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Short Communication

Women's well-being during a pandemic and its containment ☆

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ABSTRACT

The COVID-19 pandemic brought the dual crises of disease and the containment policies designed to mitigate it. Yet, there is little evidence on the impacts of these policies on women in lower-income countries, where there may be limited social safety nets to absorb these shocks. We conduct a large phone survey and leverage India's geographically varied containment policies to estimate the association between the pandemic and containment policies and measures of women's well-being, including mental health and food security. On aggregate, the pandemic resulted in dramatic income losses, increases in food insecurity, and declines in female mental health. While potentially crucial to stem the spread of COVID-19, the greater prevalence of containment policies is associated with increased food insecurity, particularly for women, and reduced female mental health. For surveyed women, moving from zero to average containment levels is associated with a 38% increase in the likelihood of reporting more depression, a 73% increase in reporting more exhaustion, and a 44% increase in reporting more anxiety. Women whose social position may make them more vulnerable – those with daughters and those living in female-headed households – experience even larger declines in mental health.

1. Introduction

Pandemics represent a twin health and economic shock with devastating effects, particularly in low-income countries, where substitutes for in-person transactions are scarce and formal safety nets are limited. Women may be especially vulnerable in these settings given gender norms, low availability of mental health services, and weaker state capacity. To examine how women fare in these contexts during the COVID-19 pandemic, we conduct a large phone survey in six states in rural areas in northern India. Combined with India's highly spatially-variant containment policies, we are able to estimate the relationship between both the pandemic and the containment policies and key measures of women's well-being, including female mental health, in a country of 1.4 billion people.

While lockdowns may be crucial to stem the spread of COVID-19 cases, when not combined with adequate social safety nets, they can also generate economic and health distress. Low-income settings may be particularly affected, as they have limited state capacity for aid and insurance, a lack of alternatives for in-person transactions, and less resilient supply chains (Mobarak and Barnett-Howell, 2020; Egger et al., 2021). Anecdotal evidence suggests that rural India suffered from significant disruptions to food supply chains and losses of economic livelihood, perhaps affecting the physical and mental well-being of vulnerable populations (Purohit, 2020; Singh and Kumar, 2021). Yet, without the systematic measurement of these outcomes for at-risk populations, the extent of this crisis, and its relationship with containment policies are difficult to quantify.

Using a sample of households that were first interviewed in Fall 2019, we conduct a timely phone re-survey in August 2020, near the height of the first COVID-19 wave in India, when India had between 50,000 and 70,000 new COVID-19 cases per day.[1] This setup not

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[1] These numbers are from the COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University.

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only gives us measures of pre-pandemic baseline characteristics, but also allowed a trusted organization, which had already developed a relationship with these households, to inquire about women's mental well-being.

We find that the pandemic is associated with drastic income losses and decreases in food security, as well as declines in female mental health and well-being.[2] The mental health effects suggest that many important costs of the pandemic may be difficult to observe in standard data sources. Additionally, these aggregate effects may stem from both the direct stress and economic effects of the pandemic as well as containment policies that limit economic activity, even as they may stem disease.

Identifying the impact of containment itself is challenging in most settings. We leverage the fact that containment exposure is uniquely variable in our setting. While India initially pursued a nation-wide lockdown in response to the pandemic, from June 2020 onward, it had a patchwork of containment zones in which lockdown measures were imposed. These zones were determined by district or town authorities, and their size could be as small as one apartment building or a 1 km radius (Express News Service, 2020). This mosaic of policies within relatively small geographic areas provides us with a unique opportunity to leverage meaningful variation in lockdown policies and assess containment's relationship with mental health and other measures of well-being.

We show that the negative food security and mental health impacts of the pandemic are exacerbated in areas with more containment. Moving from zero to average containment levels is associated with increases in the likelihood of reporting more depression among women by 38%, reporting more exhaustion by 73%, and reporting more anxiety by 44% relative to variable means. Two pieces of evidence suggest that the associations we report may be capturing the causal effects of containment, despite the fact that containment policies are not randomly assigned to geographic units. First, living in an area with a higher prevalence of lockdowns is not systematically associated with pre-treatment socioeconomic measures, either for outcomes collected from our own sample prior to the pandemic or for district level measures of food intake in the 2015–16 National Family Health Survey. Second, our estimates are robust to the inclusion of district level cumulative measures of case and death rates, which allows us to compare two areas with the same COVID-19 incidence but different containment policies.

Our last set of results examines how the relationship between the aggregate COVID-19 shock and the outcome measures varies with the pre-existing vulnerability of women. Recent evidence from high-income settings suggests that working mothers with young children are particularly affected by lockdowns (Zamarro and Prados, 2021). While relative female labor force participation in India is lower, traditional gender norms may make women particularly vulnerable at times of socio-economic stress. We find that the negative relationship between the pandemic and mental health is significantly exacerbated (i) for women who have daughters, consistent with the existence of strong son preference in India, where daughters may lower a woman's status within the household, and (ii) for women in female-headed households.

We contribute to the literature in two ways. First, we provide new evidence on the repercussions of lockdowns in countries with limited social safety nets by leveraging fine-grained geographic variation in containment, even conditional on pandemic severity. Second, we expand the evidence on the effects of the pandemic, particularly on mental health, to a lower-income setting. While contemporaneous work examines the consequences of the pandemic on mental health and well-being, much of this work is concentrated in high-income countries (Brodeur et al., 2021; Armbruster and Klotzbücher, 2020; Davis et al., 2020; Witteveen and Velthorst, 2020; Adams-Prassl et al., 2020; Huebener et al., 2020; Etheridge and Spantig, 2020), or the middle-income settings of Turkey (Altindag et al.; Özdin and Bayrak Özdin, 2020), Brazil (Ferreira et al., 2021), and Egypt (El-Zoghby et al., 2020).[3] In contrast, we focus on a lower-middle income country, where limited social safety nets, lack of mental health services, and traditional gender norms make women especially vulnerable (Angelucci and Bennett, 2021; Baranov et al., 2020; Haushofer et al., 2021).[4]

In addition, we collect data specifically from rural areas. Concurrent work using data from food markets and healthcare claims shows that rural India suffered from severe disruptions to food supply chains (Lowe et al., 2020) and access to health services (Jain and Dupas, 2021). The economic effects of the pandemic appear to have been even more severe in rural areas (Bertrand et al., 2020). Thus, our survey across rural North India allows us to measure the consequences of these disruptions for the households who were likely the most affected. Though India is officially classified as middle-income, the findings from low-income, rural areas in India are likely to be informative for other low-income settings around the world. Finally, by implementing a survey where the phone was passed to women, we are able to measure female mental health, a challenging outcome to observe in such contexts, using standard measures validated in the psychology literature.

We emphasize that our findings on the adverse repercussions of the containment measures are positive, rather than normative results, since we do not study or quantify the long-run health or economic impacts of improved mitigation. Nonetheless, the large negative associations suggest that, without expanded social insurance, lockdown policies could severely affect the well-being of women in low-income countries. Indeed, eight months after our survey, COVID-19 cases in India skyrocketed six to eight times higher than when we conducted the survey, resulting in more containment policies. Our results suggest that any time such policies are instituted, they should be complemented with targeted aid, with particular attention to the well-being of the most vulnerable.

Finally, we note that these results are not merely relevant for the current pandemic. Global pandemics are expected to increase in frequency due to urbanization, globalization, loss of biodiversity, and climate change (Dodds, 2019). Understanding the consequences of containment policies is crucial for crafting future approaches to disease control and concurrent aid-targeting in lower-income settings. Lower-middle income countries like India, alone, account for roughly 3 billion people or roughly 40 percent of the global population.

2. Data

This project uses data from a phone survey of 1,545 rural Indian households collected in August 2020. These data were collected in partnership with IDinsight (IDI), a global advisory, data analytics, and research organization. We use data from an in-person, baseline survey that IDI collected in September–October 2019 as our sample frame for the phone survey. In addition, we supplement these data with information on case and death rates.

[2] Given the vulnerability of women in this context and an epidemiological literature that highlights high rates of depression for women, we focus our analysis on women's mental health (Andrade et al., 2003; Bromet et al., 2011). Men's mental health could have also been adversely affected over the course of the pandemic, as many lost sources of income, their livelihoods, and family members.

[3] See Xiong et al. (2020) for a systematic review of the effects of the pandemic on the mental health of the general population across countries.

[4] Additional evidence on the effect of the pandemic on mental health of men and women in India can be found in Afridi et al. (2021), who focus on a sample of poor households in Delhi. In this different population, they find that mental health declines more for women than men during the pandemic. Acharya Samadarshi et al. (2020) also document increases in stress during the pandemic in an online survey from Nepal.

Data collection & key variables. Working with IDI, we conducted the phone survey in 20 districts across 6 states (Rajasthan, Uttar Pradesh, Bihar, Jharkhand, Madhya Pradesh, and Maharashtra) in Northern India in August 2020. Households participated in a 20–30 min survey with two parts, a household head module and a female respondent module. The number of questions in both modules was limited since households resist taking part in surveys with a duration greater than 20 min over the phone.[5]

In the household head module, we surveyed the household head (who was male in 78% of cases) about the household's socioeconomic conditions, household head's income, the male and female heads' nutrition, and the number of days the respondent wished for more food for themselves or their children. The nutrition questions were taken from the National Family and Health Survey (NFHS) 2015–16, allowing us to use the pre-pandemic responses to the survey from the same district to benchmark nutritional outcomes. We include the full set of food categories in the NFHS (milk, pulses, vegetables, fruits, eggs, fish, and meat) in our survey. However, since a large fraction of the population we study is vegetarian, when we construct aggregate indices for nutrition, we focus on milk, pulses, vegetables, and fruits.

After the head module, if the head was male, we asked him to pass the phone to a female household member (typically the female household head). The female responded to an additional survey asking about her mental health and status within the household, as well as if this had changed since the pandemic. In cases where the respondent to the head module was female, the same respondent answered the female survey. Altogether, this allowed the female module to be conducted with 573 women.

To ascertain information on women's mental health, we asked a selection of questions from the PHQ9 depression diagnostic scale (Kroenke et al., 2001) and the GAD7 anxiety scale (Spitzer et al., 2006).[6] From the PHQ9, we ask, "*Over the last two weeks, how often have you been bothered by:* (1) *Feeling sad, down, depressed, or hopeless?*" and (2) "*Feeling tired or like you are carrying a heavy burden or like you have little strength in your body?*" From the GAD7, we ask how often have you been bothered by: (3) "*Not being able to stop or control worrying?*" We supplement the mental health questions by asking women about their perceptions of their safety during the pandemic: (4) "*Over the last two weeks, how often have you been bothered by: Feeling worried about your physical safety?*"

For a subset of questions, we also directly elicit how respondents' outcomes have changed due to the pandemic. For example, for each of the mental health questions above (as well as the safety question), we ask respondents a follow-up question about whether their experiences have improved, worsened, or stayed the same since the pandemic. By measuring changes in these outcomes, we are able to both assess the aggregate effects of the pandemic and measure the relationship between lockdowns and outcome variables, accounting for pre-pandemic differences across individuals.[7] For both our "level" and "changes" mental health measures, we also create aggregate mental health indices, which take the average over the depression, exhaustion, and anxiety measures.

Table A1 reports summary statistics for the primary outcomes for the final sample used in analysis.[8] We also supplement these key variables with information on pre-pandemic socioeconomic status collected by IDI in their prior survey.

Representativeness. Our sample was randomly drawn from a sample of lactating mothers that IDinsight had previously surveyed in 2019. The lactating mothers sample was in turn drawn from a combination of voter rolls and community health worker registers. The voter rolls are representative of the population and compare well with averages from census and survey data (Joshi et al., 2020).

For the re-survey, we called a random sub-sample of 4,799 households and were able to successfully survey 32%. In the vast majority of cases where we did not re-survey a household, we were unable to reach that household with the listed phone number (61% of households could not be reached, and 6.6% refused to take part in the survey). To evaluate whether non-responsiveness led to a less representative sample, in Appendix Table A2, we estimate the relationship between baseline household characteristics (Panel A) and district level pre-pandemic characteristics in the NFHS round 4 (Panel B) and survey completion.[9] Households that completed the survey are wealthier and have a higher pre-pandemic income but do not differ in terms of caste or religion. District level socioeconomic characteristics also do not predict completion. Altogether, this evidence suggests that wealthier households may be over-represented in the sample. This phenomenon may lead us to underestimate the severity of the pandemic's effects. However, another source of potential bias may instead involve time-varying characteristics: if response rates are higher among respondents with lower opportunity cost of time, unemployed subjects may instead be over-represented in the sample, leading us to potentially overestimate the severity of the pandemic's effect.

Additional data on case rates/deaths. We supplement our phone survey data with additional district level data on COVID-19 cases and deaths between the start of the pandemic and the time of the survey. We also use hospitalization data from HMIS data. All this data is assembled by the Development Data Lab.[10]

3. The aggregate shock

We use questions that directly elicit how respondents' outcomes change from the pre- to post-pandemic period to measure the aggregate effects of the pandemic. The left sub-figure in Fig. 1 reports the distribution of the head's self-reported income before and after the pandemic, which shows a dramatic drop. On average, the head's monthly income falls from 8,625 Rupees (120 USD) in a normal month to 3,584 Rupees (50 USD) in the current (during COVID-19) month, a decline of about 50%. The right sub-figure shows that 76% of the respondents report reduced income for themselves, and 24% report reduced meals for someone in the household.

Next, we use the female well-being questions to report the percentage of households where the female respondent reports that her feelings of depression, exhaustion, anxiety, and safety have worsened over the course of the pandemic. For each measure, roughly 30% of respondents indicate that their feelings have worsened. For all four measures, female respondents report that their feelings have worsened roughly twice as much as they report that they have improved, suggesting

[5] Providing incentives for survey participation in India is challenging because mobile money is not widespread and most households have monthly, unlimited cell phone bundles, reducing the value of offering households extra data or cell phone minutes.

[6] The phone survey's short time frame prevented us from asking the two complete scales. Patel et al. (2008) validate the PHQ and other related assessment tools in the Indian context. Sadish et al. (2021) also elicit mental health information on the phone during India's COVID-19 pandemic, and highlight the feasibility of such data collection.

[7] Our questions on mental wellbeing reference the COVID-19 pandemic, as do many other recent survey projects. See for instance, the GAGEproject, the EmergeProject, and the YoungLivesSurvey.

[8] We restrict the sample to individuals for whom none of the potential control variables are missing.

[9] To create the wealth index in the table, we follow (Filmer and Pritchett, 2001) and conduct a principle components analysis over indicators for the assets owned prior to the pandemic – car, jeep, bicycle, motorcycle, scooter, refrigerator, radio, television, electric fan, dressing table, stove, pressure cooker, mobile phone – and predict the first principal component.

[10] This data can be accessed at http://www.devdatalab.org/covid.

Fig. 1. Impact of aggregate shock on income and female well-being.
Notes: The left sub-figure reports the distribution of the inverse hyperbolic sine of the household head's self-reported income in the current month and a normal month in rupees. The right sub-figure reports the percentage of households reporting reduced income, reduced meals, and worsening measures of female well-being. 'Lost Income' is the percentage of households where the head reported less income in the current month than a normal month. 'Reduced Meals' is the percentage of households where the head reported reducing the number/size of meals for at least one person in the household. The outcomes for female well-being (e.g., more depressed) were elicited by asking, "Have these feelings become worse now compared to before the COVID-19 crisis?" The figure reports the percentage of households with women reporting worse well-being.

that worsening does not simply reflect idiosyncratic changes or mean reversion.

These large declines in mental health are consistent with studies showing a high prevalence of anxiety and depression during the pandemic for both genders in seven countries (Xiong et al., 2020) relative to pre-pandemic global rates (Dattani et al., 2021), though they are somewhat larger than changes observed in other settings (Lei et al. (2020) in China and Daly and Robinson (2021) in the U.S.). The greater magnitude of our estimates may reflect differences in economic development, access to mental health resources, and measurement, as well as differences in the effect of the pandemic on men and women's mental health. Banks and Xu (2020) find that women's mental health is more negatively impacted relative to men in the UK.

4. Association with containment policies

Having established that the pandemic had large negative consequences for both households' economic outcomes and female well-being in India, we turn to understanding the relationship between containment intensity and these outcomes. We first document variation in our containment measure, validate it using an alternative data source, and show that it is not correlated with response rates or pre-pandemic characteristics that could impact the outcomes we measure. We then report estimates of the relationship between containment and contemporaneous economic, nutritional, and female well-being measures. Finally, we show that the point estimates are not sensitive to the inclusion of district level controls for case rates and deaths.

Containment measure. Since the end of the federal lockdown in May 2020, there are no centralized databases (even at the state level) containing complete information on India's patchwork of lockdown policies. As a result, we rely on our survey data.

To create our containment measure, we asked households in the survey if they were currently experiencing containment restrictions and calculated the leave-one-out share of respondents in a district experiencing these policies. We focus on the leave-one-out average because self-reports of containment intensity could be skewed by negative feelings – e.g., the more one is suffering from containment, the more one notices restrictions – and create a false correlation between containment and negative mental health outcomes. While there remains the possibility that such negative feelings are correlated within the community, it is reassuring that these self-reported measures are correlated with actual physical movement, as we will show with Google mobility data. On the other hand, a potential advantage of observing self-reported containment restrictions at the local level is that it is arguably the perceived restrictions, as opposed to actual ones, that drive mental health responses. Therefore, even if the true restrictions are measured with error, the measure we employ may more accurately represent the beliefs of the district residents.

Fig. A1 reports the distribution of this measure and shows that the prevalence of containment policies varies widely across districts. Consistent with the fact that containment areas can be extremely localized (i.e. as small as an apartment building or street (Express News Service, 2020)), the district level distribution shows substantial variation within districts in the proportion of respondents that report being affected by containment restrictions.

We next validate the containment measure using Google mobility data. Appendix Fig. A2 shows that being in a high containment zone is significantly correlated with lower presence in workplaces and transit stations and a higher presence in residential areas in our survey period of August relative to May, consistent with the containment measure capturing recent differences in lockdown severity.

Fig. 2 shows scatter plots that indicate that higher containment is associated with a worsening of all four female well-being outcomes and an increase in the fraction of households with reduced meals. Households in a higher containment area also report larger numbers of individuals who have lost income in their households.

Before continuing to the formal estimates of the relationship between containment and our outcomes of interest, we evaluate the scope for two potential sources of bias. We first evaluate whether district level containment measures are correlated with prior district characteristics. Each row of Table A3 regresses a different pre-pandemic covariate on the district level containment measure and reports the coefficient and standard error (columns 3 and 4). The top part of Table A3 reports the relationship between the containment measure and self-reported normal income (row 1), a wealth index constructed from the pre-pandemic baseline survey (row 2), and indicator variables for whether the household male and female heads have completed secondary school. The bottom part uses measures of the frequency with which individuals in a given district report eating different food types in the NFHS. These answers have been recoded so that a higher value indicates a higher likelihood of consumption and normalized so that the coefficients can be interpreted in terms of standard deviations.[11] Across 20 measures, the containment measure is only significantly

[11] The values were normalized with the full NFHS, so the means and SD are not exactly 0 and 1.

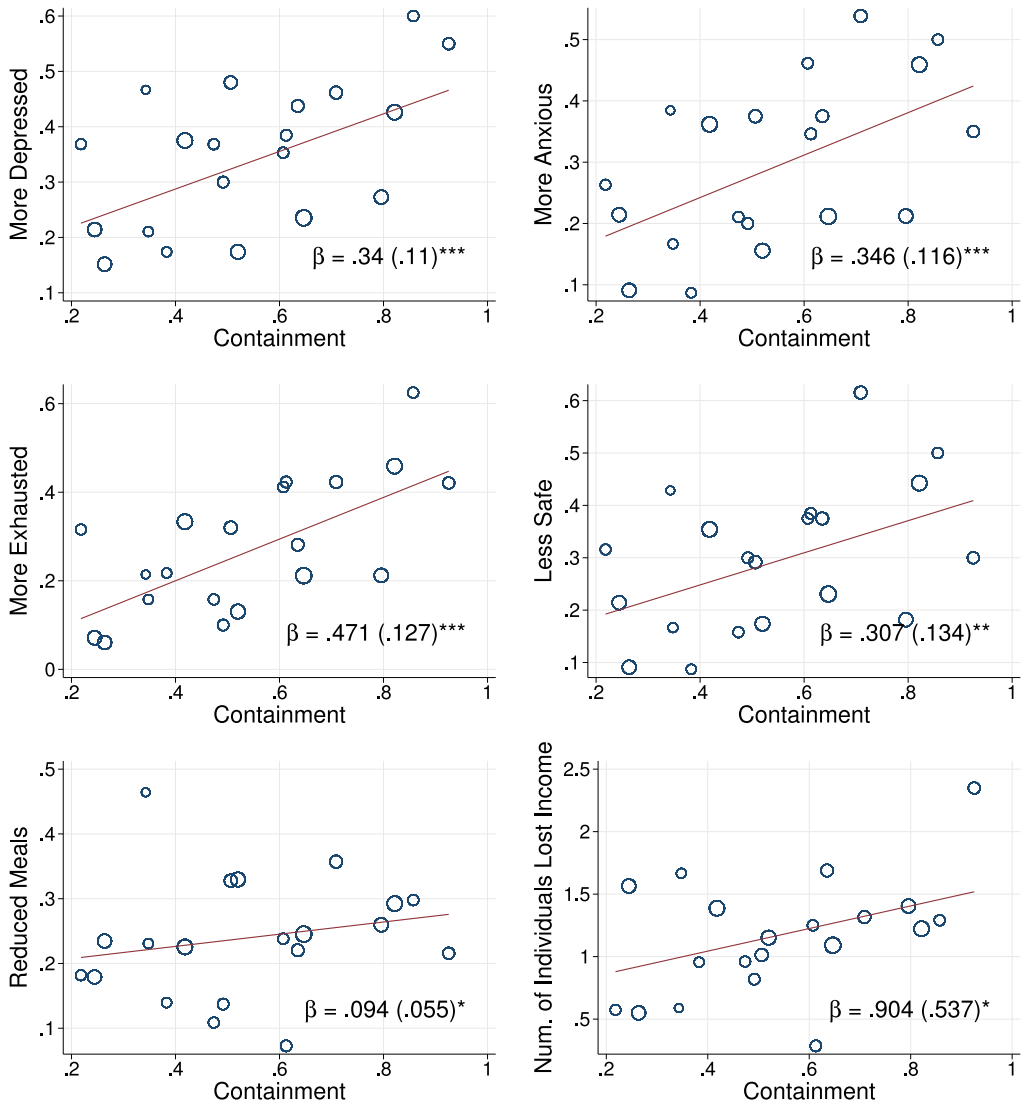

Fig. 2. Female well-being and socioeconomic outcomes by containment intensity.
Notes: This figure reports the relationship between district level leave-one-out average containment and women's well-being and household's socioeconomic outcomes. Each point represents a district level average, with bubble size weighted by sample size. β reports the regression coefficient, with standard errors clustered at the district level in parentheses. *,**, and *** denote 10, 5, and 1% significance respectively. The 'Lost Income' and 'Reduced Meals' questions were asked to the male household head. 'Reduced Meals' is an indicator variable for whether the head reported reducing the number/size of meals for at least one person in the household. 'Lost Income' is the number of adults who contribute to the income of the household who have lost their job or had their income reduced due to COVID-19. The outcomes for female well-being (e.g., more depressed) were asked directly to the female and were elicited by asking, "Have these feelings become worse now compared to before the COVID-19 crisis?".

related to one female consumption measure (vegetable consumption), and the positive coefficient suggests that, if anything, areas with higher containment had better nutritional outcomes prior to the pandemic. Altogether, we conclude that a higher prevalence of containment policies in the future is not strongly related to baseline district characteristics, and there is certainly no evidence that districts with more containment are substantially poorer or more disadvantaged.

Second, in Fig. A3, we examine whether response rates are differential by containment status. There is no overall relationship between containment and not being reached or being surveyed, limiting the scope for selection. However, areas with higher levels of containment do have statistically significantly lower refusal rates. While this is potentially concerning, because refusal rates are low, moving from a district with below-median to above-median containment only decreases refusal rates by 1.72 percentage points. Thus, we do not expect differential refusal to strongly bias our results, and we confirm that this is the case for our main estimates with Lee-style bounds (Lee, 2009).

Research design. To examine the relationship between containment and different outcomes, we estimate the following regression:

$$y_{iasd} = \beta\, containment_d + \alpha_a + \delta_s + \mathbf{\Gamma X_i} + \epsilon_{iasd}, \quad (1)$$

where i denotes the respondent, a is her age, s her state of residency, and d her district. y_{iasd} is the outcome variable, and $containment_d$ is the district level measure of containment (the leave-one-out share of respondents in a district experiencing containment policies).

All specifications include age fixed effects α_a and state fixed effects δ_s. The vector of controls $\mathbf{X_i}$ includes indicator variables for whether the district was in a red or orange zone during India's previous centralized lockdown in April and May 2020.[12] We include two additional sets of controls to assist in ruling out either simultaneous causality between

[12] India's central government classified all districts into green, orange and red zones, where red zones had the strictest mobility restrictions and green the most lenient. In June 2020, the centralized district level restrictions were dismantled, and each state could demarcate their own containment regions.

Table 1
Relationship between Containment and Female Well-being.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	More Depressed		More Exhausted		More Anxious		MH Index		Less Safe	
Containment	0.242**	0.233***	0.361*	0.363***	0.259	0.237***	0.287*	0.276***	0.149	0.127
	(0.113)	(0.0698)	(0.178)	(0.120)	(0.156)	(0.0718)	(0.141)	(0.0720)	(0.150)	(0.128)
Past Containment Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lasso Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Case and Death Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Dep Var. Mean	0.344	0.344	0.276	0.276	0.301	0.301	0.307	0.307	0.299	0.299
Adjusted R-squared	0.009	0.027	0.022	0.056	0.023	0.052	0.021	0.059	0.006	0.026
Observations	489	489	489	489	489	489	489	489	489	489

Notes: This table reports the relationship between district level leave-one-out average containment and female well-being relative to their well-being before the COVID-19 crisis from Eq. (1). In columns (1) & (2), the outcome is an indicator variable that the respondent feels more depressed. In (3) & (4), it is an indicator variable for feeling more exhausted. In (5) & (6), it is an indicator variable for feeling more anxious. In (7) & (8), it is the average over the three mental health outcomes. Finally in (9) & (10), it is an indicator variable for feeling less safe. Standard errors are clustered at the district level. *,**, and *** denote 10, 5, and 1% significance respectively.

containment and the negative outcomes we observe or omitted variable bias from pre-pandemic socioeconomic measures. First, we control for the cumulative per capita COVID-19 death and case rate between the start of the pandemic and the time of the survey to control for the direct effects of the health crisis. Second, we use double-lasso (Urminsky et al., 2016) to select additional controls, which may improve power or balance, from the pre-pandemic socioeconomic measures in the survey. The full list of potential control variables is given in Appendix A. To maintain a consistent sample across regressions, we restrict the sample in all these regressions to individuals for whom all control variables are available.

Female well-being. Table 1 reports the results from estimating Eq. (1) in our sample. For all the results, the point estimates in the odd columns (baseline specification) and even columns (COVID-19 severity and lasso controls) are almost identical, so only the magnitudes from the even columns are reported here. Containment is associated with a substantial and statistically significant increase in both the depression indicators: moving from 0 to 100% containment is related to a 23 percentage point (pp) increase in the likelihood that feelings of depression have worsened and a 36 pp increase in the likelihood that feelings of exhaustion have increased. Since the mean of the containment variable is equal to 0.554, moving from no containment to average levels of containment is associated with a 13 pp increase in the likelihood that feelings of depression have worsened (38% of the variable mean) and a 20 pp increase in the likelihood that feelings of exhaustion have increased (73% of the variable mean). Containment is also associated with a significant increase in the anxiety measure. Moving from 0 to average containment is related to a 13 pp increase in the likelihood that respondents feel more anxious (44% of the variable mean). Turning to the mental health index, moving from 0 to average containment is associated with a 15 pp increase in the likelihood that respondents have worse mental health overall (50% of the variable mean). Finally, containment is also related to decreased feelings of safety, but these results are not statistically significant. Controlling for the direct health effects of the pandemic has no effect on the estimated relationship between containment and female well-being.

We report four robustness checks for these results. First, to ensure the relationships we observe in Table 1 are not driven by differential refusal, in Table A4, we construct Lee-style bounds of the relationship between containment and the outcomes (Lee, 2009). To facilitate the bounding exercise, for this table, our explanatory variable of interest is an indicator variable equal to 1 if a district has above median containment. The first column for each outcome reports the unadjusted coefficient with this regressor. The second column reports an upper bound where we re-estimate the regression after dropping the 1.72% of observations with the best outcomes in the below-median districts. The third column reports the lower bound, as we drop the 1.72% of observations with the worst possible outcome. The resulting bounds are tight and indicate that differential non-response has little scope to bias the estimates. Second, to more richly control for the direct effects of the pandemic, and allow those effects to be non-linear, in Table A5, we control for up to third-degree polynomials in case and death rates. The relationship between containment and the mental health outcomes remains large and statistically significant. Third, in Table A6, we control for hospitalizations (along with cases and deaths), as hospitalizations may capture COVID-19 severity better than case rates if testing capacity varies across districts. The table also reports estimates without the case control, controlling only for deaths and hospitalizations. Again, the relationship between containment and the mental health outcomes remains large and significant.

Finally, while estimating the association of containment with self-reported changes in mental health outcomes has the benefit of controlling for pre-pandemic, cross-sectional differences in mental health, one potential concern is that questions about changes in mental health from the pre- to pandemic period will prime respondents to report declines. To evaluate whether our results are robust to this concern, in Appendix Table A7, we report the association between containment and the responses to questions about mental health levels, which do not ask the respondent to compare the pre- and post-periods. While the magnitudes of the coefficients for the level and change outcomes are not directly comparable, the pattern of results is very similar.

Socioeconomic and nutritional outcomes. Table 2 reports the relationship between containment and socioeconomic and nutritional measures from the phone survey, from Eq. (1). Columns 1 and 2 examine the number of household members who experienced reductions in income. The point estimate indicates that moving from a district with 0 to 100% containment is related to an increase in the number of household members who have lost income by more than one member. Moving from no containment to average levels of containment is associated with 0.6 additional household members who have lost income (a 50% increase relative to the mean of the dependent variable). In columns 3 and 4, the outcome is an indicator variable for whether the household had to reduce meals; the point estimates indicate that moving from no containment to full containment is associated with a 14 pp increase in the likelihood of reducing meals. Hence, moving from no containment to average levels of containment is associated with a 8 pp increase in the likelihood of reducing meals (a 31% increase relative to the mean of the dependent variable).

The final four columns examine the relationship between containment and food intake for men and women. Our outcome indices are formed by creating an indicator variable equal to 1 if an individual is below the gender-specific, district level median food consumption for a food category in the pre-pandemic NFHS and then averaging over these indicator variables for all of the food categories for each

Table 2
Relationship between Containment and Socioeconomic and Nutritional Outcomes.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					Below Median Consumption for:			
	Num. Lost Income		Reduced Meals		Male		Female	
Containment	1.065**	1.075***	0.145**	0.142**	0.0245	0.0227	0.204*	0.190**
	(0.381)	(0.334)	(0.0664)	(0.0631)	(0.101)	(0.0968)	(0.0992)	(0.0827)
Past Containment Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lasso Controls	No	Yes	No	Yes	No	Yes	No	Yes
Case and Death Controls	No	Yes	No	Yes	No	Yes	No	Yes
Dep Var. Mean	1.183	1.183	0.250	0.250	0.291	0.291	0.342	0.342
Adjusted R-squared	0.102	0.106	0.028	0.027	0.087	0.112	0.034	0.082
Observations	1057	1057	1057	1057	1057	1057	1057	1057

Notes: This table reports the relationship between district level leave-one-out average containment and socioeconomic and nutritional outcomes from Eq. (1). In columns (1) & (2), the outcome is the number of household members who lost their job or income. In columns (3) & (4), it is an indicator variable for whether the household reduced meals for at least one member. In columns (5)–(8), it is the share of food categories for which the respondent's intake is below the gender-specific district level median in the pre-pandemic NFHS. Standard errors are clustered at the district level. *,**, and *** denote 10, 5, and 1% significance respectively.

Table 3
Relationship between Household Structure and Female Well-being.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	More Depressed		More Exhausted		More Anxious		MH Index		Less Safe	
Has Daughter	0.0925**	0.0920**	0.104***	0.104***	0.0743**	0.0765**	0.0903***	0.0898***	0.103**	0.0977**
	(0.0421)	(0.0424)	(0.0357)	(0.0356)	(0.0348)	(0.0363)	(0.0298)	(0.0304)	(0.0379)	(0.0416)
Has Son	0.0362	0.0360	0.00777	0.00796	0.0101	0.0107	0.0180	0.0179	−0.0158	−0.0110
	(0.0548)	(0.0571)	(0.0409)	(0.0444)	(0.0562)	(0.0601)	(0.0445)	(0.0484)	(0.0512)	(0.0524)
Female Headed Household	0.124***	0.137***	0.0901**	0.107***	0.0395	0.0533	0.0844**	0.0999***	0.119**	0.130**
	(0.0349)	(0.0328)	(0.0397)	(0.0371)	(0.0449)	(0.0413)	(0.0317)	(0.0273)	(0.0513)	(0.0462)
Past Containment Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lasso Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Case and Death Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Dep Var. Mean	0.344	0.344	0.277	0.277	0.302	0.302	0.308	0.308	0.302	0.302
Adjusted R-squared	0.023	0.037	0.024	0.051	0.020	0.045	0.028	0.057	0.028	0.048
Observations	483	483	483	483	483	483	483	483	483	483
P-Value of Difference	0.322	0.332	0.061	0.066	0.246	0.238	0.134	0.144	0.011	0.023

Notes: This table reports the relationship between household structure and female well-being relative to their well-being before the COVID-19 crisis from Eq. (2). The *p*-value from testing the equality of the coefficients 'Has Son' and 'Has Daughter' is reported in the last row. All outcomes report well-being relative to before the COVID-19 pandemic. In columns (1) & (2), the outcome is an indicator variable for the respondent feeling more depressed. In (3) & (4), it is an indicator variable for feeling more exhausted. In (5) & (6), it is an indicator variable for feeling more anxious. In (7) & (8), it is the average over the three mental health outcomes. Finally in (9) & (10), it is an indicator variable for feeling less safe. Standard errors are clustered at the district level. *,**, and *** denote 10, 5, and 1% significance respectively.

individual. Thus, the regressions "control" for cross-district variation, since a positive coefficient for these estimates indicates that an individual is doing worse than her pre-pandemic district-specific average. From the more conservative specifications, moving from a district with 0 to 100% containment is related to an increase in the share of food categories for which a woman's consumption is below her district's pre-pandemic median of 19 pp. Moving from no containment to average levels of containment is associated with a 11 pp increase in the share of food categories for which a woman's consumption is below her district's pre-pandemic median (a 31% increase relative to the dependent variable mean). For males, the coefficient is positive but not statistically significant and one-eighth the size.[13] As before, across all outcomes, controlling for the direct health effects of the pandemic leaves the associations with containment unchanged.

[13] In Appendix Tables A8 and A9, we also disaggregate the food consumption responses by each category (eat daily, weekly, or occasionally) and control for baseline district level averages of the outcome variables. The results are similar. Containment is associated with men reducing their consumption from 'daily' to 'occasionally' and with women reducing their consumption from 'daily' to 'never.'

The results in the last four columns underline the relationship between food insecurity and containment and suggest that food insecurity disproportionately impacts women. Further, they provide one potential mechanism for the negative mental health effects in Table 1. When there are negative economic shocks to households, women are particularly vulnerable to declines in consumption. Hathi et al. (2021) provide evidence in favor of this connection: women who eat after men in their households also have worse mental health.

Turning to robustness tests, Table A10 reports the Lee-style bounds for the socioeconomic and nutritional outcomes, which are tight. Table A11 reports the estimates including the non-linear controls for case and death rates. Table A12 includes hospitalizations in the set of controls and reports results that do not control for cases. In both tables, the point estimates are very similar.

5. Family structure and vulnerable women

The results from Tables 1 and 2 speak to the vulnerability of women—a particularly hard to reach population in phone surveys in countries like India, especially during the pandemic. We now examine the relationship between the pandemic and the outcomes of women who are in a more vulnerable position in the household. We

focus on women with daughters, because son preference is common in India (Jayachandran, 2015) and having a daughter (rather than a son) may lower a woman's status. Indeed, Milazzo (2018) finds that having a daughter rather than a son increases a woman's likelihood of experiencing anemia and intimate partner violence. We also examine whether female-headed households fare worse, although we caution these results are suggestive since these households are also likely to be of lower socioeconomic status.

Empirical strategy. To examine the relationship between family structure and female well-being, we estimate the following regression:

$$y_{iasd} = \beta_1\, has_son_i + \beta_2\, has_daughter_i + \beta_3\, female_headed_i + \alpha_a + \delta_s + \mathbf{\Gamma X_i} + \epsilon_{iasd}, \quad (2)$$

where i denotes an individual, a the respondent's age, s the respondent's state of residency, and d the district, y_{iasd} is the outcome variable, and has_son_i and $has_daughter_i$ are indicator variables denoting whether the respondent has a son or daughter. $female_headed_i$ denotes whether the respondent lives in a household where the head is female. The fixed effects and other controls are the same as in the previous equation.

Results. Table 3 reports the results from estimating Eq. (2) in our sample. Having a daughter is associated with a substantial and statistically significant decrease in mental health. If the woman has a daughter, she is 9 pp more likely to have worsening feelings of depression and 10 pp more likely to have worsening feelings of exhaustion. Having a daughter is also statistically significantly associated with the anxiety measure (8 pp increase), the mental health index (9 pp increase), and feeling less safe (10 pp). The latter finding may capture an increased threat of intimate partner violence. These negative effects appear to be specific to women with daughters rather than women with children. The effects associated with having a son are small, statistically insignificant, and not systematically positive. While we lack the precision to reject that the coefficients on having a son and daughter are the same in all cases, we can reject that they are the same for safety at the 5 percent level.[14]

The effects on well-being are also exacerbated when the head of the household is female, although we caution that female-headed household's socioeconomic status could also be systematically different from male-headed households.[15] When the respondent lives in a female headed household, she is 14 pp more likely to have worsening feelings of depression, 11 pp more likely to have worsening feelings of exhaustion, and 10 pp more likely to report worsening outcomes on all mental health questions. Living in a female-headed household is also significantly associated with the safety measure (13 pp increase in the likelihood that respondents feel less safe). We show these results are robust to the inclusion of additional controls for COVID-19 severity in Table A14.

6. Discussion and policy implications

We find that the onset of the COVID-19 pandemic is associated with adverse outcomes for women's mental health, household food security, and incomes in India. In addition to the aggregate shock, there is evidence that increased containment measures are associated with worse outcomes, demonstrating that movement restrictions are materially important. In areas with greater exposure to containment policies, women experienced large declines in mental health and well-being, as well as decreased food security.

Moreover, we show that women who are in a more vulnerable position in the household are more likely to experience declines in mental health and show increased concern for their safety. While potentially crucial for public health purposes, containment is associated with large negative consequences for both standard socioeconomic outcomes and outcomes that are harder to observe and measure, like mental health. This may be especially the case in low-income contexts with limited social insurance, where more vulnerable populations – such as Indian women – may be particularly harmed by both the direct effects of the pandemic and these policies. Furthermore, some important negative consequences of lockdowns may be hidden in more standard socioeconomic datasets that do not collect information on mental health.

These results have strong implications for economic policy, as policymakers should consider what supportive measures are necessary to limit economic devastation from lockdowns, and target aid, particularly access to food, to vulnerable households and women. As vaccine disparities in lower-income countries persist, and other pandemics are likely, understanding the consequences of the pandemic and containment policies is crucial for policymakers.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.jdeveco.2022.102839.

References

Acharya Samadarshi, Saurav, Sharma, Sharmistha, Bhatta, Jeevan, 2020. An online survey of factors associated with self-perceived stress during the initial stage of the COVID-19 outbreak in nepal. Ethiop. J. Health Dev. 34, 84–89.

Adams-Prassl, Abi, Boneva, Teodora, Golin, Marta, Rauh, Christopher, 2020. The Impact of the Coronavirus Lockdown on Mental Health: evidence from the U.S.. Working Paper.

Afridi, Farzana, Dhillon, Amrita, Roy, Sanchari, 2021. The Gendered Crisis: livelihoods and Mental Well-Being in India During COVID-19. UNU-WIDER Working Paper.

Altindag, Onur, Erten, Bilge, Keskin, Pinar, Mental health costs of lockdowns: Evidence from age-specific curfews in Turkey, American Economic Journal: Applied Economics, Forthcoming.

Anderson, Siwan, Ray, Debraj, 2019. Missing unmarried women. J. Eur. Econom. Assoc. 17 (5), 1585–1616.

Andrade, Laura, Caraveo-Anduaga, Jorge J., Berglund, Patricia, Bijl, Rob V., De Graaf, Ron, Vollebergh, Wilma, Dragomirecka, Eva, Kohn, Robert, Keller, Martin, Kessler, Ronald C., Kawakami, Norito, Kiliç, Cengiz, Offord, David, Ustun, T. Bedirhan, Wittchen, Hans-Ulrich, 2003. The epidemiology of major depressive episodes: results from the International Consortium of Psychiatric Epidemiology (ICPE) Surveys. International Journal of Methods in Psychiatric Research 12 (1), 3–21.

Angelucci, Manuela, Bennett, Daniel, 2021. The economic impact of depression treatment in India. IZA Discussion Paper.

Armbruster, Stephanie, Klotzbücher, Valentin, 2020. Lost in Lockdown? covid-19, Social Distancing, and Mental Health in Germany. Working Paper 2020–04, Diskussionsbeiträge.

Banks, James, Xu, Xiaowei, 2020. The mental health effects of the first two months of lockdown and social distancing during the covid-19 pandemic in the UK. http://dx.doi.org/10.1920/wp.ifs.2020.1620, Publisher: The IFS.

Baranov, Victoria, Bhalotra, Sonia, Biroli, Pietro, Maselko, Joanna, 2020. Maternal depression, women's empowerment, and parental investment: Evidence from a randomized controlled trial. Amer. Econ. Rev. 110 (3), 824–859.

[14] Additionally, in Appendix Table A13, we directly control for the number of children. Doing so does not eliminate the effect of having a daughter. Having a daughter still has a significant association with exhaustion, lack of safety, and the mental health index.

[15] Around 20% of the households in the data have a female head. Among these households, 84% of the female heads are currently married, and 13% are widowed. Anderson and Ray (2019) document that widows are particularly vulnerable in India.

Bertrand, Marianne, Krishnan, Kaushik, Schofield, Heather, 2020. How are Indian households coping under the COVID-19 lockdown? 8 key findings.
Brodeur, Abel, Clark, Andrew E., Fleche, Sarah, Powdthavee, Nattavudh, 2021. COVID-19, lockdowns and well-being: Evidence from google trends. J. Public Econ. 193, 104346.
Bromet, Evelyn, Andrade, Laura Helena, Hwang, Irving, Sampson, Nancy A., Alonso, Jordi, de Girolamo, Giovanni, de Graaf, Ron, Demyttenaere, Koen, Hu, Chiyi, Iwata, Noboru, Karam, Aimee N., Kaur, Jagdish, Kostyuchenko, Stanislav, Lépine, Jean-Pierre, Levinson, Daphna, Matschinger, Herbert, Mora, Maria Elena Medina, Browne, Mark Oakley, Posada-Villa, Jose, Viana, Maria Carmen, Williams, David R., Kessler, Ronald C., 2011. Cross-national epidemiology of DSM-IV major depressive episode. BMC medicine 9, 90.
Daly, Michael, Robinson, Eric, 2021. Anxiety reported by US adults in 2019 and during the 2020 COVID-19 pandemic: Population-based evidence from two nationally representative samples. J. Affect. Disord. 286, 296–300.
Dattani, Saloni, Ritchie, Hannah, Roser, Max, 2021. Mental health. Our World in Data.
Davis, Cassandra R., Grooms, Jevay, Ortega, Alberto, Rubalcaba, Joaquin Alfredo-Angel, Vargas, Edward, 2020. Distance learning and parental mental health during COVID-19. Educ. Res..
Dodds, Walter, 2019. Disease now and potential future pandemics. In: The World's Worst Problems. Springer, pp. 31–44.
Egger, Dennis, Miguel, Edward, Warren, Shana S., Shenoy, Ashish, Collins, Elliott, Karlan, Dean, Parkerson, Doug, Mobarak, A. Mushfiq, Fink, Günther, Udry, Christopher, Walker, Michael, Haushofer, Johannes, Larreboure, Magdalena, Athey, Susan, Lopez-Pena, Paula, Benhachmi, Salim, Humphreys, Macartan, Lowe, Layna, Meriggi, Niccoló F., Wabwire, Andrew, Davis, C. Austin, Pape, Utz Johann, Graff, Tilman, Voors, Maarten, Nekesa, Carolyn, Vernot, Corey, 2021. Falling living standards during the COVID-19 crisis: Quantitative evidence from nine developing countries. Sci. Adv. 7 (6), eabe0997, Publisher: American Association for the Advancement of Science Section: Research Article.
El-Zoghby, Safaa M., Soltan, Enayat M., Salama, Hend M., 2020. Impact of the COVID-19 pandemic on mental health and social support among adult Egyptians. J. Community Health 45 (4), 689–695.
Etheridge, Ben, Spantig, Lisa, 2020. The Gender Gap in Mental Well-Being During the Covid-19 Outbreak: Evidence from the UK. ISER Working Paper Series.
Express News Service, 2020. Explained: What are containment zones, how are they demarcated? The Indian Express.
Ferreira, Fernanda de Oliveira, Lopes-Silva, Júlia Beatriz, Siquara, Gustavo Marcelino, Manfroi, Edi Cristina, de Freitas, Patrícia Martins, 2021. Coping in the Covid-19 pandemia: how different resources and strategies can be risk or protective factors to mental health in the Brazilian population. Health Psychol. Behav. Med. 9 (1), 182–205.
Filmer, Deon, Pritchett, Lant H., 2001. Estimating wealth effects without expenditure data-or tears: An application to educational enrollments in states of India. Demography 38 (1), 115–132.
Hathi, Payal, Coffey, Diane, Thorat, Amit, Khalid, Nazar, 2021. When women eat last: Discrimination at home and women's mental health. PLoS One 16 (3), e0247065.
Haushofer, Johannes, Mudida, Robert, Shapiro, Jeremy, 2021. The comparative impact of cash transfers and a psychotherapy program on psychological and economic well-being. no. 1377.
Huebener, Mathias, Waights, Sevrin, Spiess, C. Katharina, Siegel, Nico, Wagner, Gert, 2020. Parental well-being in times of Covid-19 in Germany. Rev. Econ. Household 19 (1), 91–122.
Jain, Radhika, Dupas, Pascaline, 2021. The Effects of India's Covid-19 Lockdown on Critical Non-Covid Health Care and Outcomes: evidence from a Retrospective Cohort Analysis of Dialysis Patients. Working Paper.
Jayachandran, Seema, 2015. The roots of gender inequality in developing countries. Annu. Rev. Econ. 7 (1), 63–88.
Joshi, Ruchika, McManus, Jeffery, Nagpal, Karan, Fraker, Andrew, 2020. Are Voter Rolls Suitable Sampling Frames for Household Surveys? Evidence from India. IDinsight Working Paper.
Kroenke, Kurt, Spitzer, Robert L., Williams, Janet B.W., 2001. The PHQ-9. J. Gen. Intern. Med. 16 (9), 606–613.
Lee, David S., 2009. Training, wages, and sample selection: Estimating sharp bounds on treatment effects. Rev. Econom. Stud. 76 (3), 1071–1102.
Lei, Lei, Huang, Xiaoming, Zhang, Shuai, Yang, Jinrong, Yang, Lin, Xu, Min, 2020. Comparison of prevalence and associated factors of anxiety and depression among people affected by versus people unaffected by quarantine during the COVID-19 epidemic in southwestern China. Med. Sci. Monit. : Int. Med. J. Exp. Clin. Res. 26, e924609–1–e924609–12.
Lowe, Matt, Nadhanael, G.V., Roth, Benjamin, 2020. India's Food Supply Chain During the Pandemic. Working Paper.
Milazzo, Annamaria, 2018. Why are adult women missing? Son preference and maternal survival in India. J. Dev. Econ. 134, 467–484.
Mobarak, Ahmed Mushfiq, Barnett-Howell, Zachary, 2020. Poor countries need to think twice about social distancing. Foreign Policy 10.
Özdin, Selçuk, Bayrak Özdin, Şükriye, 2020. Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in turkish society: The importance of gender. Int. J. Soc. Psychiatry 66 (5), 504–511.
Patel, V., Araya, R., Chowdhary, N., King, M., Kirkwood, B., Nayak, S., Simon, G., Weiss, H.A., 2008. Detecting common mental disorders in primary care in India: A comparison of five screening questionnaires. Psychol. Med. 38 (2), 221–228.
Purohit, Kunal, 2020. India Covid-19 lockdown means no food or work for rural poor. Al Jazeera.
Sadish, D., Adhvaryu, Achyuta, Nyshadham, Anant, 2021. (Mis)information and anxiety: Evidence from a randomized Covid-19 information campaign. J. Dev. Econ. 152, 102699.
Singh, Karan Deep, Kumar, Hari, 2021. Covid-19 pushes India's middle class toward poverty. The New York Times News Service.
Spitzer, Robert L., Kroenke, Kurt, Williams, Janet B.W., Löwe, Bernd, 2006. A brief measure for assessing generalized anxiety disorder: The GAD-7. Arch. Internal Med. 166 (10), 1092–1097.
Urminsky, Oleg, Hansen, Christian, Chernozhukov, Victor, 2016. Using Double-Lasso Regression for Principled Variable Selection. Working Paper.
Witteveen, Dirk, Velthorst, Eva, 2020. Economic hardship and mental health complaints during COVID-19. Proc. Natl. Acad. Sci. 117 (44), 27277–27284.
Xiong, Jiaqi, Lipsitz, Orly, Nasri, Flora, Lui, Leanna M.W., Gill, Hartej, Phan, Lee, Chen-Li, David, Iacobucci, Michelle, Ho, Roger, Majeed, Amna, McIntyre, Roger S., 2020. Impact of COVID-19 pandemic on mental health in the general population: A systematic review. J. Affect. Disord. 277, 55–64.
Zamarro, Gema, Prados, Maria, 2021. Gender differences in couples' division of childcare, work and mental health during Covid-19. Rev. Econ. Household 19, 11–40.