RESEARCH ARTICLE

The impact of COVID-related economic shocks on household mental health in Pakistan

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Abstract

We combine data collected just prior to the unfolding of COVID-19 with follow-up data from July 2020 to document the adverse economic effects of the pandemic and resulting impact on parental and child mental well-being in peri-urban Pakistan. 22% of the households in our sample are affected by job loss, with monthly income down 38% on average. Our difference-in-difference results show that job loss is associated with a 0.88 standard deviation (SD) increase in adult mental distress scores (K10), a 0.43 SD reduction in a Hope index of children's aspirations, agency and future pathways, and a 0.39 SD increase in children's depression symptoms. In addition, we observe higher levels of parental stress and anger reported by children, as well as an increase in reported prevalence of domestic violence. Overall, we document that the pandemic has disproportionately and negatively affected the economic and mental well-being of the most vulnerable households in our sample.

KEYWORDS
COVID, economic shocks, mental health, Pakistan

1 | INTRODUCTION

The COVID-19 pandemic, while primarily a global health crisis, has induced an economic crisis, the consequences of which are particularly worrisome for low-income populations in lesser developed countries (LDCs). Increased economic stressors, coupled with a reliance on the informal sector, poor access to mental healthcare, high baseline prevalence of mental health conditions (Baranov et al., 2020; Gelaye et al., 2016; Maselko et al., 2018; Muhammad Gadit & Mugford, 2007), and low state capacity, has left many residents of LDCs especially vulnerable in these times.

We explore the impact of COVID-19 (COVID, hereafter) on economic and mental health outcomes in Pakistan by leveraging data collected from an ongoing project just prior to the outbreak of the pandemic. Our sample consists of 883 parents and 883 children from peri-urban areas across 29 villages in four districts of Punjab province. Four months into the pandemic, we conducted phone follow-up surveys to collect information on exposure to COVID and other key indicators, including income loss, psychological well-being, and prevalence of domestic violence. Our sample, with a mean household income of 167 USD

[Correction added on 20 July 2022, after first online publication: In the abstract, 0.40 SD increase in children's depression symptoms has been corrected to 0.39 SD in this version.]

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per month, is representative of peri-urban households in Pakistan, whose standards of living are below the average monthly household income of USD 268 in 2019 (PBS., 2020), allowing us to gain insights into how the pandemic has affected poor-to middle-income households in a low-income setting.

Our data reveal that just four months after the outbreak of COVID, the pandemic and subsequent lockdowns resulted in a 26% decline in working hours and about 39% income loss. While few respondents in our sample (8.6%) reported that they personally knew someone who had been diagnosed with COVID, and less than 4% lost a family member during the pandemic, nearly 22% of the sample reported that either they or their spouse lost their job due to the pandemic.[1] On average, respondents reported a loss of around 1.5 days of work per week due to the pandemic, while only 10% of women and 15% of men reported receiving some form of economic support.[2]

Given the relationship between economic hardship and mental health (Hu et al., 2019; Ridley et al., 2020), we focus our analysis on the economic consequences of the pandemic on mental health and domestic violence outcomes. We document significant consequences of the pandemic-related economic shock, beyond the impact of the pandemic itself, on mental health for both parents and children. Comparing mental health scores for parents and children before and during the pandemic, we find that on average, reported mental health remained roughly stable for adults and children, with moderate levels of psychological distress in both periods. However, suffering a job loss within the household led to worse mental health outcomes. For adults, the mental health scale deteriorated by 0.88 SD for those who suffered a job loss in the household. We also observe a 0.43 SD decline in levels of hope among children with a parent who suffered a job loss, and a 0.39 SD decrease in the child's well-being as reported by the parent. At the same time, children in households with job loss reported that their mothers and fathers seemed more stressed (24% points for mothers; 21% points for fathers) and angrier (16% points for mothers; 13% points for fathers) compared to children from households with no job loss. Household job loss was also highly correlated with a higher perception of domestic violence in the community: among adults who suffered a job loss in their household, personal safety and familial contentment was 0.36 SD lower, while the perceived likelihood of domestic violence in the community was 0.28 SD higher. Overall, we document negative mental health effects for adults and children alike, which, at least in the initial period of the pandemic, derive primarily from the increased economic stressors brought about by the pandemic and related lockdowns rather than the direct health consequences of the pandemic.

Our paper contributes to the literature in several ways. First, we document the economic impacts of the COVID pandemic in an LDC using data on self-reported job and income loss. Poor infrastructure, sanitation (Surico & Galeotti, 2020), health care (Singh & Misra, 2020), and high population densities (Theinemann et al., 2020) make people in LDCs particularly vulnerable to the health impacts of COVID. Coupled with a lack of social safety nets, these populations are also the most economically vulnerable (Anser et al., 2020; Dev, 2020; Khan et al., 2020; Reardon et al., 2020) especially in the event of a long, drawn out pandemic (Baldwin & Weder di Mauro, 2020). Our results on the economic impact of COVID are comparable with findings from studies in other developing countries. For instance, Bau et al. (2021) found a 50% reduction in the household head's monthly income, from 120 USD to 50 USD in India, while in our sample we observe a 39% reduction in average household income from 167 USD to 103 USD.

Our setting is unique in that we are able to leverage mental health data just prior to and during the pandemic. Current literature that examines the effects of the pandemic on mental health and well-being is largely focused on the developed world (Adams-Prassl et al., 2020; Armbruster & Klotzbücher, 2020; Brodeur et al., 2021; Davis et al., 2021; Etheridge & Spantig, 2020; Huebener et al., 2021; McCracken et al., 2020; O'Connor et al., 2021; Witteveen & Velthorst, 2020), with additional evidence from middle income countries, such as China (Li et al., 2020a, 2020b, 2020c; Dong & Bouey, 2020; Ho et al., 2020; Wang et al., 2020) and Turkey (Altindag et al., Forthcoming; Özdin & Bayrak Özdin, 2020). We focus on an LDC setting, where access to mental healthcare is limited and opportunities for online transactions and remote work are non-existent, especially in rural and peri-urban areas. While the pandemic itself has potential for harmful mental health impacts, the economic impacts compound these potential effects. Overall, we provide evidence of an effect of the pandemic on mental health outcomes that is largely driven by economic impacts, which is consistent with results from nearby developing countries, such as India, where Bau et al. (2021) find that mental health was impacted by the lockdowns.

Further, we show that women and children living in poverty are the most vulnerable to the economic effects of the pandemic. The increase in pandemic induced stress has led to a rise in domestic violence worldwide (Nanthini & Nair, 2020; Ravindran & Shah, 2020; Taub, 2020) and especially in low- and middle-income countries (Agüero, 2021; Hamadani et al., 2020; Mahmud & Riley, 2021; Ravindran & Shah, 2020). This increase is likely to persist as the economic stressors of the pandemic linger long after the health crisis is over (Davies et al., 2020). Similarly, while most recessions disproportionately affect men, the global recession brought about by the COVID pandemic has been labeled as a "shecession", with higher declines in employment and labor force participation among women than men in high income countries (Albanesi & Kim, 2021; Alon et al., 2021; Bundervoet et al., 2021). Evidence from high- and low-income countries shows that working women who have children seem

to be hardest hit (Bau et al., 2021; Zamarro & Prados, 2021). In the long run, this could lead to a widening of the gender wage gap, as well as a worsening of gender inequalities within the home, further exacerbating the existing burden that women bear in terms of child and household responsibilities (Alon et al., 2020). It is postulated that the impact should be similar in countries across all stages of development, however, there is little literature on how women, and generally vulnerable populations, may have been disproportionately impacted during the pandemic in LDCs. In India, for example, there has been a 21% increase in crimes against women during the lockdowns (Das et al., 2020).

The economic recession caused by COVID related lockdowns has not only affected mental health in adults, but in children and adolescents as well (see Porter et al., 2021; Singh et al., 2020). The literature that documents this increase in behavioral and emotional distress among children is also largely focused on high- and middle-income countries (Golberstein et al., 2020; Center for Disease Control, 2020; Ravens-Sieberer et al., 2021), including China (Jiao et al., 2020) and the US (Golberstein et al., 2020). In Pakistan, evidence on young adults suggests that nearly 85% of students aged 16–25 indicated worsened mental health during the pandemic (Aqeel et al., 2020). We focus on younger children, aged 10–14 years, and document a deterioration in their well-being as a result of increased economic stressors during the pandemic.

Finally, while the vast majority of the literature surrounding COVID focuses on the impact of the virus on health and mortality (Bhadra et al., 2021; Michelozzi et al., 2020; Sarwar et al., 2020; Townsend et al., 2020), little is known about the economic impact of the pandemic and its consequences on much of the world. Our study contributes to understanding the socio-economic impacts of the pandemic on people in LDCs and particularly how the economic consequences of the pandemic have led to detrimental mental health outcomes in this population. While these results are focused on the current pandemic, they are relevant for future health and economic shocks. It is expected that pandemics will increase in the future given the rapid increase in globalization, urbanization and climate change (Dodds, 2019). Understanding the consequences of economic stressors on vulnerable sections of society will assist in creating targeted policies that can address issues of mental health, domestic violence and well-being, particularly for women and children.

The rest of the paper is organized as follows. Section 2 describes the data and provides descriptive statistics on the economic impacts of COVID and on mental health measures. We present our empirical strategy in Section 3 and discuss the mental health effects of the economic shock linked to the pandemic in Section 4. We then discuss the implications of our findings for social and public health policy design in LDCs.

2 | DATA

2.1 | Sample

We leverage data collected as part of a separate intervention, conducted between October and December 2019 among a random sample of school-going children (aged 10–14 years), in four peri-urban districts of Pakistan's province of Punjab (Figure A1 in Appendix). The sampling frame consisted of 45 schools run by Ghazali Education Trust, of which 29 were randomly selected to participate in our study.[3] Within each school, about 30 students between the ages of 10 and 14 were randomly selected from school enrolment rosters, and invited, along with their parents, to participate in a study about mental health and educational outcomes. As part of the intervention, we collected information on mental health and socio-economic indicators for 1005 students and either one or both of their parents in late 2019. These interviews were conducted in person at the schools. Then, at the height of the pandemic in July-August 2020, we conducted telephone follow-up interviews with the same sample of parents and children to measure the impact of the COVID pandemic on the socio-economic well-being of our sample.[4]

2.2 | Attrition

Of the 1005 parents and children interviewed at baseline, 947 could be contacted at the COVID follow-up (6% attrition). There is further item non-response for key variables that resulted in a total of 64 households that could not be used in our analytical sample: (i) job loss as a result of COVID ($N = 7$) and (ii) pre-COVID income ($N = 57$).[5] Our resulting analytical sample comprises of 883 parents and children. Appendix Table B2 shows that individuals with missing information (either due to attrition or item non-response) are similar to our analytical sample across almost all baseline covariates. Female respondents are somewhat more likely to have missing information, which is mostly driven by lack of knowledge about pre-COVID income. Attritors also had fewer children in the household.

2.3 | Timeline

Baseline surveys for the educational intervention were conducted between November and December 2019, just prior to the onset of the COVID pandemic. The COVID pandemic first peaked in Pakistan in around mid-June 2020 with 6825 new cases reported on June 15, after which the country saw a downward trend in new cases until the start of the second wave in late October 2020. The province of Punjab imposed a widespread lockdown from March 24 to April 6, after which a strategy of "smart lockdowns" was imposed, which consisted of short-term restrictions at the neighborhood, city, or district level, based on the number of COVID cases in the area. After a surge in cases at the end of May, stricter lockdowns were implemented from June 16, 2020. We conducted telephone interviews in July 2020 for the COVID follow-up. At this time, widespread lockdowns were still in place in the province. While enforcement of the lockdowns was patchy due to limited state capacity, main roads were blocked and businesses, schools and non-essential markets were shut down.

2.4 | Measurement–Demographics and exposure to COVID-19

2.4.1 | Demographics

Adults: Our analytical sample consists of 883 adults (725 females and 158 males).[6] The relevant descriptive statistics for our sample of adults are in Table 1 (Panel A). The average age of the respondents in our sample is 37.
Children: Our analytical sample consists of 883 children (510 females and 373 males). The relevant descriptive statistics for our sample of children are given in Table 1 (Panel B). The average age of the children in our sample is 11.

2.4.2 | COVID-related economic shocks

This is our key treatment of interest. At the extensive margin, we use job loss as a proxy for economic impact, which takes the value one if the respondents report that *they or their partner* lost their job due to the COVID pandemic and zero otherwise. Reassuringly, reporting of job loss is consistent between men and women: that is, 22% of women and 21.5% of men report a job loss in the household.[7]

We use the inverse hyperbolic sine (IHS) of average monthly household income lost due to COVID to capture the negative economic consequences of COVID at the intensive margin. The average monthly household income lost during the pandemic is USD 64, which is 39% of mean income at baseline.

2.4.3 | Social exposure to the COVID-19 disease

While we do not focus on estimating the impacts of exposure to the disease, we provide some summary statistics of this in our sample to elucidate how aware respondents were of the pandemic's prevalence and how COVID disease correlated with economic shocks. We use a social definition of COVID exposure, as opposed to a medical definition (e.g., exposure to the virus pathogens) and measure several dimensions of COVID exposure. First, we capture four indicators reporting if: (i) someone in household or extended family was diagnosed with COVID, (ii) personally knew someone diagnosed with COVID, (iii) heard about people in their village being diagnosed with COVID or (iv) knew someone who passed away from COVID. Next, we create an overall COVID exposure dummy variable equal to one if the respondent answered yes to any of the individual scenarios (and zero otherwise). 8.6% of our sample reported that they personally know someone with COVID, while 17% reported any COVID exposure using the overall definition. We then create an intensity of COVID exposure, which is the sum of the four indicator variables mentioned above, and a deviation from average village COVID exposure, which is the difference between the individual COVID exposure and the average COVID exposure of the village. In Appendix Table B3, we show that COVID-related economic shocks, specifically job loss, are correlated with various measures of social exposure to COVID. The correlations suggest that across all measures of COVID exposure, people who were more exposed to the pandemic were more likely to experience a job loss in the household.

TABLE 1 Baseline characteristics and their differences by COVID-related job loss

	(1)	(2)	(3)	(4)	(5)
	Mean			**Observations**	
	No COVID job loss	**COVID job loss**	**Normalized difference**	**No COVID job loss**	**COVID job loss**
	Panel A: Adults				
Female	0.82	0.82	0.01	690	193
Age	36.79	36.26	−0.07	690	193
Lived in the village all life	0.38	0.33	−0.08	690	193
Lived in the village >10 years	0.57	0.62	0.07	690	193
Lived in the village less than 10 years	0.04	0.05	0.02	690	193
K10 psychological distress score	18.57	17,590	−0.09	690	193
High risk of mental distress	0.22	0.18	−0.06	690	193
Happiness (cantril ladder 0–10, present)	7.15	7.15	0.00	690	193
Number of people in the household	6.72	6.55	−0.04	690	193
Number of children in the household	3.97	4.06	0.03	690	193
Completed higher secondary qualification	0.35	0.31	−0.04	690	193
Spouse completed higher secondary qual.	0.43	0.34	−0.08	690	193
Subjective social status (relative to village)	5.41	5.40	−0.00	690	193
Subjective social status (rel. to Pakistan)	3.94	3.47	−0.16***	690	193
Employed full time	0.07	0.08	0.04	690	193
Part-time employee/Seasonal worker	0.02	0.02	−0.01	690	193
Self-employed	0.11	0.10	−0.03	690	193
Unemployed	0.05	0.04	−0.06	690	193
Daily wager	0.04	0.04	0.02	690	193
Housewife	0.71	0.72	0.02	690	193
Log (total household monthly expend.)	5.22	5.17	−0.06	690	193
Total household monthly expend. (USD)	113.61	102.69	−0.10	690	193
Log (monthly income pre COVID-19)[a]	5.77	5.51	−0.47***	690	193
Monthly income pre COVID-19 (USD)[a]	177.74	127.93	−0.43***	690	193
	Panel B: Household assets				
Water heater	0.15	0.11	−0.08	689	193
Motorbike	0.70	0.67	−0.04	689	193
Car	0.08	0.08	−0.01	689	193
Television	0.81	0.76	−0.09*	689	192
Satellite antenna	0.12	0.10	−0.05	689	192
Computer laptop	0.16	0.18	0.04	689	193
Home Internet access	0.25	0.22	−0.05	689	193
Refrigerator	0.84	0.81	−0.05	689	193
Freezer	0.07	0.09	0.04	688	192
Household has a bank account	0.33	0.32	−0.03	689	193
Household has a national savings account	0.02	0.02	−0.04	681	192
Household owns land	0.37	0.34	−0.05	687	193
Household owns apartment/flat/home	0.69	0.69	0.00	689	193

T A B L E 1   (Continued)

	(1)	(2)	(3)	(4)	(5)
	Mean			**Observations**	
	No COVID job loss	COVID job loss	Normalized difference	No COVID job loss	COVID job loss
	Panel C: Children				
Female	0.57	0.61	0.05	690	193
Age	11.30	11.48	0.10*	690	193
Huebner's student life satisfaction score	31.11	30.56	−0.11*	599	166
Hope score	21.39	21.31	−0.02	625	172
Depression score	2.09	2.06	−0.02	689	192

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$ for test of the difference in means between columns (1) and (2). This Table shows normalized differences in means (Imbens & Rubin, 2015) for each covariate. Income pre COVID-19 was reported at the COVID follow-up while all other variables were collected at baseline.

[a]Monthly pre-COVID income was reported at the COVID follow-up. A joint test of whether characteristics measured at baseline differ by job loss status returned an F-statistic of 1.05, with a *p*-value of 0.40.

2.5 | Outcome measurement–Parental mental health and awareness of domestic violence

2.5.1 | Mental health

Mental health in parents is measured both at baseline and during the pandemic using the Kessler-10 (K10) questionnaire (Kessler et al., 2003).[8] Appendix Table B1 lists all of the outcomes studies and in which wave of data collection. The K10 is a self-reported questionnaire, which includes 10 questions regarding different measures of psychological distress that a respondent may have felt in the past four weeks. The K10 has been used to assess mental health in respondents in numerous studies (Carra et al., 2011; Hickie et al., 2002; Sakurai et al., 2011), including in Pakistan (Qamar et al., 2014; Shahid et al., 2020). A higher score on the K10 indicates greater distress, where the following cutoffs are typically used to indicate ranges of psychological distress: (i) ≤19 psychologically well; (ii) 20–24 mild psychological distress; (iii) 25–29 moderate psychological distress; and (iv) ≥30 severe psychological distress (Kessler et al., 2003).

The mean K10 score in our sample is 18.364 at baseline, decreasing slightly to 17.44 during the COVID follow up, representing a small increase in average mental health over this period. For comparison, the population weighted mean K10 score in Australia is 14.2 (14.5 for females vs. 13.9 for males), with 68% of the respondents scoring under 15 (Andrews & Slade, 2001). The higher K10 scores in either period of our sample are indicative of the generally worse mental health outcomes in developing countries, which may make households even more vulnerable to shocks.

2.5.2 | High risk of mental distress

We define an indicator variable equal to one if the K10 score is greater than or equal to 25 (indicating moderate to severe psychological distress). Approximately 20% of our sample reports moderate to severe psychological distress at baseline.

2.5.3 | Stress and anger as reported by the children

During the COVID follow up phone survey, we asked children whether each of their parents has been angrier and more stressed during the lockdowns (indicator variables equal to one if the child answered yes and zero otherwise). On average, 37% of children reported that their mother seemed more stressed than usual while 17% responded that she seemed angrier than usual during the lockdown. 46% of children reported that their father seemed more stressed than usual, while 18% reported that he seemed angrier than usual during the lockdowns.

2.5.4 | Personal safety and familial contentment

We use measures of personal safety and familial contentment as proxies for domestic violence. Since this can be a sensitive topic for respondents, we ask indirect questions to ascertain the perceptions of personal safety and marital satisfaction to avoid antagonizing our respondents.[9] The measure for personal relationships and familial contentment is an index calculated from the following four statements regarding whether the respondent: (i) has enjoyed spending time at home with their family during the lockdown, (ii) has enjoyed spending time at home with their spouse during the lockdown, (iii) has had fewer disagreements with their spouse during the lockdown and, (iv) feels safe at home during the lockdown. The statements are measured on a Likert scale, with a value of five if the respondent completely agrees with the statement and a value of one if they completely disagree with the statement. We then calculate an overall sum index for each respondent. The average index for our sample was 16.1, with women reporting higher feelings of personal safety and marital satisfaction during the lockdown than men (16.26 for women and 15.37 for men).

2.5.5 | Domestic violence

As a more direct measure of domestic violence in the community, we ask respondents to rate on a scale of zero to ten how likely they think it is that women in their community are subjected to domestic violence during the COVID lockdowns with zero being not likely at all and ten being very likely. Respondents who have personally experienced greater domestic violence tend to report an increase in their community, even if they are not comfortable disclosing their own personal experience (Ellsberg et al., 2001; Mahmud & Riley, 2021; Peterman, 2021; Stark et al., 2013, 2010; UNICEF & Mahidol University, 2020). On average, respondents scored this as 1.23 or equivalently 12.3%. This is comparable with the UNICEF report from Thailand where 12% of the participants reported a perceived escalation in domestic violence (UNICEF & Mahidol University, 2020).

2.5.6 | Outcome measurement–Child mental health and well-being

Appendix Table B1, Panel B, illustrates the various measures collected for children and the time periods for which they were collected.

2.5.7 | Child well-being

At baseline and during the pandemic, we use the child-reported Huebner's Student Life Satisfaction Scale to assess well-being among children (Huebner, 1991). The index is a seven-question scale designed to measure life satisfaction among children as young as 8 years old.[10] The scale is scored between 7 and 42 where a higher score indicates greater life satisfaction. On average, children reported a life satisfaction score of 31 at baseline and 29.6 during the pandemic.

2.5.8 | Child hope (hope, aspirations, agency and pathways)

Recent literature in psychology, and especially the theoretical framework of Snyder (1994), makes a compelling case that hope (comprised of aspirations, agency and pathways) has an effect on developmental outcomes for children (see also work in economics on hope by Lybbert and Wydick (2017)). To capture hope, we ask children, both at baseline and during the pandemic, to what extent they agree with the following statements: (i) they feel positive about their future, (ii) if they try hard, they can improve their situation in life, (iii) they like to make plans for their future studies and work, (iv) they have opportunities to develop job skills.[11] The statements are scored on a scale from 1–6, with a value of one if they strongly disagree with the statement and a value of six if they strongly agree. The index for hope is the sum over these items. A higher score on this index indicates higher hope. The average hope index was 21.4 at baseline and 21.2 at the COVID follow up.

2.5.9 | Child depression as reported by parents

At baseline and during the COVID follow up, we asked parents to report how often they noticed their child feeling depressed.[12] The statement was scored on a scale of 1–5, with a score of one if they never noticed their child feeling depressed and five if they noticed their child feeling depressed very often. The average measure was 2.1 at baseline and 1.6 at the COVID follow up.

3 | EMPIRICAL STRATEGY

We examine how the economic hardship caused by COVID lockdowns has impacted parental and child mental health by comparing households who suffered job loss with those that did not. In some specifications, we also examine a continuous measure income loss during the COVID period, irrespective of job loss.

We present our empirical strategy, including a discussion of identification assumptions, in the following sections.

3.1 | Empirical specifications

We collected baseline data for all mental health indicators for children (Huebner's life satisfaction, Hope, Depression) and one indicator (K10) for parents. Other variables, including parent stress, anger, personal safety and domestic violence, were only collected during the COVID follow-up (Table B1 summarizes which data were collected at each wave).

We use two specifications, depending on whether data for the relevant outcome was collected at baseline or not.

For outcomes for which both baseline and COVID follow-up data is available, we estimate the following difference-in-difference (henceforth DiD) model:

$$Y_{ijt} = \beta_0 + \beta_1 \text{PostCOVID}_t + \beta_2 \text{PostCOVID}_t \times \text{EconShock}_{ij1} +$$
$$\beta_3 \text{PostCOVID}_t \times X_{ij0} + \alpha_i + \varepsilon_{ijt} \tag{1}$$

Y_{ijt} are mental health and well-being outcomes for individual I in village j at time t (with $t = 0$ for baseline and $t = 1$ for follow-up), including (i) mental health in adults, (ii) life satisfaction in children, (iii) hope in children and (vii) well-being of children as reported by their parents. The variable PostCOVID is an indicator variable for the COVID follow up and EconShock_{ij1} is a measure of the household-level economic shock due to COVID, which takes two forms, alternatively: (i) an indicator variable equal to one if there was a COVID-related job loss in the household, which we use to measure effects at the extensive margin; and (ii) the IHS of income lost during the pandemic, which we use to measure effects at the intensive margin.

We examine two measures of economic shock to elucidate different potential effects of economic hardship on mental health. Income loss may affect mental health through reductions in the quality of life or ability to meet basic needs and access essential services, particularly in places with few social safety nets. In addition to a complete loss of income, job loss may affect mental health through stigma, loss of social status, or anxiety about the future. Our empirical strategy allows us to examine both channels.

The coefficient, β_2, is our difference-in-difference estimator. We include individual fixed effects, α_i, which control for all time-invariant characteristics of the respondent, which are potentially correlated with the main regressor of interest (i.e., economic hardship during the pandemic) and the outcomes of interest. Also we include in all specifications controls for pre-COVID income interacted with post-COVID (PostCOVID$_t \times X_{ij0}$) to account for the fact that job loss in particular was not random, and in particular, seemed to occur more in low-earning households (Table 1). We cluster standard errors at the village level and, given the small number of clusters (29), we implement and report the cluster bootstrapping adjustment as recommended by Cameron and Trivedi (2010).

For outcomes for which we did not collect baseline data, we estimate the following cross-sectional Equation (2) via OLS

$$Y_{ij1} = \beta_0 + \beta_1 \text{EconShock}_{ij1} + \Gamma' X_{ij0} + \gamma_j + \varepsilon_{ij} \tag{2}$$

The outcome variable Y_{ij1} captures the other measures of mental health, well-being, perceptions of domestic violence, personal safety and familial contentment index for individual i in village j measured at follow-up (time 1). Except for high risk of mental distress and increased stress and anger in adults as reported by their children, which are indicator variables, all dependent variables have been normalized to mean zero and standard deviation one. We include the following vector of

individual controls, measured at baseline (X_{ij0}): respondents' gender, age, educational attainment, and K10 score, household size, number of children in the house, the respondent's attitudes toward their lives (Cantril ladder (Bjørnskov, 2010)) and their perception of relative social status (McArthur scale (Adler et al., 2000)), as well as the IHS of average monthly household pre-COVID income (reported at the follow-up).[13] We include village fixed effects (γ_j) in all specifications to account for time invariant unobservables at the local level that could be correlated with exposure to COVID related economic shocks and individual mental health (e.g., industrial composition, availability of health services, etc.). We cluster standard errors at the village level and also report wild bootstrap p-values (Cameron et al., 2008; Cameron & Miller, 2015) in brackets below the main output given the low number of clusters (29 villages).

3.2 | Identification assumptions

Identification of the causal effect of exposure to COVID and subsequent economic shocks is impaired by the possibility that those who were most affected economically are systematically different from others in ways that also relate to our outcomes of interest, mental health or safety. Pre-existing differences may confound the analysis if, for instance, those who have lower mental health to begin with are also the ones most vulnerable economically to COVID. The literature has documented a systematic correlation between poverty, depression and anxiety–the so-called psychological poverty trap (e.g., Ridley et al., 2020). This relationship is due to feedback effects between poverty and poor mental health. In our context, we consider an employment and income shock deriving from external factors–the COVID pandemic. Yet, it could be the case that such shocks are not distributed randomly across individuals but instead are correlated with pre-existing mental health and associated economic vulnerability. We address this potential selection bias in several ways.

First, our DiD specifications allow for the inclusion of individual fixed effects that absorb any unobservable, time-invariant factors that correlate with how susceptible a household is to an income shock, or the latent mental health of parents and children. The DiD identification assumption requires that in the absence of the COVID related economic shock, the average mental outcomes for households who suffered job loss and those that did not would have followed parallel paths over time (parallel trends assumption). While this assumption is fundamentally untestable, its plausibility is typically justified through a statistical test of pre-trends in the outcome variable. The statistical absence of pre-trends, however, is neither necessary nor sufficient for the parallel trends condition to hold, as noted by Kahn-Lang and Lang (2020), who recommend first establishing that the levels are balanced in prior periods.

The short timeframe of our study (7 months) helps assuage concerns that other events outside of the COVID related economic shock could have systematically affected the two groups. However, with only two time periods (pre and post COVID), we cannot test for pre-trends in our data. We can, however, check for systematic differences in baseline mental health indicators, and a large number of observable baseline covariates associated with mental health, across those who were more or less affected by the COVID related economic shock. If these factors are balanced pre-COVID, it is plausible that unobservable characteristics, as well as trends in mental health outcomes in the absence of the COVID economic shock, are also parallel.

In Table 1, we conduct a balance of covariates exercise to elucidate whether time-invariant and baseline characteristics are systematically different across households who did and did not suffer job loss during the pandemic. For each covariate, we calculate the normalized difference between those who lost a job ($i = 1$) and those who did not ($i = 0$): $\Delta x \frac{\overline{X}_{1-}\overline{X}_0}{\sqrt{S_0^2+S_1^2}}$, where $\overline{X}_i$ is the mean and S_i^2 is the sample variance in group i. Differences in magnitude of less than 0.25 are considered balanced (Imbens & Rubin, 2015).

We find that across almost all dimensions, pre-COVID characteristics are balanced between households that suffered job loss and those that did not. Table 1 shows that of the 39 characteristics at baseline, only one (subjective social status relative to Pakistan) was significantly different (at 5%) between households that experienced COVID-related job loss and households that didn't, while 4 were significant at 10%. These patterns are what we would expect to arise by chance. Moreover, the magnitudes of the difference are also modest, with all differences being less than 0.11 SD. A joint test of whether characteristics measured at baseline differ by job loss status returned an F-statistic of 1.05, with a p-value of 0.40.

One important exception occurs in a variable measured not at baseline: those who suffered job loss have lower average household income pre-COVID (baseline household income for those who suffered job loss was USD 128 compared to USD 178 for those who did not, a normalized mean difference of 0.43). However, this variable was reported in the COVID follow-up and potentially affected by recall bias, overstating the true difference between treatment and control prior to COVID. Nevertheless, in all specifications we control for pre-COVID income, although adding this control does not substantially impact the estimates of the treatment effect (indicating that to the extent that recall bias affected reporting of pre-COVID income, it was

not correlated with the outcomes). In the DiD specifications, we interact pre-COVID income with the PostCOVID indicator variable. The resulting DiD estimate is identified off the additional effect of job loss once the potential dynamic differences in pre-existing economic vulnerability are accounted for. In the cross-sectional estimations, we include pre-COVID income as a control in our main specifications. The resulting cross-sectional estimate is identified off the additional impact of job loss on mental health outcomes post-COVID, conditional on initial economic vulnerability.

It is worth noting that, contrary to concerns about the presence of psychological poverty traps, we find no differences in pre-COVID mental health indicators, for parents, as well as children, when we compare households who suffered job loss with those that did not. This is assuring for our analysis; if there are no differences in baseline mental health indicators it is likely that mental health outcomes would remain balanced in the absence of the COVID related economic shock.

We nevertheless control for pre-COVID mental health in all cross-sectional specifications, where we only have information from the post-COVID period. The identification assumption in the cross-sectional specifications requires that conditional on pre-existing differences in mental health and socio-economic status, as well as village fixed effects and other baseline controls, the COVID related economic shock is as good as random. While we do our best to control for a rich set of observables that may be correlated with both job loss and mental health outcomes, this strategy does not preclude the possibility of omitted variable bias.

We therefore report the degree of selection on unobservables relative to observables that would be necessary for $\beta_1 = 0$, following Oster (2019). At the core of this exercise is a conjecture about the covariance between the omitted variables and treatment variable. One commonly made assumption is that the covariance between unobservables and the treatment variable is equivalent to the covariance between observables and the treatment variable. This is known as the proportional selection assumption and implies a coefficient of proportionality (δ) equal to 1. Intuitively, a higher absolute value of δ implies that the degree of selection on unobservables relative to observables would need to be large to overturn the results. We calculate δ for each of our cross-sectional specifications and report it at the bottom of the tables. Following Oster (2019), we assume that Rmax, the R^2 from a hypothetical regression of the outcome on treatment and both observables and unobservables, is equal to 1.3 x $\tilde{R}$, where $\tilde{R}$ is the R^2 from the regression with full controls. The values of δ reported in Tables 3 and 4 are all greater than 1 in magnitude, indicating that the degree of selection on unobservables relative to observables would need to be quite large to overturn our results.[14] We nonetheless interpret our cross-sectional results with caution.

As an additional exercise, we implement a propensity score matching technique to improve the balance on our pre-COVID covariates. We implement a kernel matching using a Gaussian kernel and common support to match households who suffered job loss with those that did not. We match on the following variables: respondent age, age², gender, and educational attainment; child age, age², and gender; household size, number of children in the household, the respondent's attitudes toward their lives (Cantril ladder (Bjørnskov, 2010)), their perception of relative social status (McArthur scale (Adler et al., 2000)), and the IHS of pre-COVID income. We verify in Appendix Figure A2 that after the matching exercise, each of these covariates is balanced (i.e., the absolute value of normalized differences is less than 0.25). Importantly, the pre-existing differences in pre-COVID income are now balanced. We then rerun our main DiD and cross-sectional estimates, weighting each regression by the propensity score (i.e., the conditional probability of job loss). The results are presented in Appendix Tables B6-B9 and are almost identical to our main specifications.

Finally, we implement a doubly robust DiD specification (Sant'Anna & Zhao, 2020), which combines propensity score matching with linear regression to estimate the average treatment effect on the treated (ATT). When used separately, both linear regression and propensity score methods are unbiased only if the underlying statistical model is correctly specified. The doubly robust estimator combines these two approaches in a way that requires only one of models to be correctly specified to obtain an unbiased estimator. The doubly robust DiD estimator only considers binary treatment conditions (i.e., job loss). We therefore conduct this exercise for each of our DiD specifications using job loss. The results, presented in Appendix Table 10, are consistent with our main DiD specifications.

4 | RESULTS

First, we show raw trends in mental health by whether the household reported COVID-related job loss in Figures 1–4. For parental mental health (K10 scores), Figure 1 shows a slight improvement in mental health in the absence of job loss, and a dramatic decline for those who experienced job loss. Importantly, in the pre-COVID period (baseline) K10 scores were similar for both groups (as we have already seen in Table 1). Similarly, for child Hope, Figure 2 shows a slight improvement (though not significant) in the absence of job loss, and a decline for those whose parents experienced job loss. For child life satisfaction (Figure 3), it appears that this measure declined for both groups, but significantly more for children with parental job loss. Finally, for child depression (Figure 4), it appears that both groups experienced reductions in depression, but that children whose parents did not lose their jobs experienced a larger decline.
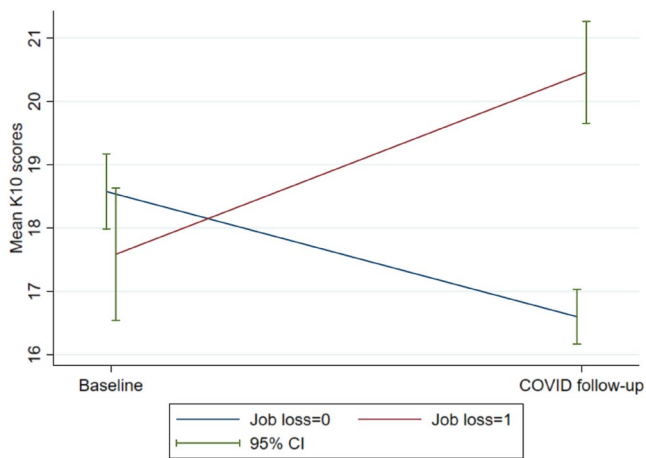
FIGURE 1 Parents' psychological distress score by COVID-related job loss. This figure shows the mean K10 score of the parents at baseline and the COVID-19 follow up by job loss. K10 scores are the Kessler 10 scores [Colour figure can be viewed at wileyonlinelibrary.com]
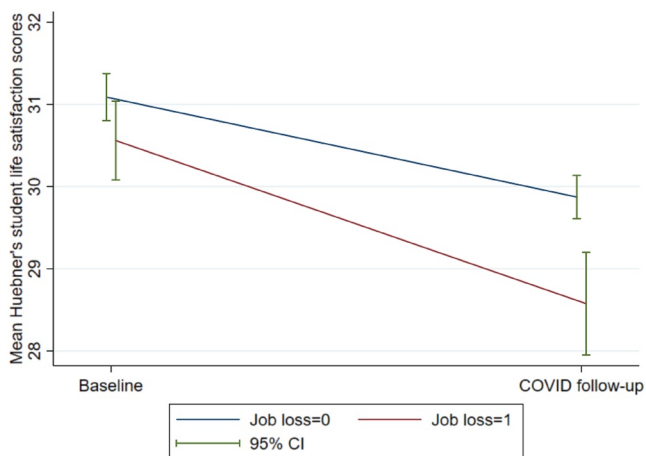

FIGURE 2 Children's' life satisfaction score by COVID-related job loss. This figure shows the mean Huebner's student life satisfaction score of the children in our sample at baseline and the COVID-19 follow up by job loss [Colour figure can be viewed at wileyonlinelibrary.com]
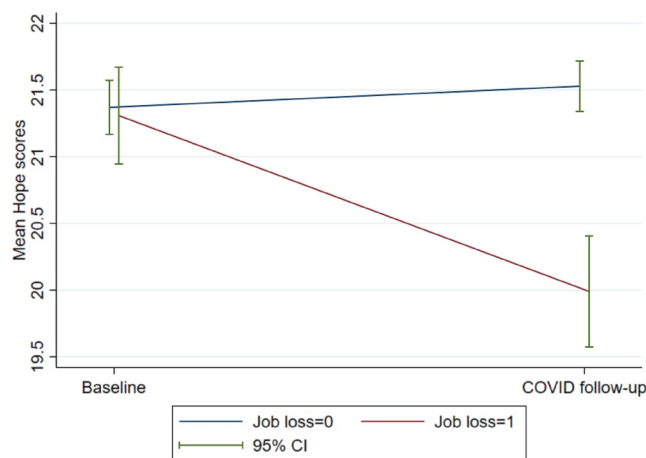
FIGURE 3 Children's Hope score by COVID-related job loss. This figure shows the mean "Hope" score of the children in our sample at baseline and the COVID-19 follow up by job loss. "Hope" is an index, calculated by adding the respondents score for following four statements: (i) they feel positive about their future, (ii) if they try hard, they can improve their situation in life, (iii) they like to make plans for their future studies and work, (iv) they have opportunities to develop job skills. The statements are scored from 1–6, with a score of 1 if they strongly disagree and a score of 6 if they strongly agree. A higher score indicates greater 'hope' [Colour figure can be viewed at wileyonlinelibrary.com]

FIGURE 4 Children's mean depression score by COVID-related job loss. This figure shows the mean depression score of the children in our sample at baseline and the COVID-19 follow up by job loss. Depression is the score of the respondents on how often they have noticed their child getting depressed during the lockdown scored from 1 to 5. A higher score indicates higher frequency with which the parent has noticed their child getting depressed [Colour figure can be viewed at wileyonlinelibrary.com]
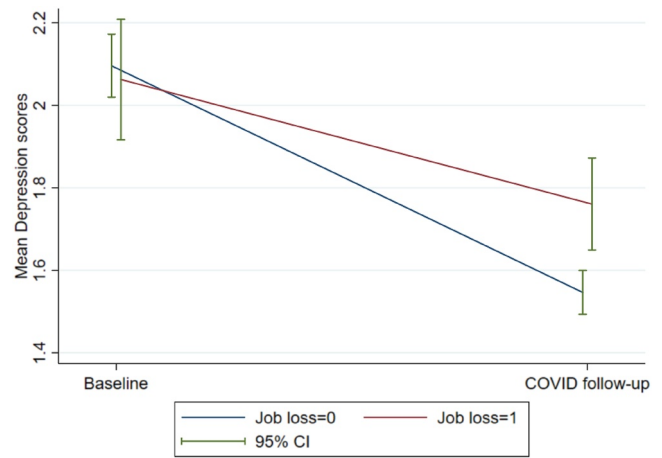
4.1 | Economic impact of the pandemic on parents

In Table 2, we examine the economic impact of the COVID pandemic on parents' mental health measured by the normalized K10 score. Our results show that COVID related job loss is associated with a 0.88 SD reduction in the K10 score, and the coefficient is statistically significant at the one percent level (Column 1). We find similar results focusing specifically on anxiety using the GAD-7, reported in Appendix Tables B4, where job loss is associated with a 0.18 SD reduction in the cross-sectional specification.

Using the continuous measure of income lost due to COVID (Column 2), the effects are smaller. A 10% loss in income is associated with a 0.11 SD decrease in mental health. Although this is statistically significant at the five percent level, it is considerably smaller than the extensive margin effect of job loss observed in Column 1. The diminished magnitude may Be

TABLE 2 Economic impact of COVID and mental health of adults: DiD

	(1)	(2)	(3)	(4)
Dependent variable	**Normalized K10 score**		**High risk of mental distress**	
Job loss * post COVID	0.88***		0.21**	
	(0.24)		(0.08)	
	[0.00]		[0.04]	
Log (income lost due to COVID) *		0.11**		0.02
Post COVID		(0.05)		(0.02)
		[0.06]		[0.32]
Log (income pre COVID) *	0.42	0.13	0.10	0.04
Post COVID				
	(0.28)	(0.31)	(0.08)	(0.09)
	[0.16]	[0.67]	[0.21]	[0.69]
Post COVID	−2.59	−1.18	−0.69	−0.35
	(1.69)	(1.78)	(0.48)	(0.52)
	[0.15]	[0.50]	[0.18]	[0.51]
Individual fixed effects	Y	Y	Y	Y
SE clustered by village	Y	Y	Y	Y
No. of clusters	29	29	29	29
Observations	1766	1762	1766	1762
R-squared	0.47	0.45	0.48	0.47

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Unit of observation is a parent at baseline and the COVID follow-up. Difference-in-differences estimations. Standard errors are clustered at the village level in parentheses. Bootstrap *p*-values, based on 1000 replications, are given in brackets below the standard errors. All estimates control for individual fixed effects. Job loss is an indicator variable equal to 1 if the respondent reported that they or their partner lost their job due to the COVID-19 pandemic. Log(income lost due to COVID) is the self-reported loss in average monthly household income during COVID-19, transformed using the inverse hyperbolic sine (IHS). K10 score is the Kessler 10 score, normalized to mean 0 and SD 1, where a higher score on the K10 indicates worse mental health. High risk of mental distress is an indicator variable equal to 1 if the respondent has a K10 score of 22 or more, and 0 otherwise. Post COVID is an indicator variable for the COVID-19 follow up.

TABLE 3 Economic impact of COVID and stress and anger in parents as reported by children: Cross-sectional regression

	(1)	(2)	(3)	(4)
	Stress		**Anger**	
Dependent variable	**Panel A: Among mothers**			
Job loss	0.24***		0.16***	
	(0.05)		(0.05)	
	[0.00]		[0.00]	
Log (income lost due to COVID)		0.04***		0.03***
		(0.01)		(0.01)
		[0.00]		[0.00]
Oster (2019)'s delta	4.91	−50.20	9.21	732.68
Village fixed effects	Y	Y	Y	Y
SE clustered by village	Y	Y	Y	Y
No. of clusters	29	29	29	29
Mean of DV	0.37	0.37	0.17	0.17
Observations	882	880	882	880
R-squared	0.29	0.28	0.13	0.12
	Panel B: Among fathers			
Job loss	0.21***		0.13**	
	(0.05)		(0.05)	
	[0.00]		[0.01]	
Log (income lost due to COVID)		0.04***		0.03***
		(0.01)		(0.01)
		[0.00]		[0.00]
Oster (2019)'s delta	6.74	4.99	156.89	4.80
Village fixed effects	Y	Y	Y	Y
SE clustered by village	Y	Y	Y	Y
No. of clusters	29	29	29	29
Mean of DV	0.46	0.46	0.18	0.18
Observations	882	880	882	880
R-squared	0.28	0.28	0.11	0.12

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Unit of observation is a child in the COVID follow-up, reporting about each parent. Standard errors are clustered at the village level in parentheses. Bootstrap *p*-values, based on 1000 replications, are given in brackets below the standard errors. All estimates include village fixed effects and individual controls, including: household size, the number of children in the household, the child's gender and age, the parent's age, educational attainment, normalized baseline K10 score, the inverse hyperbolic sine of average monthly household income pre COVID-19, the respondent's attitudes toward their lives (Cantril ladder (Bjørnskov, 2010)) and their perception of relative social status (McArthur scale (Adler et al., 2000)). Job loss is an indicator variable equal to 1 if one or both of the parents lost their job due to the COVID-19 pandemic. Log(income lost due to COVID) is the self-reported loss in average monthly household income during COVID-19, transformed using the inverse hyperbolic sine (IHS). Stress is an indicator variable equal to 1 if the child responded that their parent seems more stressed, and Anger is an indicator variable equal to 1 if the child responded that their parent seems angrier than usual during the COVID-19 lockdowns. These questions were asked individually to the child for both parents. The dependent variable in Panel A is the child's responses for the mother, while the dependent variable in Panel B is the child's responses for the father. We report Oster (2019)'s delta assuming Rmax $= 1.3 \times R^2$.

driven by greater measurement error in the loss of income variable, which is more difficult to estimate for households than the simple (binary) report of job loss.

In columns 3 and 4 we examine the risk of mental distress with an indicator variable equal to one if the K10 score is greater than or equal to 25. Here, we find that job loss is associated with a 0.21% point increase in the likelihood of high mental distress. Relative to a baseline mean of 20%, the magnitude is qualitatively large. The coefficient on the continuous measure of income loss, however, is small and statistically insignificant.

We further examine whether the deterioration in mental health has been large enough to generate behavioral change that has been noticeable to children. In a cross-sectional specification, Table 3 (Panel A, columns 1 and 3) shows that children whose parent lost their job are 24% points more likely to report their mothers being more stressed and 16% points more likely to report

TABLE 4 Economic impact of COVID and interpersonal safety of adults: Cross-sectional regression

	(1)	(2)	(3)	(4)
Dependent variable	**Normalized personal safety and familial contentment**		**Normalized domestic violence**	
Job loss	−0.36***		0.28***	
	(0.11)		(0.07)	
	[0.00]		[0.00]	
Log (income lost due to COVID)		−0.04**		−0.00
		(0.02)		(0.01)
		[0.07]		[0.89]
Oster (2019)'s delta	1.76	1.44	3.45	−0.12
Village fixed effects	Y	Y	Y	Y
SE clustered by village	Y	Y	Y	Y
No. of clusters	29	29	29	29
Observations	840	838	883	881
R-squared	0.58	0.57	0.37	0.36

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$, +$p < 0.115$. Unit of observation is a parent at the COVID follow-up Standard errors are clustered at the village level in parentheses. Bootstrap *p*-values, based on 1000 replications, are given in brackets below the standard errors. All estimates control for village fixed effects and individual controls, including: household size, the number of children in the household, the parent's age, gender, educational attainment, normalized baseline K10 score, the inverse hyperbolic sine of average monthly household income pre COVID-19, the respondent's attitudes toward their lives (Cantril ladder (Bjørnskov, 2010)) and their perception of relative social status (McArthur scale (Adler et al., 2000)). Job loss is an indicator variable equal to 1 if the respondent reported that they or their partner lost their job due to the COVID-19 pandemic. Log(income lost due to COVID) is the self-reported loss in average monthly household income during COVID-19, transformed using the inverse hyperbolic sine (IHS). Personal safety and familial contentment is an index, normalized to mean 0 and SD 1, calculated by adding the respondent's score for following five statements: (i) if the respondent has enjoyed spending time at home with their family during the lockdown, (ii) if the respondent has enjoyed spending time at home with their spouse during the lockdown, (iii) if the respondent has had fewer disagreements with their spouse during the lockdown and, (iv) if the respondent feels safe at home during the lockdown. The statements are scaled from 1-5 with the individual given a score of 5 if they completely agree with the statement and a score of 1 if they completely disagree with the statement. A higher score on the index measure represents higher personal safety and marital contentment of the individual. Domestic violence is the respondents' score on a scale of 0–10 of their opinion on how likely it is that women in their community are subjected to domestic violence during the COVID-19 lockdowns with 0 being not likely at all and 10 being very likely, normalized to mean 0 and SD 1. We report Oster (2019)'s delta assuming $Rmax = 1.3 \times R^2$.

them being angrier during the lockdown compared to those who did not suffer job loss. Similarly for fathers, Table 3 (Panel B, columns 1 and 3) shows that children in a household that suffered a job loss are 21% points more likely to observe increased stress and 13% points more likely to report increased anger for their fathers.

The continuous measure of income loss in columns 2 and 4 also suggests a relationship between COVID related economic loss and stress/anger, though the magnitudes are quite small. A 10% increase in income loss due to COVID is associated with a 0.04% point increase in stress for mothers and fathers. Relative to a mean of 0.36 (mothers) and 0.46 (fathers), this corresponds to a 1–2% magnitude. Similarly for anger, the coefficients on income loss suggest that a 10% point increase in income loss due to COVID is associated with a 0.03% increase in anger for both mothers and fathers.

Next, we examine feelings of personal safety and marital/familial contentment, and perceptions of domestic violence in the community, in a cross-sectional specification. The results in columns 1 and 3 of Table 4 show that job loss is associated with a 0.36 SD reduction in feelings of personal safety and a 0.28 SD increase the perception of domestic violence in the community. These results are statistically significant at the one percent level. The continuous measure of income loss in columns 2 and 4 shows little evidence that the amount of income lost due to COVID is associated with feelings of personal safety and uncorrelated with perceptions of domestic violence.

4.2 | Economic impact of the pandemic on children

Above, we found that children perceived increased stress and anger in parents who had lost their job. In Table 5, we examine direct impacts on their own mental health and well-being.

In columns 1 and 2, there is no evidence that parental job loss is associated with a drop in life satisfaction for children. The DiD coefficient is negative but statistically insignificant in the case of parental job loss (Column 1), and small, positive, and statistically insignificant with the continuous measure of parental income loss (Column 2).

TABLE 5 Economic impact of COVID, self-reported life satisfaction, Hope, and depression symptoms among children: DiD

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
	Normalized huebner's student life satisfaction score		**Normalized hope score**		**Normalized depression score**	
Job loss * post COVID	−0.08		−0.43**		0.39**	
	(0.37)		(0.15)		(0.19)	
	[0.86]		[0.02]		[0.04]	
Log (income lost due to COVID) * Post COVID		0.03		−0.02		0.02
		(0.03)		(0.03)		(0.04)
		[0.37]		[0.49]		[0.62]
Log (income pre COVID) * Post COVID						
	0.36*	0.36	0.42**	0.54***	0.26	0.15
	(0.19)	(0.23)	(0.16)	(0.16)	(0.19)	(0.21)
	[0.12]	[0.15]	[0.02]	[0.00]	[0.20]	[0.46]
Post COVID	−2.03*	−2.18	−2.28*	−2.94**	−1.63	−0.98
	(1.09)	(1.34)	(0.98)	(1.00)	(1.13)	(1.19)
	[0.12]	[0.15]	[0.03]	[0.01]	[0.19]	[0.41]
Individual fixed effects	Y	Y	Y	Y	Y	Y
SE clustered by village	Y	Y	Y	Y	Y	Y
No. of clusters	29	29	29	29	29	29
Observations	1528	1524	1592	1588	1760	1756
R-squared	0.51	0.51	0.55	0.55	0.49	0.48

Note: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Unit of observation is a child at baseline and the COVID follow-up. Standard errors are clustered at the village level in parentheses. Bootstrap *p*-values, based on 1000 replications, are given in brackets below the standard errors. All estimates include individual fixed effects. Job loss is an indicator variable equal to 1 if one or both parents lost their job due to the COVID-19 pandemic. Log(income lost due to COVID) is the self-reported loss in average monthly household income during COVID-19, transformed using the inverse hyperbolic sine (IHS).The Huebner's student life satisfaction score has been normalized to mean 0 and SD 1, where a higher score indicates greater well-being. Hope is an index, normalized to mean 0 and SD 1, calculated by adding the respondents score for following four statements: (i) they feel positive about their future, (ii) if they try hard, they can improve their situation in life, (iii) they like to make plans for their future studies and work, (iv) they have opportunities to develop job skills. The statements are scored from 1-6, with a score of 1 if they strongly disagree and a score of 6 if they strongly agree. A higher score indicates greater hope. Depression is the score of the respondents on how often they have noticed their child getting depressed during the lockdown scored from 1-5, normalized to mean 0 and SD 1. A higher score indicates higher frequency with which the parent has noticed their child getting depressed. Post COVID is an indicator variable for the COVID-19 follow up.

However, we find robust negative effects on Hope, a normalized index of children's aspirations, agency and future pathways, and positive effects on child depression symptoms. In column 3, we find that children whose parents lost their job report a 0.43 SD reduction in hope, which is statistically significant at the one percent level. The results are larger in magnitude (0.60 SD reduction, statistically significant at the one percent level) when we allow the time trend to vary with the pre-COVID Huebner's student life satisfaction score (Table B5, Column 1). In other words, parental job loss is an important source of increased despair among children and significantly affects the way they envision their own agency and future prospects. With the continuous measure of income loss, again, we find no evidence that the amount of income lost worsens child mental health outcomes.

Such increased despair seen in children whose parents lost their job has noticeable behavioral manifestations. Job loss is associated with a 0.39 SD increase in the depression score reported by the parent for their child (Column 5), with no effects, again, using the continuous measure of income loss (Column 6). However, when we allow the time trend to vary with the pre-COVID Huebner's student life satisfaction score (Appendix Table B5, Column 4), the relationship is not robust.

4.3 | Robustness

We first implement a propensity score method, as described in Section 3.2, to predict job loss and then re-run all of our DiD and cross-sectional estimations, weighting by the propensity score. The results for parent outcomes are presented in Appendix Tables B6-B8 and are consistent with our main specifications. In the DiD specifications in Appendix Table B6, the coefficient for job loss is slightly more conservative for K10 scores (0.80 SD reduction), but almost identical for mental distress, while the coefficients for the continuous measure of income loss are almost identical to the main specifications. In the cross-sectional estimations on stress and anger (Table B7), the coefficients are slightly more conservative for mother stress (19% point increase in stress for job loss), and almost identical to our main results in Tables 3 and 4 for everything else. Finally, in Table B8, the coefficient on job loss is slightly more conservative for personal safety (0.31 SD reduction) and slightly larger for domestic violence (0.31 increase). For children (Table B9), we find that weighting by the propensity score produces results that are slightly larger than the main specifications. Job loss is associated with a 0.46 SD reduction in Hope and 0.42 SD increase in depression.

In Table B10 we present the results from doubly robust DiD estimations, noting that we can only apply this exercise to the binary indicator of job loss. Here, we find again that the results are qualitatively similar to our main DiD specifications. The coefficients on job loss are slightly more conservative, but similar to the propensity score results, for parent outcomes (0.77 SD reduction in K10 and 0.20 increase in likelihood of high mental distress). For children, the magnitudes of the coefficients on job loss are slightly larger (0.49 SD reduction in Hope and 0.42 SD increase in Depression), and again similar to the propensity score results.

5 | DISCUSSION

Our study, using a unique panel survey of parental and child mental health, finds that COVID has had significant negative economic consequences for low-income peri-urban populations in Pakistan. Our results suggest that the negative economic shock created by the pandemic has translated into significant socio-economic harm for adults as well as children; and has affected the most vulnerable households and children the most. The pandemic has disproportionately affected the poorest households in our sample, and those in which young children enjoyed lower life satisfaction to start with. Mental health, well-being, feelings of safety, contentment and hope are all lower as a result of pandemic-related job loss. These results strongly point toward a need for safety nets and support for the most vulnerable populations in the event of negative economic shocks.

We find that while mental health has not deteriorated overall from baseline during the lockdowns for adults, for those who have suffered economically, it has significantly worsened. Our results show that this worsening of mental health has been prominent enough for the children to notice; children report higher stress and anger among parents in households that have suffered job loss.

Our results also suggest that while many respondents have enjoyed spending time at home with their family and their spouse during the lockdown, this, again, was not true for those who have suffered job loss. We find that compared to those who have not suffered economically during the pandemic, those suffering the greatest from the adverse economic consequences report less enjoyment at time spent with family and spouse. They also report more disagreements with their spouse and feel less safe at home.

Accordingly, those who have suffered economically report a higher incidence of domestic violence than those who have not suffered. Our results highlight the importance of establishing public safety nets combined with increased protection of women and children in order to alleviate some of the negative consequences of economic shocks on domestic violence.[15]

Insofar as the negative economic shocks suffered by parents affect children, our results show that life satisfaction is lower among children whose parent lost their job due to the pandemic. Similarly, hope, agency, and self-efficacy among these children is also lower. Children feel less positive about their future, less likely to feel that if they work hard, they can improve their situation, less likely to make plans about their future, and less likely to believe that they have opportunities to develop their job skills compared to children from households that have not suffered job loss. One particular worry, and an avenue for future research, concerns the long-term impact of these negative feelings on educational investment and achievement. This is particularly worrisome as the negative shock to child mental health is large enough that parents perceive negative behavioral consequences. While overall, parents have noticed lower levels of depression among children compared to before the pandemic (which itself could be driven by reduced workload from school and less busy schedules), the effect is opposite for children in households where a parent has lost their job. Given that households affected by job loss also tended to be poorer before the pandemic,

these effects may aggravate economic inequalities in the long-term through their consequences on educational achievement and future earnings of these children.

Overall, in our sample we find that the COVID-19 pandemic has had significant socio-economic effects, and that these may be primarily driven by the negative economic consequences of the pandemic. While we do not find evidence that the lockdown itself has led to decreased well-being–in fact we see that those who have not suffered economically display, if anything, improved well-being (although these effects are not statistically significant)–we find that households who have lost their jobs during the lockdowns due to the pandemic are faring worse mentally and emotionally, and that these effects are multi-generational. Indeed, it is not only adults, but also children who are perceptive to the negative economic shock to their households and are consequently worse off than their counterparts.

These results shed light on the plight of vulnerable populations worldwide, especially in countries where public safety nets are inadequate and access to mental healthcare is poor. The wide ranging impacts of the pandemic mediated through the increase in economic deprivation highlight the need for policy to mitigate said effects during such crises. In countries where welfare payments are not prevalent or cannot be efficiently disbursed, it becomes important to understand the channels through which populations may be affected. Alternatives, such as providing mental health care to adults and children, subsidizing essentials, or providing support to employers that can maintain employment targets are just a few strategies that can help to minimize the negative effects of not only the COVID-19 pandemic but future economic shocks.

CONFLICT OF INTEREST
The authors have no conflict of interest to disclose.

DATA AVAILABILITY STATEMENT
Data available on request from the authors.

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ENDNOTES
[1] 98.5 percent of the jobs lost in our sample were lost by the man in the household. This is explained by the very different rates of labor market participation across genders. At baseline, 100 percent of the men and only 13 percent of the women worked.

[2] On 20th March 2020, the government had approved a Rs.100 billion Residual/Emergency Relief Fund, the "Ehsaas Emergency Cash" program, aimed at daily wage workers (KPMG., 2020). Of the respondents who received any kind of economic support in our sample, including family and social support, around 77 percent of them reported receiving economic support from the state government. This could Include support from the Ehsaas Emergency Cash program.

[3] Our sample was not intended to be nationally representative, though it is similar in characteristics to the urban sample from the nationally-representative Demographic and Health Surveys (see Appendix Table B13). Thus, generalizability of our findings to rural Pakistan or other rural areas in LMICs maybe be limited.

[4] Existing data collection protocols have been adapted to conduct phone surveys that comply with social distancing guideline in numerous studies on COVID-19 (see Bundervoet et al., 2021; Egger et al., 2021; Mahmud & Riley, 2021).

[5] We exclude individuals who do not report pre-COVID income from our analytical sample because it is an important control. However, our results are similar if we include the 57 observations missing pre-COVID income but omit that variable as a control.

[6] There is a natural unbalance between females and males in our adult sample given that baseline data has been leveraged from a study where the student population was the initial target and either parent could respond coupled with greater availability of mothers to respond during school hours.

[7] The closeness of the two numbers is to be expected since we do not expect households where the men responded to be very different from households where the women responded in terms of how the COVID-19 pandemic has affected them within the same village and similar socio-economic backgrounds.

[8] We find similar patterns when looking at anxiety measured with the GAD7 (see Appendix Table B4) (Spitzer et al., 2006). We choose to focus on the K10 as we have baseline scores of our respondents for this measure.

[9] See Peterman (2021) for a discussion on the use of indirect measures in research on violence against women. We also take this approach in light of ethics guidelines that require one to report a crime to adequate authorities if domestic violence is revealed, which could in turn further endanger our respondents.

[10] This scale has been used to assess life satisfaction and well-being among children in numerous studies (see Jiang & Huebner, 2017; Leto et al., 2019; Leto et al., 2021; Lewis et al., 2011). It has reliability and validity (see Bender, 1997).

[11] These questions for hope and self-efficacy have been adapted from Ungar & Liebenberg (2011), Lietz et al. (2015) and Ryberg (2019).

[12] All questions were translated into Urdu. The literal translation of the Urdu word for depressed would be 'gloomy', which parents would have understood in the local context without the stigma attached to depression/mental health conditions. This would also have ensured a more candid response from the parents.

[13] We present only the main cross-sectional results in Tables 3 and 4. For the full regression results see Appendix Tables B11 and B12.

[14] Some of the deltas are negative, which means that if the observables are positively correlated with the treatment, the unobservables have to be negatively correlated with the treatment to explain away the treatment effect.

[15] This strategy has had success in Peru, where Kavanaugh et al. (2019) estimate that the opening of dedicated Women Justice Centers led to a 40% decrease in the incidence of gender-based violence.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.