be surveyed during days with a higher number of mandatory restrictions. However, balance in number of restrictions by treatment arm remained (p-value = 0.794) – see Appendix Table 3.

To account for potential baseline differences between treatment arms and for systematic differences between people surveyed during more and less stringent times, we employ a Difference-in-Differences strategy of the following form:

$$Y_{ict} = \alpha + \beta_1 T_c + \beta_2 Restrictions_t + \beta_3 (T_c * Restrictions_t) + \mathbf{\Gamma' X}_{ict} + \varepsilon_{ict} \quad (1),$$

where Y_{ict} is the outcome for the mother or child i living in cluster c, at time t. The variable T_c is a dummy equal to one if the mother is in the treatment arm, which varies at the cluster level c. $Restriction_t$ measures the number of restrictions with a stringency level of 2 or higher, indicating that the policy was mandatory for at least some of the population. The three policy restrictions[5] that were used to construct this measure were set at the national level, so this measure only varies over time (daily). Our main parameter of interest is β_3, the interaction of the treatment dummy and the number of mandatory restrictions.

The term $\mathbf{X}_{ict}$ is a vector of characteristics, all of which are demeaned and interacted with the treatment indicator. This is meant to account for the fact that a) the baseline and the follow-up samples were not perfectly balanced along all observable characteristics, and b) who experienced a higher number of restrictions during the survey rollout was not entirely random. The interaction with treatment allows for

[5] Workplace closures, stay-at-home orders and limits on the number of people allowed in gatherings.

differing impacts of these characteristics on outcomes (Baranov et al., 2020). The baseline characteristics include enumerator fixed effects, union council fixed effects,[6] mother's height and waist circumference, an indicator for joint/extended families, the number of adults in the household, the number of people per room, a standardized wealth index, the mothers' education, the fathers' education, the mother's experience of sexual IPV in the past 12 months, and the mother's PHQ-9, WHODAS (disability) and PSS (perceived stress) scores.[7] We follow the same procedure for characteristics measured at year 6, which include: enumerator fixed effects, month of survey and its square. We report standard errors clustered at the unit of randomization.

5. Results

In what follows, we first report and discuss estimates of the protective effects of the intervention during periods of stringent COVID-19 restrictions on maternal mental health and spousal conflict. Then, we discuss the robustness of our findings to alternative measures of restrictions, placebo lockdowns during pre-COVID waves, and sensitivity to additional controls.

5.1. Maternal Mental Health

In Table 4, we examine the protective effects of the THPP+ intervention on maternal mental health and spousal conflict amidst the COVID-19 restrictions. First, we show that more stringent COVID restrictions are associated with significantly worse maternal mental health. Our results indicate that women in the control arm who were surveyed during days with one additional number of mandated restrictions, experienced a higher common mental disorder score by 0.22 standard deviations compared to women surveyed when no restrictions were in place. Appendix Table 4 indicates that this increase arises from a 1.173 (21.8%) and 0.862 (11.14%) increase in

[6] The subdistrict where the intervention took place was administratively subdivided into 11 union councils. Within these, we identified an even number of village clusters to receive either the intervention or control conditions.

[7] Missing values at baseline are recoded as zeros and indicators for missingness are created for each variable with recoded values.

GAD-7 and PHQ-9 scores, respectively. Multiple SCID items also contributed towards this deterioration in mental health including a higher probability of experiencing loss of interest, decreased appetite, psychomotor agitation, feeling worthless, trouble concentration and suicidal ideation. This is the case even after controlling for baseline measures of mental health.

Importantly, women who were randomized into receiving the THPP+ intervention, experienced 0.26 standard deviations fewer common mental disorders during periods of more stringent government restrictions, as compared to women in the control arm. Appendix Table 4 shows that the intervention was successful at lowering depression and anxiety scores by 1.454 (21%) and 1.651 (27%), respectively. Being assigned to the treatment arm also decreased various SCID symptoms including the likelihood of experiencing loss of interest by 12.5 percentage points (52%), trouble concentrating by 9.9 percentage points (62%), psychomotor agitation by 9.3 percentage points (37.2%), and feeling worthless by 4.1 percentage points (25.6%) during times with more mandatory restrictions. Though only the first two SCID symptoms are statistically significant under conventional standards.

Overall, these results suggests that the intervention more than fully offsets the negative mental health effects of the restrictions among treated mothers. In Appendix Table 5, we show that psychotherapy was particularly effective against the adverse mental health effects of workplace closures, stay-at-home orders and restrictions on gatherings, fully offsetting the direct effects of each type of restriction on common mental disorders.

5.2. Spousal Conflict

The pandemic had a profound effect on the financial wellbeing of Pakistani households by increasing job loss and decreasing income (Baranov, Grosjean, et al., 2022). These types of economic shocks alone have been shown to increase intimate partner violence in other settings (Bhalotra et al., 2021; Tur-Prats, 2021). In combination with stay-at-home orders and workplace closures, which forced partners

to spend more time together in the privacy of their homes, it is unsurprising that violence against women reportedly increased to unprecedented levels in many countries during the pandemic (UN Women, 2021). Intimate partner violence takes a significant toll on maternal mental health with the potential for lasting consequences (Dokkedahl et al., 2022; Lagdon et al., 2014; Mechanic et al., 2008; Soares, 2006). At the same time, poor maternal mental health is a well-known risk factor for intimate partner violence (Du Mont & Forte, 2014).

While we cannot ascertain which was affected first, mental health or IPV, we find evidence indicating that the pandemic restrictions increased domestic violence among our sample of Pakistani women. As maternal mental health deteriorated when multiple mandatory restrictions were in place, so too did spousal relationships. In columns (2) – (4) of Table 4, we find that even after controlling for a rich set of covariates, including baseline IPV, a higher number of mandatory COVID restrictions is associated with a significant decrease in the quality of the relationship between spouses, with RFH scores dropping by 1.316 points (5.6% relative to the mean). The probability of reporting marital problems increased by 11 percentage points (47.8%) and the frequency of experiencing any form of intimate partner violence increased by 51.87% though the latter was imprecisely estimated.

Our estimates also show that women who received the intervention were fully protected against the deleterious effects of more stringent restrictions. Specifically, we find that treated women reported higher relationship scores by 2.66 points (11.3%). In Appendix Table 6, we show that when restrictions were high, treated women were more likely than the control group to feel that their husband looked after their needs, understood their feelings, and supported her in difficult times, whilst receiving more money for personal expenses, reporting greater satisfaction with their husband's behavior towards them and overall indicating that their relationship with their partner was very good. Moreover, women in the treatment group also reported a lower likelihood of experiencing marital problems by 21.2 percentage points (92.17%), and a 1.46 unit (68.7%) decrease in the frequency of all forms of IPV during periods with

more stringent restrictions, compared to women in the control arm. The intervention was particularly effective at reducing the frequency of sexual IPV during more stringent restrictions (see Appendix Table 7).

In Appendix Table 5, we provide evidence suggesting that the intervention was particularly protective against the deleterious effects of workplace closures and stay-at-home restrictions on marital unrest and relationship scores. This is consistent with our earlier findings for maternal mental health. Next, in Appendix Table 8, we show that the violence experienced by women, and the protective effects of psychotherapy were restricted to acts committed by the women's partner and not by other members of the family.

Research shows that psychotherapy can cause lasting and significant improvements in female empowerment (Baranov et al., 2020). Furthermore, by decreasing depression (Maselko et al., 2020), the intervention could have also improved women's ability to advocate for themselves, thus increasing their bargaining power and shielding them from violence. This could consequently reduce the toll of the restrictions on women mental health and risk of experiencing spousal conflict.

5.3. Robustness Checks and Placebo Tests

In this section we test the robustness of our results to alternative measures of COVID-19 restrictions and perform placebo tests using pre-COVID survey rounds. In Appendix Table 9, we replace the number of binary restrictions above level 2 (mandated policies) with a restriction intensity index ranging from 0 to 10. These modified results exploiting all the variation in the three types of restrictions are consistent with our main specification. They indicate that as the COVID restriction index increases by 1-unit, its effects on common mental disorders among women in the treatment arm were smaller by 8% of a standard deviation, compared to women who did not receive the intervention. Similarly, as restrictions increased, relationship scores were higher among the treatment group by 0.875 points, the likelihood of

reporting marital problems was lower by 6.5 percentage points and the frequency of IPV decreased by 0.42 units, though the latter is not statistically significant.

One of the key assumptions behind our empirical strategy is that the temporal pattern in which the COVID restrictions developed is independent of other factors changing over time, such as weather and agricultural seasons, which could also affect maternal mental health and spousal conflict. To test this, we create a placebo treatment by imposing the same daily pattern of restrictions onto follow-up survey waves during years 3 and 4 post birth, which took place before the start of the pandemic. These results are presented in Appendix Table 10. In neither post birth years 3, 4, or the combined sample of these two waves do we observe statistically significant effects of COVID-19 restrictions on any of our primary outcomes. More importantly, neither do we see significant interaction effects between the intervention indicator and the number of mandated restrictions. This is reassuring as it indicates that results from our primary specifications are not driven by other unobserved time varying factors following a similar pattern as the restrictions which could bias our primary estimates.

Lastly, we test the robustness of our primary estimates to additional controls for temperature and rain, which are known to cause changes in affect, sleep patterns, suicide rates and domestic violence (Baylis, 2020; Burke et al., 2018; Carleton, 2017; Díaz & Saldarriaga, 2023; Minor et al., 2022; Zhu et al., 2023). As Appendix Table 11 shows, our primary findings remain qualitatively unchanged when controlling for maximum temperature and total rain during the day of the survey (odd columns) and the average of maximum temperature and total rain during the past 30 days (even columns). Generally, our estimates become slightly larger after adding these controls.

6. Mechanisms

6.1. Economic Impacts of the COVID-19 Restrictions

Next, we investigate whether the containment measures imposed by the national government affected household's financial wellbeing and whether the intervention attenuated these potential economic effects during our survey period. In Table 5, we

show the results of a modified version of equation (1) with economic shocks and financial support as outcomes. We find suggestive evidence indicating that when restrictions were more numerous and stringent, respondents were between 2.2 and 6.4 percentage points (2.8% - 8.1%) more likely to report that they did not have enough money to cover their basic needs. However, beyond this outcome, we find not further evidence that the national restrictions increased daily stressors, household financial impacts or economic uncertainty. Given the lack of main effects of restrictions on economic shocks, it is therefore not surprising to find no significant interaction effects between the intervention and restrictions.

How should one interpret this seemingly surprising finding? First, it's important to understand that the year six survey took place during the last three waves of the pandemic in Pakistan. In our surveys, respondents were asked to report whether they had experienced different COVID-related economic stressors since the start of the pandemic. Most of these are likely to have occurred during the first two waves of the pandemic. Our findings therefore show that past economic shocks are not correlated with current restrictions. A second key factor that helps us understand these findings is that by the time when the year six survey was rolled out, the government infrastructure to roll out financial support was a well-oiled machine. We show this in column 5, where we regress our measures of restrictions on an index of economic support constructed by Hale et al. (2021). These results indicate that as the stringency of restrictions increased, so too did economic support. These findings lead us to conclude that a) economic shocks are not key drivers of the mental health and IPV effects of restrictions reported in Table 4, and b) the intervention did not affect treated women's ability to shield themselves from potential economic shocks.

6.2. Stress, Uncertainty and Lack of Social Support

In this last section, we explore whether stress, uncertainty and loss of social support associated with COVID-19 restrictions might be additional potential mechanisms

behind the deleterious mental health effects and the protective intervention effects found earlier.

By definition, the containment restrictions imposed by the authorities would only achieve their goal if the population followed orders and reduced their interactions with people outside their household. One might therefore expect a potential reduction on perceived social support during periods of isolation. Moreover, because in Pakistan, heightened restrictions always followed spikes in COVID-19 cases and deaths, one might also expect to observe increased stress and worry about contracting the virus. Indeed, in Table 6, we find that when more mandatory restrictions were in place, stress overload scores increased by approximately 1.9 units or 71% among the control group. During these times, worry about the prospect of getting sick from COVID also increased by about 14% and mothers' concerns about problems experienced by their children either at school or in regard to their health also increased by almost 20%. Our estimates for the interaction between number of restrictions and treatment, show that the intervention helped women better manage this stress and worry, completely offsetting the main effects of the restrictions experienced by women in the control group.

Lastly, in columns (4) to (7), we find suggestive evidence that during times with more mandatory restrictions, women scored lower in various scales measuring perceived social support from family, friends and their significant other. However, only social support from friends dropped significantly (16%) when restrictions were high. We find no evidence that the intervention significantly affected women's perceptions of social support during stringent times.

7. Discussion

We evaluate the protective effects of a psychosocial intervention against the deleterious effects of COVID-19 restrictions on mental health and IPV in the context of rural Pakistan. The intervention, which has previously been shown to cause lasting reductions in maternal anxiety and depression (Baranov, Frost, et al., 2022; Maselko et

al., 2020), provided cognitive behavioral therapy to 283 clinically depressed women and enhanced usual care to 287 women (the control group). The intervention was delivered by volunteer peer women from the same community as the mothers. Five to seven years after the intervention started, we identify large protective effects of treatment on women's mental health, spousal conflict and intimate partner violence during periods with a high stringency of pandemic restrictions.

To the best of our knowledge, this is the first evidence that a low cost and scalable CBT-based intervention offers significant protection against common mental disorders and domestic violence induced by the recent pandemic in a low- and middle-income country. We find suggestive evidence that these effects operate, at least in part, through an improved ability to manage stress and process worry. The intervention also appears to have improved women's ability to concentrate in the situation at hand and maintain interest in the present instead of mentally absconding from the difficult circumstances they were experiencing.

Overall, our findings suggest that treating maternal depression may provide psychological resilience and reduce spousal conflict when negative shocks strike. Given the persistent levels of poverty and the heightened risk that climate changes poses to many in low- and middle-income countries, and the potential for intergenerational transmission of poor mental health and domestic violence, the results in this paper provide new evidence to motivate greater policy investment in maternal depression in LMICs.

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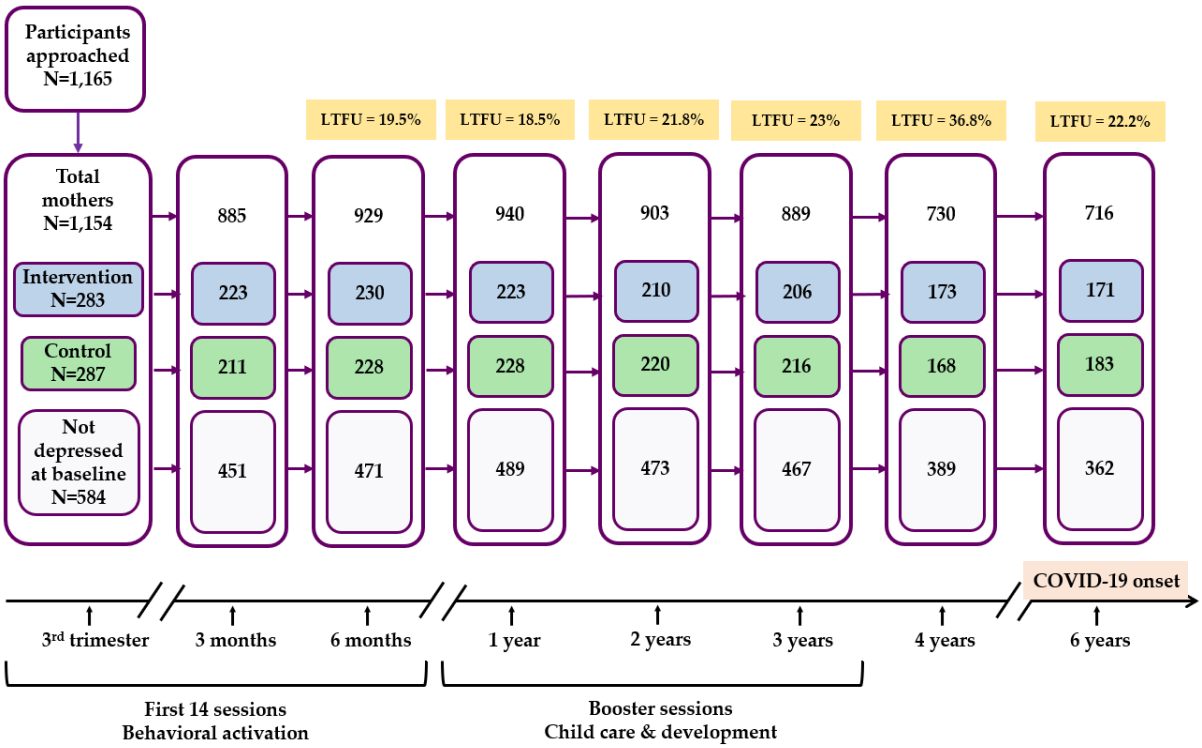
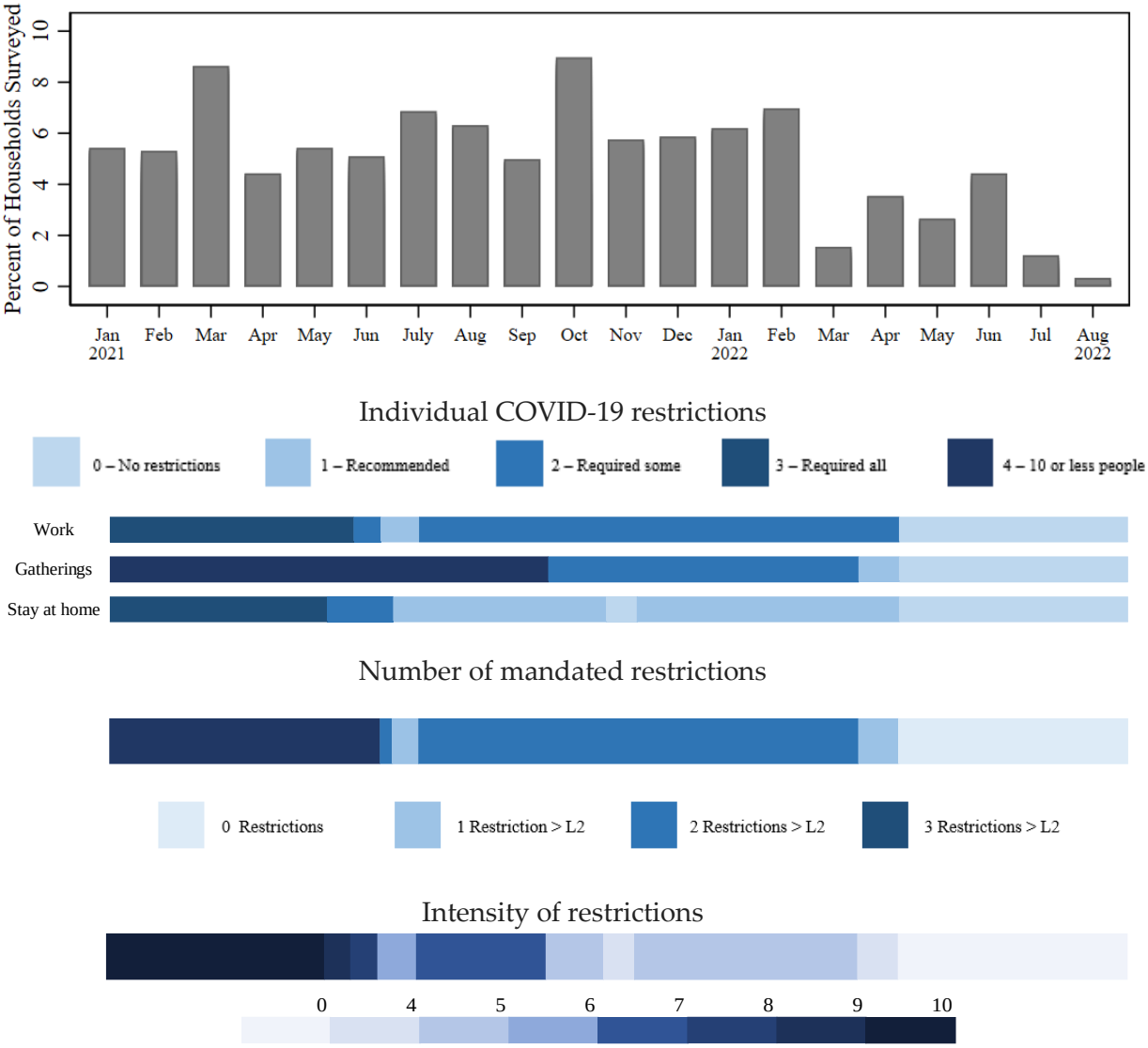
Figures

Figure 1. Timeline of THPP+ Intervention and Follow-ups



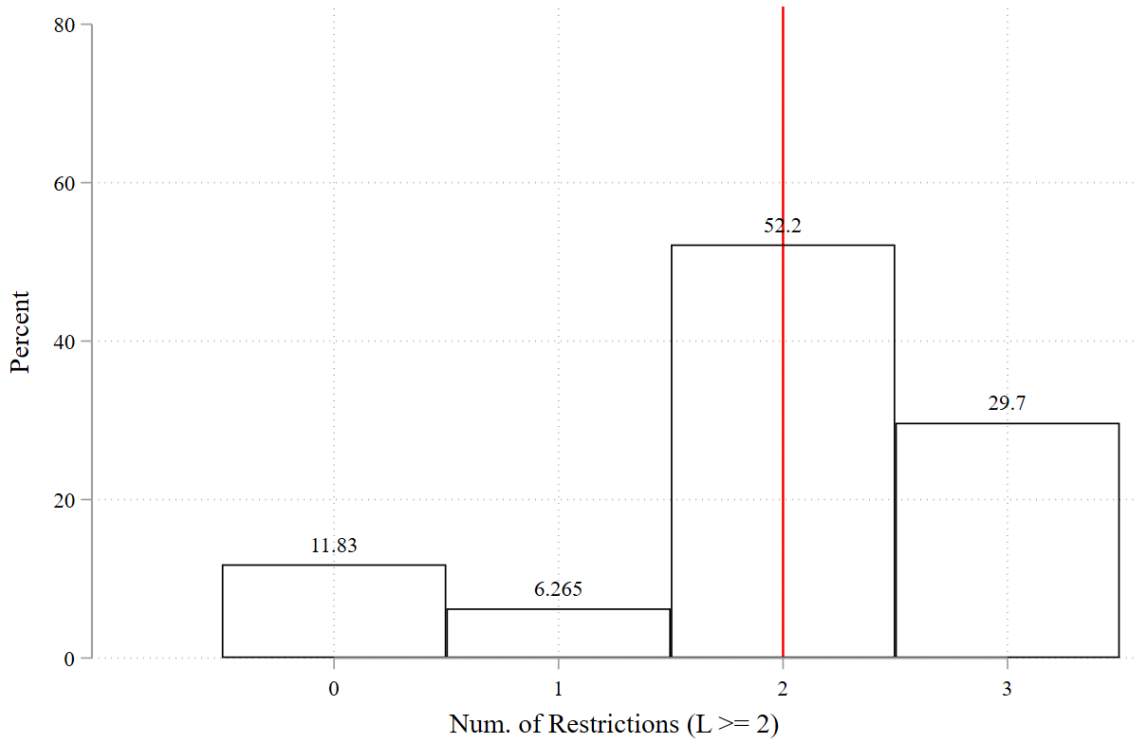
Note: In year 4, surveys were collected using mobile phones, which explains why lost to follow-up increased from 23% in year 3 to 36.8%. However, by year 6, we were able to reach 22.2% of the original sample.

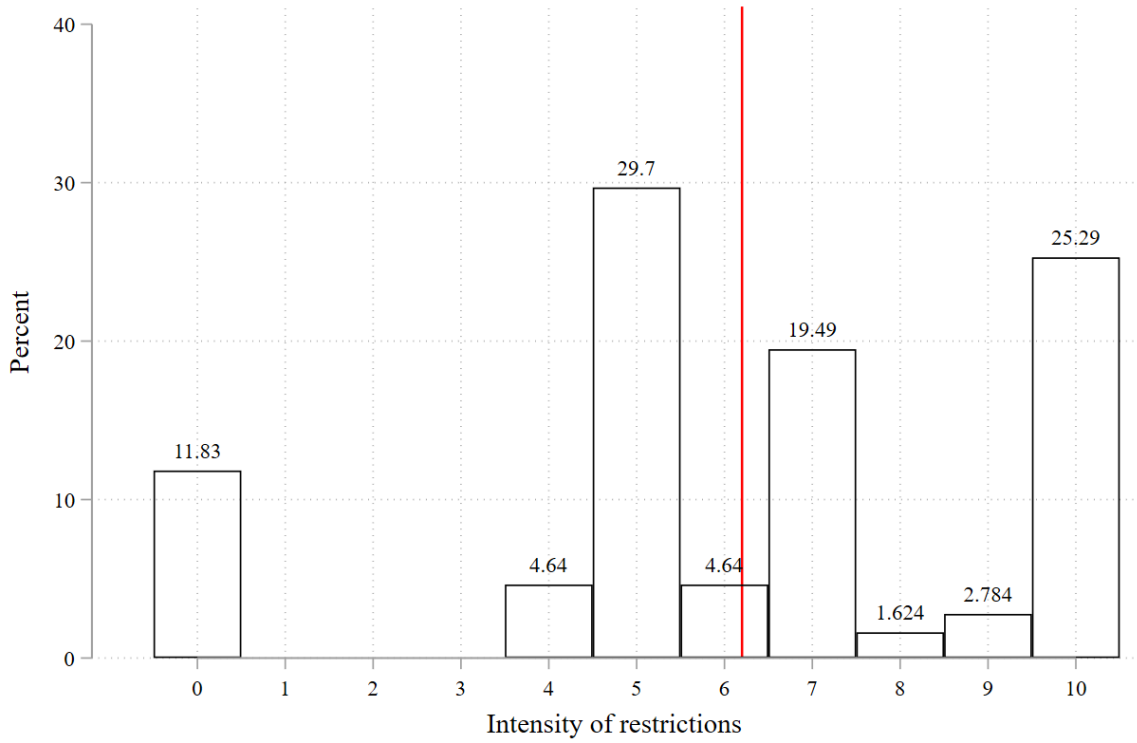
Figure 2. Timeline of the Bachpan Year-6 survey rollout and national restrictions



Note: Daily data on restrictions at the national level comes from the Oxford COVID-19 Government Response Tracker (Hale et al., 2021) and Our World in Data.

Figure 3. Aggregate restriction measures during year 6 of the study





Tables

Table 1. Characteristics of COVID-19 waves in Pakistan

COVID-19 Wave	Dates	Confirmed Cases	Deaths	Vaccinations
Wave 1	March 2020 - October 2020	321,877	6,621	-
Wave 2	October 2020 - February 2021	242,200	5,712	-
Wave 3	February 2021 - June 2021	379,988	9,448	3,136,386
Wave 4	June 2021 - September 2021	309,803	6,175	45,291,948
Wave 5	December 2021 - February 2022	221, 825	1,401	45,667,572

Note: Data come from Ahmad et al. (2023) and Emmanuel et al. (2023). COVID-19 vaccines were not being administered during waves 1 and 2. The peaks of each wave were usually reached around the middle of each timeframe: wave 1 – June 2020, wave 2 – December 2020, wave 3 – May 2021, wave 4 – August 2021 and wave 5 – January 2022.

Table 2. Balance in baseline characteristics by treatment arm

	Baseline Sample (N=1,154)								72-months (898)	
	Control		Treatment	Non-depressed	Diff.	p-val	Diff.	p-val	Diff.	p-val
	Mean	SD	Mean	Mean	(ND-D)		(T-C)		(T-C)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Mother's age	27.29	4.97	26.80	26.37	-0.67	0.012	-0.49	0.225	-0.49	0.276
Mother's height (cm)	156.33	6.09	157.43	156.84	-0.04	0.932	1.10	0.030	1.17	0.048
Mother's weight (kg)	61.24	12.88	60.17	59.89	-0.82	0.238	-1.07	0.313	-1.43	0.246
Mother's waist circ. (in)	37.56	4.09	36.85	37.07	-0.14	0.600	-0.70	0.045	-0.83	0.037
Mother's blood pressure	71.82	14.10	70.66	71.18	-0.07	0.922	-1.16	0.291	-0.61	0.615
PHQ-9 Score	14.48	3.58	14.89	2.80	-11.89	0.000	0.41	0.181	0.27	0.443
WHODAS Score	16.11	9.12	16.71	5.61	-10.80	0.000	0.60	0.416	0.63	0.459
PSS Score	22.90	7.52	23.84	12.21	-11.15	0.000	0.94	0.138	1.05	0.152
Current major dep. episode	0.73	0.44	0.78	0.02	-0.73	0.000	0.05	0.206	0.05	0.276
Nuclear family	0.25	0.43	0.25	0.20	-0.05	0.056	0.00	0.923	-0.02	0.621
Joint/extended family	0.63	0.48	0.58	0.71	0.10	0.000	-0.06	0.182	-0.04	0.397
Grandmother present	0.67	0.47	0.63	0.72	0.07	0.010	-0.04	0.362	-0.01	0.845
Total adults in the household	5.70	2.99	5.33	5.98	0.47	0.008	-0.37	0.133	-0.08	0.768
First child	0.25	0.43	0.23	0.36	0.12	0.000	-0.02	0.555	0.00	0.968
Number of boys	0.79	0.96	0.86	0.56	-0.26	0.000	0.07	0.405	-0.05	0.569
Number of girls	0.85	1.06	0.96	0.66	-0.24	0.000	0.10	0.256	0.05	0.632
People per room	2.47	1.87	2.79	2.22	-0.42	0.000	0.32	0.051	0.35	0.041
SES asset index	-0.32	1.69	-0.56	0.42	0.86	0.000	-0.24	0.094	-0.08	0.606
Mother's education	6.80	4.55	6.83	8.57	1.75	0.000	0.03	0.945	0.24	0.562
Father's education	8.33	3.29	7.85	9.15	1.06	0.000	-0.48	0.099	-0.61	0.063
Any psychological IPV past 12m	0.49	0.50	0.52	0.20	-0.31	0.000	0.03	0.469	0.00	0.938
Any physical IPV past 12m	0.23	0.42	0.27	0.07	-0.18	0.000	0.03	0.393	0.05	0.284
Any sex-related IPV past 12m	0.37	0.48	0.43	0.22	-0.18	0.000	0.07	0.102	0.10	0.036
Observations	287		283	584						
Joint test (p-value)						0.000		0.055		0.217

Note: This table tests for balance in baseline characteristics. Columns 1, 3 and 4 show the mean in the control, treatment and non-depressed group at baseline.

Table 3. Main study measures used in the analyses

Variable	Description	72-months		
		Control		Treatment
		Mean	SD	Mean
Panel A - Mental Health and Spousal Conflict Outcomes				
Common mental disorders score	Standardized score using principal components analysis of the GAD-7 score, the PHQ-9 score and 9-SCID items • Generalized Anxiety Disorder (GAD-7) was measured in years 4 and 6 • Patient Health Questionnaire (PHQ-9) was measured in all but year 1 • Structured Clinical Interview for DSM-IV disorders (SCID) was measured in all wounds except year 4	4.97 7.60	5.28 5.85	5.82 7.88
Relationship with father/husband score	6-item scale measuring the quality of the spousal relationship	23.91	6.41	23.21
Marital problems	Binary indicator of problems with marital relations in the past 12 months	0.21	0.41	0.25
Frequency of any form of IPV	Sum of frequency of psychological, physical and sexual IPV in the past 12 m	2.11	5.18	2.15
Panel B - COVID-19 Restrictions				
Number of mandated restrictions	Sum of dichotomized restrictions on work, stay-at-home and gatherings which = 1 if if stringency level >= 2, 0 otherwise	1.99	0.90	2.01
Intensity of restrictions	Sum of ordinal measures of 3 restrictions (work and stay-at-home 0-3; gathering 0-4)	6.23	3.01	6.21
Workplace closures	Indicator = 0 if level: 0 (no measures) or 1 (recommend closing) Indicator = 1 if level: 2 (required closing some sectors), or 3 (required closing for all but essential)	0.82	0.39	0.82
Stay-at-home orders	Indicator = 0 if level: 0 (none), 1 (recommend not leaving home) Indicator = 1 if level: 2 (required not leaving with exceptions exercise, shopping), or 3 (required not leaving with minimal exceptions)	0.29	0.46	0.32
Restrictions on gatherings	Indicator = 0 if level: 0 (none) or 1 (limit above 1,000 people) Indicator = 1 if level: 2 (limit is 101-1,000 people), 3 (101 to 10 people), or 4 (ten or less people)	0.87	0.33	0.87

Note: All restrictions are measured at the national level so variation in Panel B comes from the timing of the survey rollout.

Table 4. Number of COVID-19 restrictions, maternal mental health and spousal conflict

	Common Mental Disorders Score	Relationship w. Father/Husband Score	Marital problems	Frequency of Any form of IPV
	(1)	(2)	(3)	(4)
Num. of mandated restrictions (L >= 2)	0.222***	-1.316**	0.110**	1.105
	(0.074)	(0.560)	(0.049)	(0.688)
Intervention x Num. of restrictions (L >= 2)	-0.260**	2.664***	-0.212***	-1.463*
	(0.116)	(0.822)	(0.061)	(0.861)
p-value (of the difference)	0.008	0.003	0.004	0.089
R-squared	0.318	0.304	0.246	0.329
Outcome Mean	0	23.57	0.23	2.13
Observations	430	427	427	425

Note: Number of restrictions is the sum of the binary indicators for all 3 restrictions listed above with levels greater or equal to 2 (i.e., the survey took place in a period with mandated restrictions for at least some of the population). The mean is 2, with 5.4% of the sample having 1 restriction level 2+, 53% having 2 restrictions and 30% having 3 restrictions level 2+. Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Table 5. Restrictions and self-reported COVID-19 shocks

	Covid stressors score	Covid Economic Impact	Covid uncertainty score	Economic support index	Enough money for basic needs
	(1)	(2)	(3)	(4)	(5)
Panel A					
Num. of Restrictions (L >= 2)	-0.152	-0.214	0.295	0.473	-0.022**
	(0.175)	(0.197)	(0.324)	(1.020)	(0.010)
Intervention x Num. of Restrictions (L >= 2)	0.104	0.152	0.099	1.340	0.026
	(0.256)	(0.269)	(0.531)	(1.760)	(0.017)
Panel B					
Intensity of restrictions	-0.028	-0.043	0.088	0.620**	-0.064*
	(0.051)	(0.058)	(0.100)	(0.282)	(0.036)
Intervention x Intensity	-0.029	-0.012	-0.013	0.638	0.058
	(0.078)	(0.086)	(0.161)	(0.507)	(0.059)
Outcome Mean	2.21	3.46	7.07	68.74	0.79
Observations	431	431	431	431	431

Note: Number of restrictions is the sum of the binary indicators for all 3 restrictions (workplace closures, stay-at-home orders and number of people allowed in gatherings) with levels greater or equal to 2 (i.e., the survey took place in a period with mandated restrictions for at least some of the population). The mean is 2, with 5.4% of the sample having 1 restriction level 2+, 53% having 2 restrictions and 30% having 3 restrictions level 2+. Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

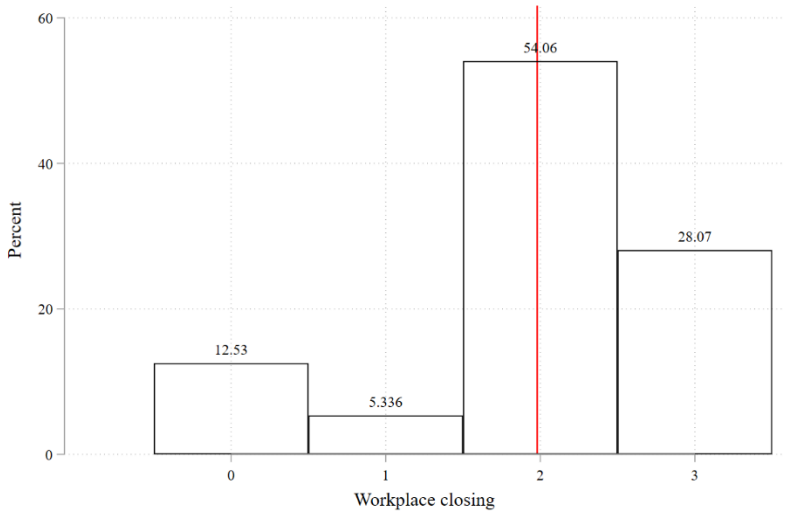
Table 6. COVID-19 restrictions, stress, worry and perceived social support

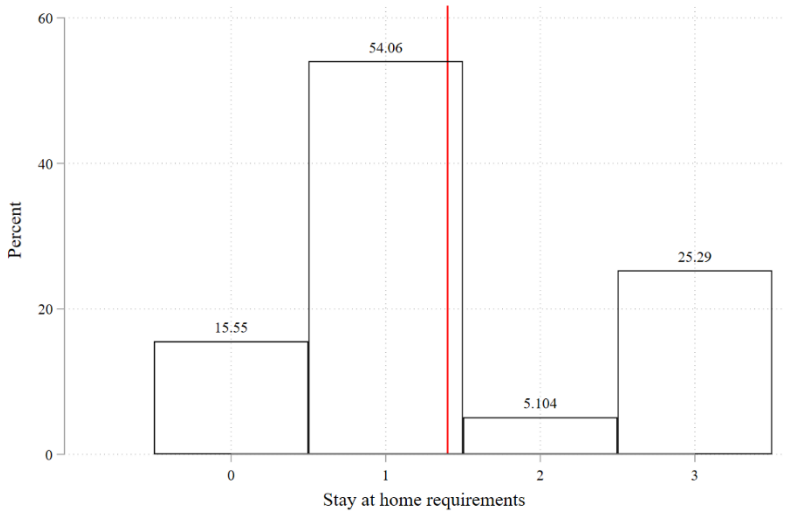
	Stress and Worry			Multidimensional Scale of Perceived Social Support			
	Stress Overload Score	Worry about getting sick from COVID	Worried about child problems	Overall Score	Family Score	Friends Score	Significant Other Score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Num. of Restrictions (L >= 2)	1.896**	0.261*	0.134***	-0.198	-0.216	-0.593*	-0.279
	(0.891)	(0.131)	(0.044)	(0.181)	(0.181)	(0.345)	(0.185)
Intervention x Num. of Restrictions (L >= 2)	-2.663*	-0.133	-0.142**	-0.226	0.189	-0.495	0.234
	(1.401)	(0.218)	(0.064)	(0.200)	(0.223)	(0.405)	(0.226)
R-squared	0.282	0.312	0.208	0.247	0.261	0.248	0.293
Outcome mean	22.79	1.85	0.70	4.65	5.93	3.69	6.09
Observations	431	431	431	431	431	431	431

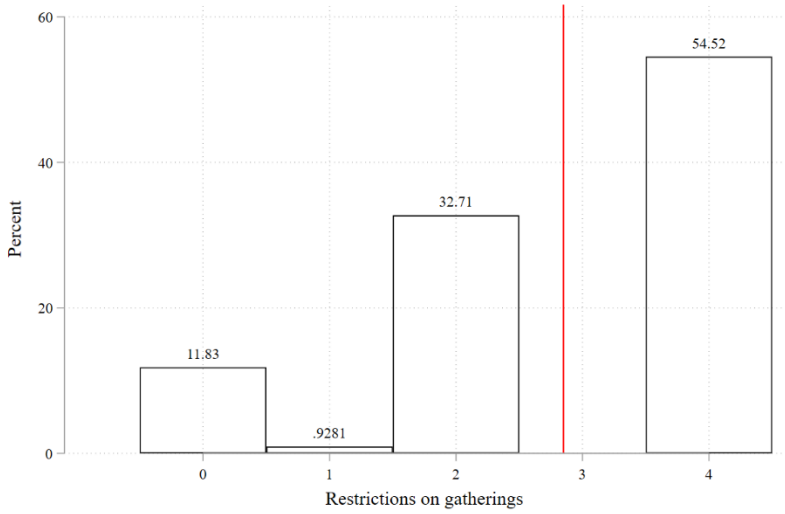
Note: Number of restrictions is the sum of the binary indicators for all 3 restrictions (workplace closures, stay-at-home orders and number of people allowed in gatherings) with levels greater or equal to 2 (i.e., the survey took place in a period with mandated restrictions for at least some of the population). The mean is 2, with 5.4% of the sample having 1 restriction level 2+, 53% having 2 restrictions and 30% having 3 restrictions level 2+. Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Appendix

Appendix Figure 1. Individual restrictions during year 6 of the Bachpan study







Appendix Table 1. Characteristics of Attritors at 6 Years (72 months)

	Attritor characteristics				Attritor characteristics by treatment arm			
	Sample mean (1)	Attritor mean (2)	Diff. (2)-(1) (3)	p-val (4)	Attritor T mean (5)	Attritor C mean (6)	Diff. (T-C) (7)	p-val (8)
Mother's age	27.15	26.72	-0.43	0.355	26.94	26.53	0.41	0.634
Mother's height (cm)	156.96	156.61	-0.35	0.553	156.11	157.06	-0.95	0.347
Mother's weight (kg)	61.09	59.55	-1.53	0.213	59.44	59.66	-0.22	0.916
Mother's waist circ. (in)	37.30	36.91	-0.39	0.340	37.06	36.78	0.28	0.713
Mother's blood pressure	71.40	72.32	0.93	0.430	73.92	70.89	3.03	0.218
PHQ-9 Score	14.60	14.95	0.35	0.329	14.53	15.32	-0.79	0.199
WHODAS Score	16.29	16.78	0.49	0.570	16.53	17.00	-0.47	0.761
PSS Score	23.39	23.30	-0.09	0.905	22.97	23.60	-0.63	0.625
Current major dep. episode	0.74	0.79	0.05	0.224	0.77	0.81	-0.04	0.582
Nuclear family	0.23	0.32	0.10	0.023	0.29	0.35	-0.06	0.426
Joint/extended family	0.62	0.56	-0.07	0.165	0.61	0.51	0.09	0.274
Grandmother present	0.67	0.56	-0.11	0.018	0.62	0.51	0.11	0.202
Total adults in the household	5.55	5.42	-0.13	0.654	6.08	4.84	1.24	0.021
First child	0.22	0.30	0.08	0.057	0.35	0.26	0.09	0.240
Number of boys	0.82	0.84	0.02	0.837	0.61	1.04	-0.43	0.013
Number of girls	0.87	1.00	0.13	0.238	0.86	1.12	-0.26	0.205
People per room	2.57	2.82	0.25	0.182	2.71	2.92	-0.21	0.619
SES asset index	-0.39	-0.59	-0.20	0.231	-0.22	-0.92	0.69	0.019
Mother's education	6.67	7.26	0.59	0.174	7.64	6.92	0.72	0.375
Father's education	8.20	7.76	-0.44	0.193	7.77	7.74	0.03	0.963
Any psychological IPV past 12m	0.51	0.48	-0.03	0.509	0.41	0.55	-0.14	0.103
Any physical IPV past 12m	0.25	0.25	0.00	0.944	0.26	0.25	0.01	0.882
Any sex-related IPV past 12m	0.39	0.37	-0.02	0.685	0.38	0.37	0.01	0.866
Observations	430	140			66	74		
Joint test (p-value)				0.054				0.114

Note: This table tests for balance in baseline characteristics between the full sample and attritors and between attritors in the control and treatment arms.

Appendix Table 2. Balance in COVID-19 restrictions by baseline characteristics

	Aggregate measures		Restrictions		
	Num. of Restrictions (L >= 2)	Intensity of restrictions	Work Restrictions	Stay home restrictions	Restrictions on Gatherings
	(1)	(2)	(3)	(4)	(5)
PHQ-9 Score	-0.018*	-0.043	-0.017*	-0.011	-0.014
	(0.009)	(0.029)	(0.009)	(0.009)	(0.014)
WHODAS Score	0.005	-0.001	0.005	-0.011*	0.005
	(0.005)	(0.018)	(0.005)	(0.006)	(0.008)
PSS Score	0.008	0.041**	0.007	0.018***	0.015
	(0.005)	(0.019)	(0.005)	(0.006)	(0.009)
Mother's age	0.012	0.031	0.011	0.009	0.010
	(0.008)	(0.028)	(0.008)	(0.009)	(0.014)
Mother's height (cm)	0.007	0.015	0.007	0.002	0.006
	(0.006)	(0.020)	(0.006)	(0.007)	(0.009)
Mother's weight (kg)	-0.000	-0.002*	-0.000	-0.001***	-0.001*
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Mother's waist circ. (in)	-0.013	-0.014	-0.014	-0.001	0.000
	(0.010)	(0.035)	(0.010)	(0.011)	(0.015)
Mother's blood pressure	-0.005*	-0.023**	-0.005	-0.008**	-0.010**
	(0.003)	(0.010)	(0.003)	(0.003)	(0.004)
Nuclear family	-0.023	0.031	0.014	0.068	-0.051
	(0.096)	(0.315)	(0.093)	(0.104)	(0.140)
Joint/extended family	-0.239***	-0.672***	-0.188**	-0.194**	-0.290**
	(0.076)	(0.218)	(0.078)	(0.073)	(0.109)
Total adults in the house	0.029**	0.103**	0.028**	0.044***	0.032*
	(0.011)	(0.040)	(0.011)	(0.014)	(0.018)
Number of boys	-0.063	-0.131	-0.075*	-0.014	-0.043
	(0.041)	(0.143)	(0.040)	(0.056)	(0.064)
Number of girls	-0.000	0.104	-0.013	0.049	0.068
	(0.046)	(0.150)	(0.043)	(0.050)	(0.069)
People per room	0.028	0.109	0.032	0.025	0.052
	(0.020)	(0.073)	(0.020)	(0.027)	(0.031)
SES asset index	0.006	0.012	0.015	0.003	-0.006
	(0.024)	(0.088)	(0.023)	(0.028)	(0.045)
Mother's education	-0.021***	-0.066**	-0.023***	-0.019*	-0.024**
	(0.007)	(0.025)	(0.007)	(0.010)	(0.012)
Father's education	0.003	0.012	0.001	0.002	0.009
	(0.011)	(0.035)	(0.012)	(0.011)	(0.016)
Any psych. IPV past 12m	-0.041	-0.207	-0.028	-0.045	-0.134
	(0.087)	(0.314)	(0.088)	(0.089)	(0.156)
Any physical IPV past 12m	0.095	0.440	0.059	0.085	0.295**
	(0.100)	(0.316)	(0.103)	(0.109)	(0.142)
Any sexual IPV past 12m	-0.201	-0.853	-0.188	-0.235	-0.429*
	(0.142)	(0.518)	(0.146)	(0.169)	(0.239)
Joint test (p-value)	0.000	0.000	0.000	0.000	0.000
Observations	903	903	903	903	903

Note: Table shows the association between baseline characteristics and restrictions during the year-6 survey rollout. The p-values at the bottom come from F-tests that jointly test all coefficients with the null hypothesis of balance among respondents surveyed in times with more restrictions. Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Appendix Table 3. Balance in COVID-19 restrictions by treatment arm

Variable	(1) Control Mean	(2) Treatment Mean	(3) Non-Dep Mean	(4) Diff. (T-C)	(5) p-val	(6) Diff. (ND-D)	(7) p-val
Aggregate measures of Restrictions							
Num. of Restrictions (L >= 2)	1.99	2.01	2.04	0.023	0.794	0.04	0.479
Intensity of restrictions	6.23	6.21	6.18	-0.024	0.940	-0.04	0.833
Restrictions							
Work Restrictions	1.98	1.97	2.02	-0.01	0.904	0.04	0.478
Stay home restrictions	1.41	1.39	1.43	-0.02	0.860	0.03	0.675
Restrictions on Gatherings	2.84	2.85	2.73	0.01	0.973	-0.11	0.217
Observations	222	209	472	431		903	

Note: This table tests for balance in COVID restrictions and our aggregate measures by treatment arm. Columns 1, 2 and 3 show the mean in the control, treatment and non-depressed groups at baseline.

Appendix Table 4. Components of the Common Mental Disorders Score

	GAD-7 Score	PHQ-9 Score	Depressed mood	Loss of interest	Appetite loss	Sleep disturbance	Psychomotor agitation	Fatigue	Feeling worthless	Trouble concentrating	Suicidal ideation
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Num. of Restrictions (L >= 2)	1.173**	0.862*	0.059	0.100***	0.067*	-0.001	0.117***	0.017	0.032**	0.061*	0.041*
	(0.480)	(0.454)	(0.046)	(0.030)	(0.037)	(0.038)	(0.036)	(0.057)	(0.015)	(0.032)	(0.021)
Intervention x Num. of Restrictions (L >= 2)	-1.454**	-1.651**	-0.098	-0.125**	-0.057	0.038	-0.093	-0.002	-0.041	-0.099*	-0.038
	(0.625)	(0.734)	(0.060)	(0.048)	(0.052)	(0.061)	(0.058)	(0.079)	(0.030)	(0.052)	(0.029)
p-value (difference)	0.016	0.025	0.126	0.003	0.142	0.661	0.018	0.884	0.082	0.044	0.099
R-squared	0.317	0.304	0.212	0.272	0.205	0.231	0.224	0.340	0.218	0.259	0.211
Outcome Mean	5.38	7.74	0.31	0.24	0.25	0.21	0.25	0.45	0.11	0.16	0.07
Observations	431	431	431	431	431	431	431	431	431	431	430

Note: Number of restrictions is the sum of the binary indicators for all 3 restrictions listed above with levels greater or equal to 2 (i.e., the survey took place in a peri with mandated restrictions for at least some of the population). The mean is 2, with 5.4% of the sample having 1 restriction level 2+, 53% having 2 restrictions and 3(having 3 restrictions level 2+. Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Appendix Table 5. Individual restrictions, mental health and spousal conflict

	Common Mental Disorders Score	Relationship w. father/husband Score	Marital problems	Frequency of Any form of IPV
	(1)	(2)	(3)	(4)
Panel A				
Restrictions on Work	0.210***	-1.175**	0.105**	1.048
	(0.075)	(0.553)	(0.048)	(0.686)
Intervention x Work	-0.278**	2.684***	-0.209***	-1.383
	(0.122)	(0.832)	(0.061)	(0.872)
R-squared	0.317	0.304	0.212	0.328
Panel B				
Stay at home restrictions	0.245***	-1.214**	0.097**	0.824
	(0.076)	(0.456)	(0.041)	(0.666)
Intervention x Stay home	-0.229*	2.403***	-0.190***	-0.658
	(0.122)	(0.758)	(0.054)	(0.894)
R-squared	0.322	0.302	0.210	0.325
Panel C				
Restrictions on gatherings	0.117**	-0.739*	0.052*	0.458
	(0.052)	(0.416)	(0.030)	(0.390)
Intervention x Gatherings	-0.134*	1.686***	-0.117***	-1.000*
	(0.070)	(0.594)	(0.040)	(0.519)
R-squared	0.314	0.303	0.205	0.327
Outcome Mean	0	23.57	0.23	2.13
Observations	430	427	427	425

Note: The restrictions are continuous variables between 0 and 3 (4 for gatherings), denoting whether there were no restrictions (0), whether restrictions were recommended but no mandated (1), whether they were required but only for segments of the population (2), and whether they were required for all except essential workers (3). Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Appendix Table 6. Components of Relationship with child's father/husband score

	Husband looks after your needs	Get pocket money for personal needs	Husband understand your feelings	Husband support in difficult situations	Happy with husband's behavior	Relationship w. husband (1 - bad, 5 very good)
	(1)	(2)	(3)	(4)	(5)	(6)
Num. of Restrictions (L >= 2)	-0.169	-0.075	-0.267**	-0.288**	-0.266*	-0.252***
	(0.105)	(0.125)	(0.131)	(0.123)	(0.133)	(0.089)
Intervention x Num. of Restrictions (L >= 2)	0.325**	0.383*	0.541***	0.602***	0.486***	0.326**
	(0.160)	(0.204)	(0.188)	(0.179)	(0.169)	(0.121)
p-value (difference)	0.048	0.131	0.009	0.003	0.012	0.005
R-squared	0.317	0.260	0.259	0.275	0.275	0.302
Outcome Mean	4.01	3.30	4.00	4.11	4.04	4.12
Observations	427	427	427	427	427	427

Note: Number of restrictions is the sum of the binary indicators for all 3 restrictions listed above with levels greater or equal to 2 (i.e., the survey took place in a period with mandated restrictions for at least some of the population). The mean is 2, with 5.4% of the sample having 1 restriction level 2+, 53% having 2 restrictions and 30% having 3 restrictions level 2+. Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Appendix Table 7. Frequency of IPV components

	Psychological IPV	Physical IPV	Sexual IPV
	(1)	(2)	(3)
Num. of Restrictions (L >= 2)	0.416	0.006	0.672**
	(0.324)	(0.151)	(0.284)
Intervention x Num. of Restrictions (L >= 2)	-0.693	-0.027	-0.731*
	(0.420)	(0.184)	(0.391)
p-value (difference)	0.122	0.917	0.031
R-squared	0.337	0.256	0.272
Outcome Mean	1.02	0.31	0.80
Observations	427	427	425

Note: Number of restrictions is the sum of the binary indicators for all 3 restrictions listed above with levels greater or equal to 2 (i.e., the survey took place in a period with mandated restrictions for at least some of the population). The mean is 2, with 5.4% of the sample having 1 restriction level 2+, 53% having 2 restrictions and 30% having 3 restrictions level 2+. Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Appendix Table 8. COVID-19 restrictions and other forms of conflict in the house

	Quarrels with family	Worse relationship w. children	Increase in arguments
	(1)	(2)	(3)
Num. of Restrictions (L >= 2)	0.023	-0.003	-0.048
	(0.056)	(0.040)	(0.047)
Intervention x Num. of Restrictions (L >= 2)	-0.042	0.057	0.004
	(0.067)	(0.060)	(0.063)
p-value (difference)	0.588	0.517	0.615
R-squared	0.186	0.222	0.242
Outcome Mean	0.29	0.22	0.32
Observations	431	431	431

Note: Number of restrictions is the sum of the binary indicators for all 3 restrictions listed above with levels greater or equal to 2 (i.e., the survey took place in a period with mandated restrictions for at least some of the population). The mean is 2, with 5.4% of the sample having 1 restriction level 2+, 53% having 2 restrictions and 30% having 3 restrictions level 2+. Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Appendix Table 9. Intensity of COVID-19 restrictions, maternal mental health and conflict

	Common Mental Disorders Score	Relationship w. father/husband scale	Marital problems	Frequency of Any form of IPV
	(1)	(2)	(3)	(4)
Intensity of restrictions	0.071***	-0.399**	0.032**	0.284
	(0.022)	(0.175)	(0.015)	(0.212)
Intervention x Intensity	-0.080**	0.875***	-0.065***	-0.419
	(0.034)	(0.270)	(0.019)	(0.273)
p-value (difference)	0.052	0.003	0.004	0.133
R-squared	0.319	0.307	0.213	0.326
Outcome Mean	0	23.57	0.23	2.13
Observations	430	427	427	425

Note: Intensity of restrictions is a variable between 0 and 10 which sums up the levels (0-4) of restrictions on work, stay at home orders and number of people allowed in gatherings. This aggregate variable has a mean of 6.2 and standard deviation of 3 during the period of analyses. Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Appendix to Table 10. COVID-19 restrictions, mental health and IPV (PLACEBO)

	Common Mental Disorder Score			Frequency of all forms of IPV
	Combined	Year 3	Year 4	Year 3
	(1)	(2)	(3)	(4)
Panel A				
Num. of Restrictions (L >= 2)	-0.053	-0.092	-0.086	0.421
	(0.057)	(0.086)	(0.161)	(0.721)
Intervention x Num. of Restrictions (L >= 2)	-0.012	0.037	-0.107	-0.568
	(0.092)	(0.195)	(0.229)	(0.883)
Panel B				
Intensity of restrictions	-0.014	-0.008	-0.018	0.135
	(0.022)	(0.028)	(0.065)	(0.211)
Intervention x Intensity	-0.004	-0.032	-0.045	-0.167
	(0.031)	(0.053)	(0.084)	(0.251)
Outcome Mean	0	0	0	1.48
Observations	636	298	338	358

Note: In year 3, the CMD score includes the GAD-7, PHQ-9 and all 9 SCID items as in the main results tables. In year 4, we only measured the GAD-7 and PHQ-9 scores. Column 4, frequency of all forms of IPV was not measured in year 4, only year 3 of follow-up. Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.

Appendix Table 11. Controlling for weather (temperature and rain on the day/month of the survey)

	Common Mental Disorders Score		Relationship w. father/husband score		Marital problems		Frequency of all forms of IPV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Num. of Restrictions (L >= 2)	0.222**	0.203*	-1.296**	-1.907***	0.114**	0.119*	1.306*	1.703**
	(0.089)	(0.104)	(0.610)	(0.608)	(0.051)	(0.067)	(0.721)	(0.760)
Intervention x Num. of Restrictions (L >= 2)	-0.252*	-0.144	2.798***	3.222***	-0.229***	-0.210**	-1.735*	-2.490**
	(0.132)	(0.137)	(0.883)	(0.950)	(0.062)	(0.081)	(0.905)	(0.994)
R-squared	0.323	0.325	0.307	0.309	0.219	0.221	0.287	0.290
Outcome mean	0	0	23.57	23.57	0.23	0.23	2.13	2.13
Observations	430	430	427	427	427	427	425	425
Main controls	✓	✓	✓	✓	✓	✓	✓	✓
Maximum temperature and total rain on DOI	✓		✓		✓		✓	
Average max temp and total rain over past 30 days		✓		✓		✓		✓

Notes: DOI (day of the interview). The main controls include: At baseline (PHQ-9, WHODAS, PSS, woman's height, waist circumference, joint household, adults in the house, people in the room, asset score, mother's education, father's education, sexual IPV, Union Council FE, assessor FE), at year 6 (assessor FE, month and month squared). Robust and clustered standard errors at the cluster level are reported in parentheses. *p<0.1; **p<0.05; ***p<0.01.