

Improving Women's Mental Health During a Pandemic

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Teaching Slides

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Motivation

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- Negative impact can be particularly severe in lower income countries (Egger et al., 2021; Miguel & Mobarak, 2021).
- Women in lower income countries are affected disproportionately (Afridi et al., 2021; Bau et al., 2022; Giurge et al., 2021)

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- We evaluate immediate (1-month) and 10-month impacts:
 - ▶ Main: perceived stress, depression, SWB, COVID-19 health behavior
 - ▶ Additional: food insecurity, parental (time) investment, vaccination take-up, economic preferences.
- We find that the intervention led to significant improvements in mental health ten months post-intervention:
 - ▶ reduction of 20% in the prevalence of moderate and severe stress
 - ▶ reduction of 33% in prevalence of depression
 - ▶ positive impacts on household food security and time invested in homeschooling of children

Related literature

- Covid-19 and mental health: Afridi et al. (2021); Altindag et al. (2021); Guintella et al. (2021); Sadish et al. (2021); Adams-Prassl et al. (2020); Hamermesh (2020); Bau et al. (2021).
- Psychological interventions: Singla et al. (2017); Rahman et al. (2019); Blattman et al. (2017); Baranov et al. (2020); Haushofer et al. (2020); Islam et al. (2021)
- Mental health & economic outcomes: Ridley et al. (2020); Adhvaryu et al. (2019); Persson & Rossin-Slater (2018); Currie & Stabile (2006)

The context: Bangladesh

- Over 1.5 million infections, 27 thousand deaths (underestimated)
 - ▶ Lockdown in 2020: Mar 26 - May 31; Lockdown in 2021: Apr 05 - Aug 10
 - ▶ 90% rural households are food insecure (Ahmed, 2021)
 - ▶ Schools closed for 543 days until Sept 11, 2021.

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- Working women
 - ▶ 90% working women are in informal sector (93% in rural)
 - ▶ Of all, 40% have no earnings, rely on husband/family income
- Impact on women, mostly rural
 - ▶ 49% rural women don't feel safe during lockdown (UN, 2021)
 - ▶ Unpaid and domestic care by women ↑33%
 - ▶ 43% women are unaware of basic health facilities at local clinics
 - ▶ Mostly rely on information from husbands or other family
 - ▶ 16 million fully vaccinated - 44% female

The telecounseling intervention

Domains & modules

- Collaborated with a local organization (GDRI) to deliver 'telecounseling' to rural women in Khulna division, Bangladesh
 - ▶ 94% rural households own at least 1 basic mobile phone (BDHS, 2017)

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- Collaborated with a local organization (GDRI) to deliver 'telecounseling' to rural women in Khulna division, Bangladesh
 - ▶ 94% rural households own at least 1 basic mobile phone (BDHS, 2017)
- Four telecounseling sessions, across 3 months
 - ▶ Informational + emotional support (awareness, coping with stress, self and childcare, and importance of communication)
 - ▶ Delivered by female para-counselors (graduates of public health, psychology, or social sciences)
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- More general guidelines from Singla et al. (2017)
 - ▶ targeting 4 psychological domains (behavioral, interpersonal, emotional, cognitive) that contribute to better mental health

Sampling

Map

Balance: individual

Balance: household

Balance: baseline outcomes

- GDRI directory for sampling
 - ▶ randomly selected roughly 2,650 phone numbers that belong to women, one per household

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- 2,402 (across 357 villages, 50 unions) enrolled and participated
 - ▶ 114 numbers were switched off, invalid, never answered
 - ▶ 2,533 could be reached and were invited, 2,402 (95%) agreed.

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Sampling

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Balance: individual

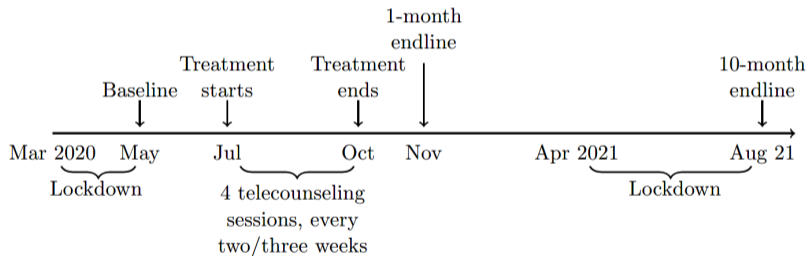
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 - ▶ 2,533 could be reached and were invited, 2,402 (95%) agreed.
- 1,299 randomly assigned to treatment, remaining to no treatment
- Data collection: baseline, 1-month and 10-month endlines.
- Stress (Cohen's PSS scale), depression (CES-D-10 scale), food security (Ballard's FIES scale), parental input (Strayhorn & Weidman)
- Pre-registered at AEA RCT Registry (AEARCTR-0005948)

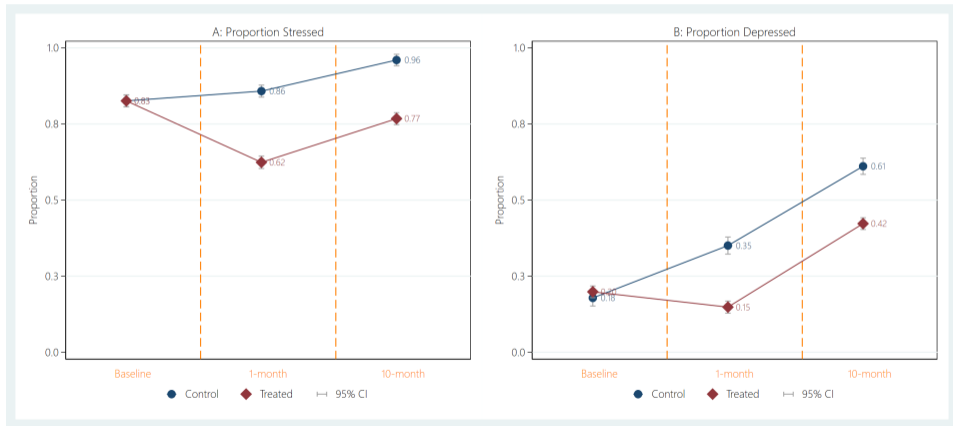
Timeline

Photos



Treatment improved mental health

Distributions



Empirical strategy

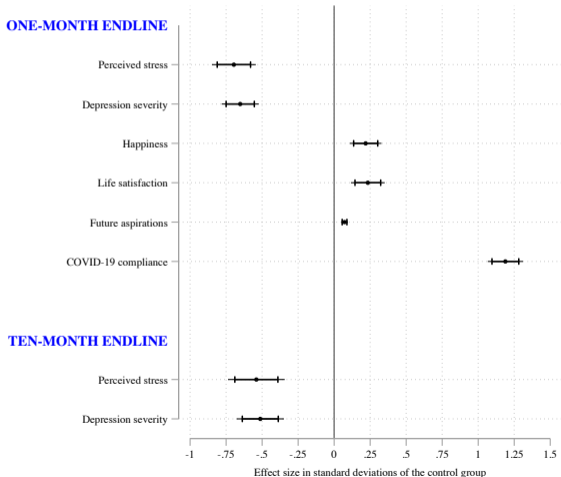
$$Y_{1ij} = \beta_0 + \beta_1 \text{Treat}_{ij} + \beta_2 Y_{0ij} + \Gamma' X_{ij} + \theta_j + \epsilon_{ij} \quad (1)$$

- Y are standardized outcomes, such that control group has mean 0 and SD 1
- $Treat$ is an indicator for treatment group
- X is a vector of controls (age, education, income, etc.)
- θ is union council FE, so comparisons are between households in the same union
- Standard errors clustered at village level

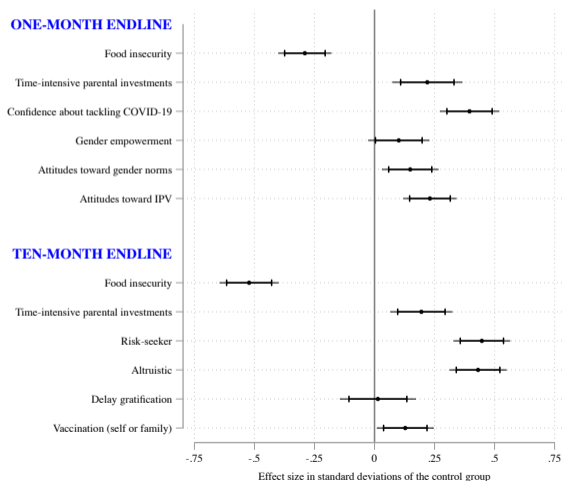
- β_1 can determine where the mean of the treatment group lies in the distribution of the control group in terms of SD

Treatment effects: mental health outcomes

Table 1



Treatment effects: additional outcomes Table 2



Heterogeneity by Baseline Stress

| Dependent variables | PSS dummy | | PSS continuous | |
|--|----------------------|----------------------|----------------------------|----------------------------|
| | Below median | Above median | Coefficient on interaction | Coefficient on interaction |
| | (1) | (2) | (3) | (4) |
| A: 1-month Endline | | | | |
| A.1. Mental health outcomes[§] | | | | |
| Perceived stress | -0.548*** (0.072) | -0.837*** (0.082) | -0.256*** (0.098) | -0.027** (0.011) |
| Depression severity | -0.538*** (0.059) | -0.752*** (0.072) | -0.210** (0.086) | -0.016* (0.009) |
| A.2. Secondary outcomes | | | | |
| Happiness | 0.116** (0.056) | 0.305*** (0.064) | 0.167** (0.082) | 0.006 (0.010) |
| Life satisfaction | 0.147** (0.058) | 0.313*** (0.067) | 0.134 (0.083) | 0.013 (0.010) |
| Future aspirations | 0.335*** (0.058) | 0.393*** (0.064) | 0.060 (0.085) | 0.006 (0.010) |
| COVID-19 Compliance | 1.098*** (0.065) | 1.267*** (0.068) | 0.173** (0.086) | 0.008 (0.010) |

Robust SE clustered at the village level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Robustness

- Attrition Attrition
- Social Desirability Bias SDB check 1 SDB check 2
- Multiple Hypotheses Testing

Potential mechanisms

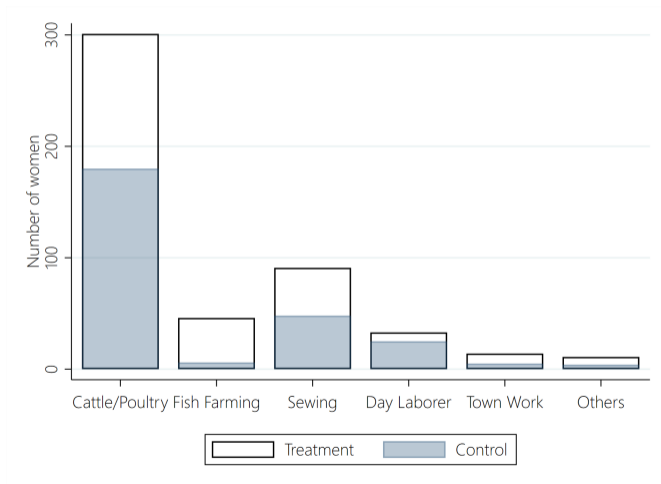
Advice table

| VARIABLES | Followed advice (1) | Followed advice (=1) (2) | Borrowing ↑ (3) | Contacted public offices (4) | Husband's work ↑ (5) | New income generating actv. (6) |
|--------------------|-------------------------------|------------------------------------|---------------------------|--|--------------------------------|---|
| Treatment | 2.083*** (0.130) | 0.368*** (0.025) | 0.098*** (0.023) | 0.012 (0.013) | 0.007 (0.007) | 0.137*** (0.028) |
| Control mean | 0.827 [1.173] | 0.419 [0.494] | 0.231 [0.421] | 0.069 [0.254] | 0.021 [0.145] | 0.261 [0.439] |
| All other controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Union council FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 2,254 | 2,254 | 2,254 | 2,254 | 2,254 | 2,254 |
| R-squared | 0.318 | 0.221 | 0.071 | 0.038 | 0.064 | 0.091 |

Robust standard errors clustered at the village level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

New income generating activities



Conclusion

- Our low-cost (\$14), over-the-phone intervention leads to large and sustained improvements in stress and depression severity

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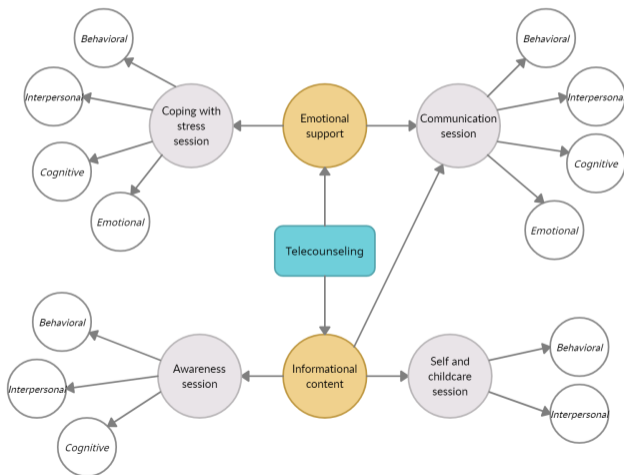
- Our low-cost (\$14), over-the-phone intervention leads to large and sustained improvements in stress and depression severity
- What explains effectiveness?
 - ▶ Timing (high stress period)
 - ▶ Lack of alternative resources
 - ▶ Multifaceted approach

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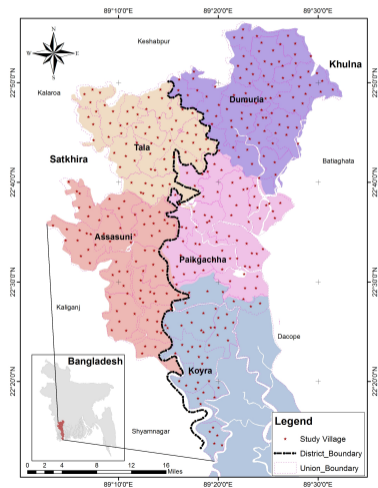
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- What explains effectiveness?
 - ▶ Timing (high stress period)
 - ▶ Lack of alternative resources
 - ▶ Multifaceted approach
- More evidence is needed to understand better greater applicability in other contexts

Psychological domains & session modules

Sampling



Map of the study area Sampling



Baseline respondent characteristics Sampling

| | Pooled Mean (Std. Dev.) | Control Mean (Std. Dev.) | Treatment Mean (Std. Dev.) | T-test p-values | RI-test p-values |
|--|----------------------------|-----------------------------|-------------------------------|--------------------|---------------------|
| Age of respondent | 35.51 (9.51) | 35.73 (9.37) | 35.32 (9.49) | 0.253 | 0.288 |
| Education of respondent | 8.39 (2.67) | 8.32 (2.59) | 8.44 (2.73) | 0.237 | 0.253 |
| Household chores increased* | 0.26 (0.44) | 0.26 (0.44) | 0.26 (0.44) | 0.736 | 0.778 |
| Someone helps with household chores* | 0.49 (0.50) | 0.50 (0.50) | 0.48 (0.50) | 0.338 | 0.346 |
| Trusts neighbors* | 0.22 (0.41) | 0.23 (0.42) | 0.21 (0.41) | 0.157 | 0.204 |
| COVID-19 perceptions | 0.63 (0.16) | 0.63 (0.16) | 0.63 (0.17) | 0.587 | 0.604 |
| Worried about: well-being of family* | 0.50 (0.50) | 0.51 (0.50) | 0.49 (0.50) | 0.263 | 0.295 |
| Worried about: providing food to family* | 0.75 (0.43) | 0.74 (0.44) | 0.76 (0.43) | 0.240 | 0.248 |
| Worried about: income* | 0.81 (0.39) | 0.81 (0.39) | 0.82 (0.39) | 0.616 | 0.652 |
| Worried about: well-being of relatives* | 0.18 (0.39) | 0.19 (0.39) | 0.17 (0.38) | 0.197 | 0.228 |
| Afraid of contracting coronavirus | 8.09 (2.16) | 8.20 (2.15) | 8.00 (2.17) | 0.026 | 0.034 |
| Scared of: socializing* | 0.86 (0.34) | 0.87 (0.34) | 0.86 (0.35) | 0.599 | 0.677 |
| Scared of: home visitors* | 0.96 (0.19) | 0.97 (0.18) | 0.96 (0.19) | 0.572 | 0.574 |
| Scared of: going outside* | 0.97 (0.16) | 0.97 (0.18) | 0.98 (0.15) | 0.209 | 0.185 |
| Feeling: anxious* | 0.74 (0.44) | 0.74 (0.44) | 0.74 (0.44) | 0.931 | 0.973 |
| Feeling: lonely* | 0.23 (0.42) | 0.22 (0.41) | 0.25 (0.43) | 0.086 | 0.132 |
| Feeling: hopeless* | 0.50 (0.50) | 0.51 (0.50) | 0.50 (0.50) | 0.757 | 0.817 |
| Feeling: worthless* | 0.10 (0.09) | 0.10 (0.08) | 0.10 (0.09) | 0.946 | 0.944 |
| Sample Size | 2,402 | 1,103 | 1,299 | - | - |

Baseline household characteristics

Sampling

| | Pooled Mean (Std. Dev.) | Control Mean (Std. Dev.) | Treatment Mean (Std. Dev.) | T-test/CS-test p-values | Rt-test p-values |
|-----------------------------------|----------------------------|-----------------------------|-------------------------------|----------------------------|---------------------|
| Age of spouse | 38.14 (8.00) | 38.23 (7.99) | 38.03 (7.92) | 0.502 | 0.566 |
| Education of spouse | 8.14 (3.35) | 8.10 (3.40) | 8.18 (3.30) | 0.522 | 0.541 |
| Number of household members | 4.39 (1.37) | 4.35 (1.27) | 4.43 (1.44) | 0.108 | 0.117 |
| Monthly household income | 9,218 (6,974) | 9,189 (6,544) | 9,243 (7,321) | 0.824 | 0.855 |
| Experienced income loss* | 0.94 (0.25) | 0.93 (0.26) | 0.94 (0.23) | 0.197 | 0.214 |
| Experienced complete income loss* | 0.59 (0.49) | 0.58 (0.49) | 0.60 (0.49) | 0.375 | 0.400 |
| Number of children under five | 0.56 (0.74) | 0.56 (0.73) | 0.56 (0.74) | 0.788 | 0.822 |
| Occupation | - | - | - | 0.375 | 0.625 |
| Farmer* | 0.17 (0.38) | 0.19 (0.39) | 0.16 (0.36) | - | - |
| Farming Day laborer* | 0.10 (0.30) | 0.11 (0.31) | 0.10 (0.30) | - | - |
| Non-Farming Day Laborer* | 0.33 (0.47) | 0.31 (0.46) | 0.34 (0.48) | - | - |
| Business* | 0.23 (0.42) | 0.22 (0.42) | 0.24 (0.43) | - | - |
| Public Service* | 0.03 (0.18) | 0.03 (0.17) | 0.04 (0.18) | - | - |
| Private Service* | 0.04 (0.21) | 0.05 (0.22) | 0.04 (0.19) | - | - |
| Other* | 0.09 (0.28) | 0.09 (0.29) | 0.08 (0.27) | - | - |
| Sample Size | 2,402 | 1,103 | 1,299 | - | - |

Baseline outcomes

Sampling

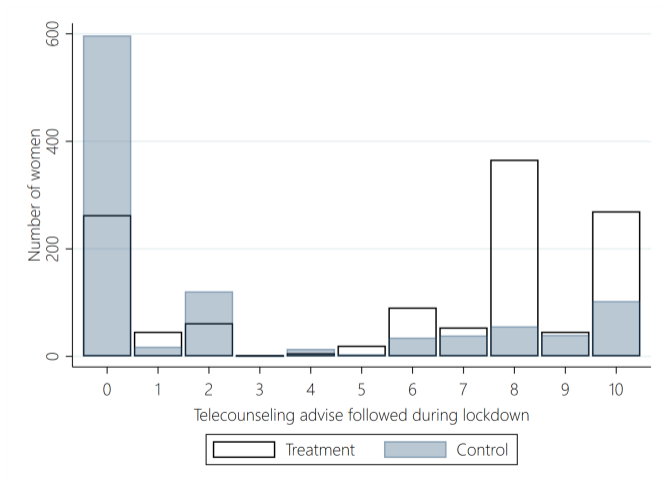
| | Pooled Mean (<i>Std. Dev.</i>) | Control Mean (<i>Std. Dev.</i>) | Treatment Mean (<i>Std. Dev.</i>) | T-test p-values | RI-test p-values |
|---|--|---|---|----------------------------------|-----------------------------------|
| Perceived stress scale score | 17.22 (4.37) | 17.22 (4.29) | 17.21 (4.43) | 0.935 | 0.945 |
| Stressed* | 0.83 (0.38) | 0.83 (0.38) | 0.83 (0.38) | 0.995 | 1.00 |
| Compliance with COVID-19 precautionary measures | 0.53 (0.26) | 0.53 (0.25) | 0.53 (0.26) | 0.697 | 0.742 |
| Food insecurity ($0 \leq FIES \leq 1$) | 0.63 (0.26) | 0.62 (0.27) | 0.64 (0.25) | 0.050 | 0.088 |
| Sample Size | 2,402 | 1,103 | 1,299 | - | - |

Paracounselors

Timeline



Suggestions followed

[Back to table](#)

Treatment improved mental health

Effect over time

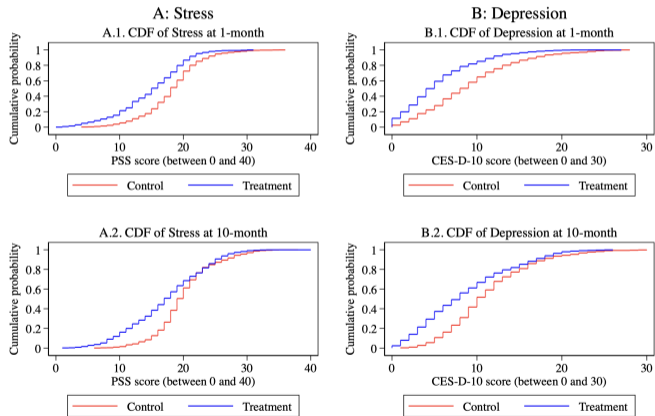


Table 1: treatment effects Coefplot

| Dependent variables | 1-month endline | | | | 10-month endline | | | |
|----------------------------------|----------------------|----------------------|-------------|---------------|----------------------|----------------------|-------------|---------------|
| | Without covariates | With covariates | RI p-values | FWER p-values | Without covariates | With covariates | RI p-values | FWER p-values |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| A. Mental health outcomes | | | | | | | | |
| Perceived stress | -0.712*** (0.061) | -0.696*** (0.059) | 0.000 | 0.000 | -0.576*** (0.077) | -0.551*** (0.075) | 0.001 | 0.000 |
| Stressed* (=1 if stressed) | -0.229*** (0.023) | -0.220*** (0.022) | 0.001 | 0.000 | -0.202*** (0.018) | -0.195*** (0.018) | 0.000 | 0.000 |
| Depression severity | -0.638*** (0.052) | -0.652*** (0.050) | 0.001 | 0.000 | -0.525*** (0.065) | -0.513*** (0.063) | 0.000 | 0.000 |
| Depressed* (=1 if depressed) | -0.200*** (0.026) | -0.207*** (0.025) | 0.001 | 0.000 | -0.193*** (0.030) | -0.191*** (0.029) | 0.001 | 0.000 |
| B. Secondary outcomes | | | | | | | | |
| Happiness | 0.232*** (0.045) | 0.219*** (0.042) | 0.001 | 0.000 | - | - | - | - |
| Life satisfaction | 0.240*** (0.047) | 0.234*** (0.045) | 0.001 | 0.000 | - | - | - | - |
| Future aspirations | 0.390*** (0.046) | 0.374*** (0.044) | 0.001 | 0.000 | - | - | - | - |
| Covid-19 compliance | 1.187*** (0.048) | 1.189*** (0.048) | 0.001 | 0.000 | - | - | - | - |
| Observations | 2,220 | 2,220 | - | - | 2,254 | 2,254 | - | - |

Robust standard errors clustered at the village level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2: treatment effects on additional outcomes Coeplot 2

| Dependent variables | 1-month endline | | | | 10-month endline | | | |
|---|----------------------|----------------------|----------------------------|------------------------------|----------------------|----------------------|----------------------------|------------------------------|
| | Without covariates | With covariates | (2)-RI <i>p</i> -values | (2)-FWER <i>p</i> -values | Without covariates | With covariates | (6)-RI <i>p</i> -values | (6)-FWER <i>p</i> -values |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Food insecurity [‡] | -0.310*** (0.042) | -0.276*** (0.041) | 0.000 | 0.000 | -0.537*** (0.045) | -0.520*** (0.047) | 0.001 | 0.000 |
| Time-intensive parental investments | 0.227*** (0.055) | 0.220*** (0.057) | 0.001 | 0.000 | 0.232*** (0.050) | 0.192*** (0.049) | 0.000 | 0.000 |
| Confidence about tackling Covid-19 | 0.394*** (0.050) | 0.396*** (0.048) | 0.001 | 0.000 | - | - | - | - |
| Gender empowerment | 0.128** (0.050) | 0.101** (0.049) | 0.041 | 0.033 | - | - | - | - |
| Attitudes toward gender norms | 0.173*** (0.047) | 0.149*** (0.046) | 0.001 | 0.006 | - | - | - | - |
| Attitudes toward IPV | 0.250*** (0.044) | 0.231*** (0.043) | 0.001 | 0.000 | - | - | - | - |
| Risk-seeking | - | - | - | - | 0.441*** (0.043) | 0.432*** (0.044) | 0.001 | 0.000 |
| Altruistic | - | - | - | - | 0.456*** (0.044) | 0.432*** (0.045) | 0.000 | 0.000 |
| Delay gratification | - | - | - | - | 0.017 (0.060) | 0.003 (0.060) | 0.954 | 0.959 |
| Covid-19 vaccination (=1 if vaccinated) | - | - | - | - | 0.059*** (0.018) | 0.058*** (0.018) | 0.004 | 0.014 |
| Observations | 2,220 | 2,220 | - | - | 2,254 | 2,254 | - | - |

Robust standard errors clustered at the village level are in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Social desirability bias Conclusion

| VARIABLES | Perceived stress | | Depression | | Food insecurity | | Child investment | |
|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|---------------------|
| | Endline 1 | Endline 2 | Endline 1 | Endline 2 | Endline 1 | Endline 2 | Endline 1 | Endline 2 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Treatment | -0.688*** (0.100) | -0.468*** (0.123) | -0.670*** (0.090) | -0.413*** (0.093) | -0.445*** (0.080) | -0.457*** (0.083) | 0.232** (0.102) | 0.316*** (0.090) |
| SDB Score | -0.001 (0.011) | 0.028** (0.013) | -0.013 (0.011) | 0.028** (0.011) | -0.009 (0.010) | 0.021** (0.009) | 0.016 (0.012) | 0.015 (0.011) |
| Treatment×SDB Score | 0.002 (0.016) | -0.016 (0.018) | 0.006 (0.013) | -0.019 (0.015) | 0.031** (0.013) | -0.012 (0.013) | -0.002 (0.015) | -0.023* (0.014) |
| All other controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Union council FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 2,124 | 2,254 | 2,124 | 2,254 | 2,124 | 2,254 | 1,724 | 1,978 |
| R-squared | 0.201 | 0.160 | 0.197 | 0.190 | 0.162 | 0.194 | 0.099 | 0.149 |

Robust standard errors clustered at the village level are in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Social desirability bias: other 1-month Conclusion

| VARIABLES | Happiness | Life satisfaction | Future aspirations | COVID-19 compliance | COVID-19 confidence | Gender empowerment | Gender norms | IPV |
|---------------------|-------------------|-------------------|---------------------|---------------------|---------------------|--------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Treatment | 0.109 (0.085) | 0.108 (0.086) | 0.378*** (0.078) | 1.117*** (0.087) | 0.301*** (0.080) | 0.127 (0.090) | 0.291*** (0.097) | 0.416*** (0.080) |
| SDB Score | -0.010 (0.011) | -0.014 (0.011) | 0.005 (0.010) | -0.003 (0.010) | 0.001 (0.010) | 0.005 (0.011) | 0.015 (0.011) | 0.010 (0.010) |
| Treatment×SDB Score | 0.018 (0.014) | 0.021 (0.013) | -0.002 (0.012) | 0.011 (0.013) | 0.016 (0.011) | -0.004 (0.014) | -0.024 (0.015) | -0.031** (0.013) |
| All other controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Union council FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 2,124 | 2,124 | 2,124 | 2,124 | 2,124 | 2,124 | 2,124 | 2,124 |
| R-squared | 0.114 | 0.107 | 0.130 | 0.332 | 0.152 | 0.075 | 0.076 | 0.101 |

Robust standard errors clustered at the village level are in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Attrition

Conclusion

- From baseline to 1-month: 7.6% (2.1pp higher in control)
- Not differential by baseline characteristics
- Re-estimate effect using inverse probability weighting and Lee bounds.
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- 88% of 2,402 never attrited; 2.2% always attrited Frequency of attrition
- High session attendance of 98% Session attendance

Frequency of attrition at endlines Attrition

| | Treatment | | Control | | Total | |
|-------------------------------------|--------------|------------|--------------|------------|--------------|------------|
| | N | % | N | % | N | % |
| (1) Never attrited at any endline | 1,165 | 89.68 | 959 | 86.94 | 2,124 | 88.43 |
| (2) Attrited at both endlines | 25 | 1.92 | 27 | 2.45 | 52 | 2.16 |
| (3) Attrited at endline 1 but not 2 | 61 | 4.70 | 69 | 6.26 | 130 | 5.41 |
| (4) Attrited at endline 2 but not 1 | 48 | 3.70 | 48 | 4.35 | 96 | 4.00 |
| Total | 1,299 | 100 | 1,103 | 100 | 2,402 | 100 |

Session attendance

Conclusion

| | <u>No. of participants</u> | <u>% of 1,299</u> |
|------------------------------------|----------------------------|-------------------|
| All four sessions | 1,248 | 96.07 |
| Three sessions | 1,252 | 96.38 |
| Two sessions | 1,261 | 97.07 |
| One session | 1,272 | 97.92 |
| Did not participate in any session | 27 | 2.08 |
| Total participants | 1,299 | - |
