

Pre-Analysis Plan

Educational inequality and parental involvement during the COVID-19 pandemic: Randomized controlled experiment of a tele-mentoring program in rural Bangladesh*

Hashibul Hassan[†] Asad Islam[‡] Abu Siddique[§] Liang Choon Wang[¶]

21 September 2020

Abstract

In this document, we provide the research design and outcome analysis plan for the impact evaluation of a weekly tele-mentoring program in rural South-West Bangladesh. The program is delivered by university students to elementary school-aged children and their parents for a 12-week period over the phone. Due to prolonged school closure during the COVID-19 pandemic, a significant portion of children is missing out on a range of educational input, especially if they lack access to the necessary educational technology or their parents do not have the ability, confidence, motivation, or skills to engage in their education. In this context, we examine whether the tele-mentoring program (i) improves children’s cognitive skills, (ii) increases parental engagement in children’s educational and other activities, (iii) changes children’s social preferences, and (iv) affects parents’ perception about their parenting ability and style.

JEL: C93, I21, I24, P46

Keywords: Mentoring, Tele-mentoring, COVID-19, Impact Evaluation, Randomized Experiment, Bangladesh, Rural Children, Primary Education.

1 Motivation

Due to prolonged school closure during the COVID-19 pandemic, many countries adopted online education and home-schooling measures to help address their educational challenges. However, children, particularly those coming from a low socio-economic background, may find learning difficult due to the lack of informational technological resources and effective educational guidance or support at home. Parents may not necessarily have the ability, confidence, motivation, or skills to help with their children’s learning and to guide them through the school curriculum.

*Ethical clearance for this project was received from Monash University, Australia (Project no. 25039).

[†]Monash University, Australia. Email: md.hassan@monash.edu

[‡]Centre for Development Economics and Sustainability (CDES) and Department of Economics, Monash University, Australia. Email: asadul.islam@monash.edu

[§]Economics Group, Technical University of Munich, Germany. Email: a.siddique@tum.de

[¶]Department of Economics, Monash University, Australia. Email: Liang.C.Wang@monash.edu

Parental beliefs about the best way to engage in their children’s education may also be incorrect. One potentially useful and low-cost approach to mitigate these problems is to utilize recent graduates who are not working otherwise or current university students as (tele)mentors to provide parents and children with guidance, support, and mentoring services in relation to the children’s learning via telephone.^{1,2} These mentors can teach students directly as well as mentor and support parents to help improve their ability, skills, and confidence in engaging in their children’s education and facilitating their learning at home. Having regular phone meetings with parents and children may also serve as a useful device to motivate both children and parents to follow through the curriculum. Thus, with the support from the mentors, parental engagement in their children’s education may become stronger and their children’s educational outcomes may become better than they would have otherwise. We consider this type of program as low-tech solution i.e. low-cost, does not require online access, and uses the basic mobile phone which is accessible to (almost) all households in Bangladesh. Hence, this type of program has the potential to be adopted beyond the pandemic period and in developing countries where first generation learners constitute a major segment of their student population.

2 Background

In Bangladesh, because schools are closed under the COVID-19 lockdown and most children do not have internet access, the government is using a public broadcasting organization to provide prerecorded education programs via television to deliver education to children. Education programs totaling 100 minutes per day are allocated for children in grade 1 to grade 5 to facilitate their learning at home. However, these programs are not accessible to more than half of the children in rural Bangladesh because only 44% of households in rural Bangladesh own a television [1].

Since the shutdown of educational institutions on 18 March 2020, the learning of rural Bangladeshi children now depends heavily on their parental input. In general, higher parental involvement can lead to better student learning [2, 3, 4, 5, 6]. But, parents often do not know the best approach to engage with their children’s learning at home. As a result, parental involvement is not evenly distributed across households. However, past studies suggest that it is possible to increase parental involvement through nudges, such as providing short and simple tips, texts, take-home report cards, emails, calls, or short in-person meetings, etc. In line with this previous research, we plan to provide a weekly tele-mentoring intervention to children in rural Bangladesh, where the intervention is delivered by current university students in Bangladesh, and evaluate the effectiveness of the intervention.

The tele-mentoring program may also ameliorate the adverse impact of the pandemic on gender inequality. In Bangladesh, girls disproportionately share household chores and suffer from domestic abuse in normal times. These burdens may worsen further under the COVID-19 lock-down. Hence, the differences in learning as well as parental input between children of different genders and socio-economic backgrounds will likely exacerbate due to the COVID-19

¹Mobile phone is commonly available for all households in Bangladesh. According to MICS 2019, 94.2% of total rural households has the access to basic mobile phone [1].

²These university students are currently staying at home as there are also no face-to-face classes at universities.

lock-down. We plan to measure this gender (in)equality in parental involvement in the context of rural Bangladesh during the pandemic and the effect of the tele-mentoring program in this regard.

3 Intervention and Research Design

3.1 The Tele-mentoring Intervention and Sample

In the tele-mentoring program, current university students and recent graduates from various educational institutions serve as a mentor for a maximum of two children over a 12-week period.³ They make a weekly 30-minute phone call at a pre-determined time of the day. As the children in this tele-mentoring program are primary graders, mentors mostly call, discuss and interact with the parents (mothers) to provide them with guidance and support. However, children accompany their parents during each mentoring session.⁴ The tele-discussion covers direct tutoring of mentee’s curriculum, weekly goal setting for the parents (involvement time, study target), parenting assistance (solving textbook problems, idea for better psychological, emotional and social involvement, mental health support, etc.), and general counseling.⁵ We have provided all relevant textbooks and solutions (all digital versions) and training using online platforms to the mentors before the program begins. Beside the direct phone calls by the mentors, there will also be a text message campaign (1 text message per week), which basically nudges the parents further to follow the mentor’s advices and guidelines.

We use a randomized controlled experiment to measure the effectiveness of this tele-mentoring intervention. To conduct this trial, we collaborate with a local research-focused NGO, Global Development and Research Initiative (GDRI). GDRI recently completed a randomized controlled experiment on early childhood education in south-western Bangladesh, which was funded by UK ESRC-DFID research grants (AEA registry number: AEARCTR-0002356). More than 6000 children participated in that program in various experimental arms. In the first phase of this present tele-mentoring project, 1047 parents-child pairs from the past project were randomly selected and interviewed. We have selected 840 who showed interest and willing to participate in the program for next three months. Half of these 840 parent-child pairs are randomly assigned to receive the intervention, while the rest serves as the control group.^{6,7} We have assessment results of these children and survey data about the household’s socioeconomic status and parents’ involvement and interaction with their children from the project. Section 3.5 depicts that characteristics of treatment and control groups are balanced.

In July 2020, we launched a Facebook group to buildup communication between the research team and mentors. We circulate our flyers in various universities’ pages and socio-cultural

³The mentors are primarily undergraduate students. 32 out of the 210 mentors are graduate students.

⁴In a small number of cases where both parents are illiterate, the mentor will provide an alternative older household member with guidance and support

⁵81% of the parents of our sample have at least primary education, which means if they provided with tutoring support and motivation they could tutor their children.

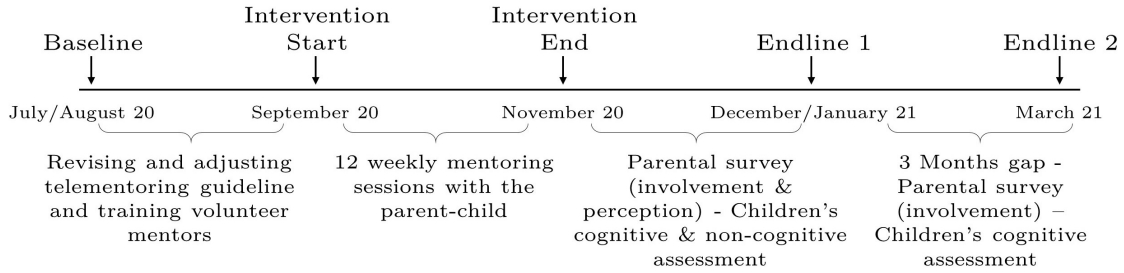
⁶Note, we have selected only one child from each household who participated in the project.

⁷To calculate the sample size, we assume three alternative effect size of 0.20SD, 0.25SD and 0.30SD. In Botswana during COVID-19, Angrist et al. [7] have found 0.29SD effect of a similar program with shorter duration. To achieve this range of effect with 80% statistical power, 176 to 394 observations are required in each arm. Therefore, we keep all 840 eligible families in the experiment.

groups. Finally, we got 219 registered mentors from 22 different educational institutions from various parts of the country. In August 2020, we have conducted an online survey over mentors to know their personality traits, academic results, economic status and mentoring or tutoring experiences. After the survey, we randomly match 210 mentors with their 420 mentees using a random number generated by the computer. Mentors’ average age is 21.69 years, 51% of the mentors are female, 80.48% is from Business discipline and 62.86% is from an urban background. More detail descriptive information is given in Tabel B1 of Appendix B. Moreover, in Table B2, correlations between the ability of the mentors and mentees are presented, which indicates no such correlations exist.

Upon program completion, there will be two endlines. In endline 1, we will survey the parents to understand their involvement in their children’s education and as well as their perception about parental engagement. Furthermore, after one month from the program’s end date, we will assess the children to measure their cognitive and non-cognitive (social preferences) outcomes and examine the effects of treatment on these outcome variables. In endline 2, we will survey the parents again to know their involvement in children’s education and assess the children only in the cognitive domain.⁸ Figure 1 depicts the time line of this project.

Figure 1: Intervention Timeline



3.2 Data

3.2.1 Surveys and assessments

Children and their parents were surveyed in 2017 and 2019 as part of the previous project. These surveys collected information about demographics, income, employment status, household asset composition, livelihood, and parental involvement, etc. As part of the evaluation of the previous project, these children were assessed in 2017, 2018 and 2019. The assessment tests consisted of various domains, such as language, literacy, numeracy, fine & gross motor skills, problem solving, personal-social domain, working memory, self-regulation, etc. We use the survey and assessment data collected in 2019 to test whether characteristics of treatment and control groups are balanced at baseline of the current project.

For the purpose of this project, we also conducted an over-the-phone rapid survey to collect a range of information about children’s educational situation, household’s private educational

⁸There are four outcomes of this intervention discussed in Section 3.2.2, two primary and two secondary. Primary outcomes will be assessed in both endline 1 and 2, while secondary outcomes will be measured in endline 1 only as these outcomes are related to perception and preferences that is not expected to change in such a short span of time.

investment and household’s access to (information) technology in August 2020. The information allows us to select households that match the eligibility criteria (grade level) and performs additional tests of balance. The tele-mentoring intervention begins on September 4, 2020.

During the intervention period, we would also collect some key information from the mentors, such as their perception about mentee and their family, their motivation in mentoring, weekly input of mentoring in minutes etc. Furthermore, mentors will complete an exit survey immediate after the intervention ends. We would use this information in heterogeneity and mediation analysis of the outcome.

The end-line data will be collected between December 2020 and March 2021 (see Figure 1). The end-line survey will collect information about parental involvement and perception about parental engagement, parent-child interactions, parental inputs, children’s time use, familiarity of parents with children’s know-how, etc. through an in-depth over-the-phone interview with structured questionnaires. This survey will be repeated in March 2021 to observe whether the effects of the intervention persist or not.

In January 2020, we will conduct an over-the-phone assessment with the children in the sample. The assessment consists of a cognitive ability test based on the children’s respective curriculum. We will also conduct a social preference experiment over the phone to obtain measures (distributive choices) of children’s social preferences.⁹Next section outlines these outcomes in more detail.

3.2.2 Outcome Variables

There are two primary outcomes and two secondary outcomes.

Primary Outcome Variables

1. Children’s Cognitive Ability: Children’s cognitive ability will be measured using standard assessment test based on the national curriculum of Bangladesh. The assessment test would consist of questions related to literacy (reading, vocabulary & speaking in Bangla and English) and numeracy. Due to the pandemic and the uncertainty regarding when it is safe to conduct face-to-face interview and assessment, the assessment will be conducted over the phone. The test totals 100 points which are divided equally between literacy and numeracy. The answers are in binary form. One sample question is provided in the Appendix A. The test covers the following areas:

(a) Literacy

- Knowledge of letters and words e.g., spelling, word meanings, etc. [Bangla and English]
- Understanding of English dialogue and finding information from the English paragraph

⁹We expect this tele-mentoring intervention to have an impact on children’s social preferences due to the potential belief transmission from mentors to mentees. Mentors provide the service on a voluntary basis, which has been explicitly explained to the participating parents and children. It is possible that after benefiting from the pro-social service delivered by the mentors, children may become more pro-socially motivated in making distributive decisions.

- Listening story and finding information from the story [Bangla and English]
- Basic vocabulary [Bangla and English]

(b) Numeracy

- Concept of numbers
- Concept of addition, subtraction, division and multiplication
- Measurements (e.g., length, weight, time, etc.) and basic geometry (e.g., point, line, shapes, etc.)
- Monetary transaction related ideas

To examine the effect of treatment on cognitive ability, we will construct two outcome variables: test score (continuous; $Y_i^{cog} \in [0, 100]$), and an indicator of high test performance (1 if $Y_i^{cog} \geq$ median test score).

2. Parental Involvement: Parental involvement in children’s educational and non-educational activities will be measured by asking the following questions to the mother:

- (a) How much time (hours) in various academic activities (i.e., writing, reading, storytelling, mathematics, etc.) do you give to your child each week? Total hours spent in various academic activities will be used as an outcome variable (continuous; $Y_i^{PIh} \in [0, Y_{max}^{PIh}]$) for parental involvement in children’s academic activities. Moreover, an indicator variable will be constructed (1 if $Y_i^{PIh} \geq$ median hours given in academic activities) and used as additional outcome variable.
- (b) How much time (5-point Likert-scale response; ‘none’ to ‘a great deal’; $Y_i^{PIc} \in \{1, 2, 3, 4, 5\}$) in various academic activities do you give to your child each week? The response will be re-coded as a dummy variable.
- (c) How much time (hours) in various non-academic activities (i.e. discussion, leisure time activities, etc.) do you give to your child each week? Similar to academic activities, total hours spent in various non-academic activities will be used as an outcome variable. This outcome variable will be continuous and $Y_i^{PIh'} \in [0, Y_{max}^{PIh'}]$. Moreover, an indicator variable will be constructed (1 if $Y_i^{PIh'} \geq$ median hours given in non-academic activities) and used as additional outcome variable.
- (d) How much time (5-point Likert-scale response; ‘none’ to ‘a great deal’; $Y_i^{PIc'} \in \{1, 2, 3, 4, 5\}$) in various non-academic activities do you give to your child each week? The response will be re-coded as a dummy variable.
- (e) Aggregate parental involvement - how much time (hours) given to the children in all kind of activities (i.e. educational and non-educational)? Total hours spent in various activities will be used as an outcome variable (continuous; $Y_i^{PIagg} \in [0, Y_{max}^{PIagg}]$). Moreover, an indicator of high parental involvement will be constructed (1 if $Y_i^{PIagg} \geq$ median parental involvement) and used as additional outcome variable.

1. Children’s Social Preference: Children’s social preferences will be measured using standard lab-in-the-field economic experiments but administered over the phone. We use three experiments where children make decisions as a spectator so that the experiments can be executed over-the-phone. These three tasks are related to distributive justice. The decisions made in the distributive justice experiment will not affect the earnings of the participants but have real consequences on the gift received by other children. These distributive tasks are adapted from Cappelen et al. (2020)[8] and Huppert et al. (2019) [9] with some modifications. The other children receiving the gift will be selected from schools not in the sample or locale of the study. The specific choice scenarios are as follows:

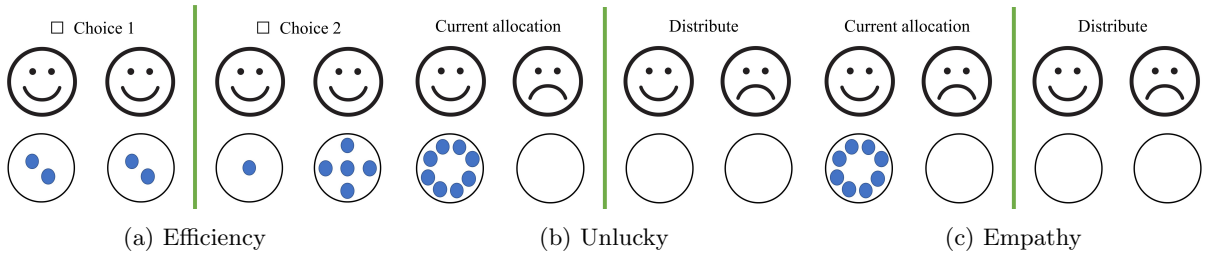


Figure 2: Distributive Choices

- (a) **Distributive preferences under efficiency condition :** In this distribution experiment, the participants will be briefed about two mutually exclusive options for distributing candies between two other children. Figure 2a depicts choice options of this task. Choice 1 represents equal distribution while choice 2 represents efficient (costly for one child) distribution as the total number of candies increases. Outcome variable for this task will be the dummy variable (0 for choice 1 and 1 for choice 2).
- (b) **Distributive preferences under unlucky condition:** Figure 2b shows the choice options of this task. Participants will be explained a current allocation (8:0) between two other children and asked either to keep the distribution or redistribute according to their choice. Participants will be further briefed that the initial distribution is skewed because one child was just unlucky in the coin toss and couldn’t win any of the candies. In this task, participants will observe a situation where one of the other children gets nothing due to bad luck. This framing will help to explore the theory of luck egalitarianism. Two outcome variables will be constructed. The first is a dummy (1 if the initial distribution altered), and the second is the number of candies redistributed ($Y_i^U \in [1, 8]$).
- (c) **Distributive preferences under empathetic condition:** Figure 2c shows the initial skewed distribution of candies as 8:0 between two other children. In this task, participants will observe a situation where one of the other children gets less due to an unlucky distribution of opportunities. This distribution is the result of the illness of one child (e.g., fever or injury), which prevented the child from participating in a task/game and led to the child’s disadvantaged distribution. Two outcome variables will be constructed. The first is a dummy (1 if the initial distribution altered), and the second is the number of candies redistributed ($Y_i^E \in [1, 8]$).

2. Parental Perception and Parenting Style: Parental perception of their involvement in their children’s educational and non-educational activities will be measured based on the following criteria:

(a) Negative parenting incidents (i.e. use of abusive words, scolding, beating, hopeless feeling about the child, etc.) in raising children. Two outcome variables will be constructed. First, by summing up dichotomous answers to the following five questions the mothers answer during the end-line survey (i.e. $\sum_{n=1}^5 Y_{i,n}^{NegP} \in [0, 5]$). Second, a dummy variable 1 if any of the answer of following five questions is yes (1 if $\sum_{n=1}^5 Y_{i,n}^{NegP} \geq 1$). The specific questions are as follows:

- (i) In the last month, did you play active role if your child is sad for any reason or just ignore him or her? [Ignore = 1; Active role = 0]
- (ii) In the last month, did you use the word ‘worthless’ to describe your child? [Yes = 1; No = 0]
- (iii) Do you believe that your child can’t do anything well in his or her life? [Yes = 1; No = 0]
- (iv) Do you believe that your child is the main reason for your unhappiness? [Yes = 1; No = 0]
- (v) In the last month, did you beat your child with a cane or other stick? [Yes = 1; No = 0]

(b) Perception about parenting ability: Parents will be asked ‘how good or bad are you in doing the following activities’ and the parents have to choose one of the five options (1-extremely bad, 2-somewhat bad, 3-neither good nor bad, 4-somewhat good or 5-extremely good). We construct an outcome variable by summing up the points of each activity ($\sum_{n=1}^{11} Y_{i,n}^{PA} \in [11, 55]$). Moreover, dummy variable will also be used (1 if $\sum_{n=1}^{11} Y_{i,n}^{PA} \geq$ median points). The activities are listed below-

- (i) Reading books and story to your child
- (ii) Helping your child to learn what words mean
- (iii) Explaining the main idea in a story or book to your child
- (iv) Providing books to your child to read
- (v) Helping your child to do elementary mathematics
- (vi) Helping your child with homework
- (vii) Helping to reinforce what your child’s teacher/mentor has taught
- (viii) Finding out about your child’s study progress
- (ix) Regulating the screen time, playing with friends, time spent outside of home, etc.
- (x) Taking your child out for leisure and walk
- (xi) Talking with your child in friendly manner

(c) Parental perception about their child’s future education. We will construct this outcome variable by summing up the answers that parents give to the following two questions:

- (i) Do you believe your child can pass the school exit examination (Secondary School Certificate Examination)? (1 if ‘yes’)
- (ii) How far do you think your child can reach in terms of educational attainment? (Higher number represents higher level of education)

(d) Parenting style: This outcome variable will be constructed using the scale based on Robinson et al. [10]. There are three sections in this scale, each section has some questions with the scoring range from “Never” to “Always” on a 5-point Likert scale. At the end of each section, the average score will be calculated, which is the score for that section. The section with the highest score indicates the parent’s preferred parenting style.

(i) Section one: Authoritative Parenting Style Questions

- I am responsive to my child’s feelings and needs.
- I take my child’s wishes into consideration before I ask him/her to do something.
- I explain to my child how I feel about his/her good/bad behavior.
- I encourage my child to talk about his/her feelings and problems.
- I encourage my child to freely “speak his/her mind”, even if he/she disagrees with me.
- I explain the reasons behind my expectations.
- I provide comfort and understanding when my child is upset.
- I compliment my child.
- I consider my child’s preferences when I make plans for the family (e.g., weekends away and holidays).
- I respect my child’s opinion and encourage him/her to express them.
- I treat my child as an equal member of the family.
- I provide my child reasons for the expectations I have for him/her.
- I have warm and intimate times together with my child.
- Score for this section $PS_1 = \frac{\sum_1^{13} SecOne_n}{13}$. Here, $PS_1 \in [1, 5]$.

(ii) Section two: Authoritarian Parenting Style Questions

- When my child asks me why he/she has to do something I tell him/her it is because I said so, I am your parent, or because that is what I want.
- I punish my child by taking privileges away from him/her (e.g., TV, games, visiting friends).
- I yell when I disapprove of my child’s behavior.
- I explode in anger towards my child.
- I spank my child when I don’t like what he/she does or says.
- I use criticism to make my child improve his/her behavior.
- I use threats as a form of punishment with little or no justification.

- I punish my child by withholding emotional expressions (e.g., kisses and cuddles).
- I openly criticize my child when his/her behavior does not meet my expectations.
- I find myself struggling to try to change how my child thinks or feels about things.
- I feel the need to point out my child's past behavioral problems to make sure he/she will not do them again.
- I remind my child that I am his/her parent.
- I remind my child of all the things I am doing and I have done for him/her.
- Score for this section $PS_2 = \frac{\sum_1^{13} SecTwo_n}{13}$. Here, $PS_2 \in [1, 5]$.

(iii) Permissive Parenting Style

- I find it difficult to discipline my child.
- I give into my child when he/she causes a commotion about something.
- I spoil my child.
- I ignore my child's bad behavior.
- Score for this section $PS_3 = \frac{\sum_1^4 SecThree_n}{4}$. Here, $PS_3 \in [1, 5]$.

(e) Confidence about parental involvement: We will construct this outcome variable by summing up the answers that parents give to the following three questions (i.e. $\sum_{n=1}^3 Y_{i,n}^{ConPI} \in [3, 30]$):

- (i) Do you enjoy teaching your child? [Rate the answer in 1 to 10 scale]
- (ii) Does your child enjoy your teaching? [Rate the answer in 1 to 10 scale]
- (iii) How capable are you in teaching your child? [Rate yourself in 1 to 10 scale]

Moreover, an indicator variable will be constructed (1 if $\sum_{n=1}^3 Y_{i,n}^{ConPI} \geq \text{median value}$) and used as additional outcome variables.

3.3 Hypotheses

The intervention is hypothesized to:

1. Improve the cognitive ability of the children.
2. Increase parental involvement in children's educational and other activities.
3. Affect children's distributive and retributive preferences, e.g., egalitarianism, empathy, fairness, etc.
4. Affect perception of parental involvement and reduce negative parenting incidents.

3.3.1 Multiple Hypotheses Testing

As we consider a range of outcomes for parents and children, we will perform tests of multiple hypotheses to correct p-values using the Westfall-Young (WY) adjustment [11], which accounts for the correlations across outcome variables using sample bootstrapping (e.g., using 1,000 and 5,000 as parameters for replications and robustness respectively).

3.4 Attrition

Due to the current COVID-19 crisis, there is potentially a high degree of attrition from the program. We plan to address potential attrition in two ways. First, we will check whether attrition and treatment status are systematically related or not through tests of differential attrition.¹⁰ Second, we will use inverse-probability-of-attrition weighting (IPAWs) and Lee bounds [12] to address the attrition if there is any.

Another related issue is partial completion, i.e., some parent-child duos may only attend some of the weeks of this tele-mentoring intervention. We will examine the number of sessions participants attended and identify participants who participate partially. This will potentially give us non-experimental but crucial evidence to understand the determinants of program completion. Using information about their program participation in each week, we can identify parents, children and their characteristics likely to benefit most from such intervention, and others who might need additional encouragement to attend and benefit from the program.

3.5 Sample Balance

We have 840 eligible and interested households randomized to take part in this tele-mentoring intervention. We randomly assigned treatment to half of them, i.e., 420 parents-child duos. The following Table 1 depicts balance on several key socioeconomic characteristics, children’s assessment scores, measures of parental involvement, and educational. These characteristics are balanced across the treatment and control groups. Moreover, we also estimate the relationships between various mentor’s and mentee’s characteristics, which is exhibited in Appendix B, to show that mentors are also randomly assigned to mentees.

Table 1: Balance Table

DV	Treatment	Control	Difference	F-test
Demography				
Child age	6.72 (0.0222)	6.727 (0.0222)	-0.0062 (0.0314)	0.8415
Child gender	0.4929 (0.0244)	0.4929 (0.0244)	0 (0.0345)	1
Father’s education	6.021 (0.209)	6.012 (0.209)	0.0095 (0.295)	0.9743
Mother’s education	6.986 (0.162)	6.729 (0.162)	0.257 (0.228)	0.2606
Family’s monthly income	11404 (253.5)	11332 (253.5)	71.90 (358.4)	0.8411
Number of sibling(s) under 15 years	0.64 (0.0314)	0.636 (0.0314)	0.0048 (0.0445)	0.9147
Value of total asset	832145 (124,316)	721515 (124,316)	110,631 (175,809)	0.5293
Children’s Assessments				
ASQ Score	262 (2.113)	258.6 (2.113)	3.357 (2.988)	0.2616
Literacy Score	16.12 (0.197)	16.24 (0.197)	-0.126 (0.278)	0.6504
Numeracy Score	14.78 (0.145)	14.75 (0.145)	0.0310 (0.205)	0.8797
Operational Span Score	12.36 (0.180)	12.71 (0.180)	-0.355 (0.254)	0.1635

¹⁰Differential attrition refers to the systematic difference in the rate of attrition across the treatment and control groups. Whereas, selective attrition occurs when the mean of baseline test scores differs, conditional on treatment status.

Table 1: Balance Table

DV	Treatment	Control	Difference	F-test
Something Same Score	10.35 (0.133)	10.65 (0.133)	-0.298 (0.188)	0.1142
Parental Involvement & perception				
Parenting - negative actions	0.371 (0.0294)	0.395 (0.0294)	-0.0238 (0.0416)	0.5672
Parenting time - education	2.307 (0.0498)	2.271 (0.0498)	0.0357 (0.0704)	0.6121
Parenting time - story book reading	1.426 (0.0540)	1.453 (0.0536)	-0.0264 (0.0761)	0.729
Parenting time - Play	1.656 (0.0772)	1.733 (0.0775)	-0.0777 (0.109)	0.4782
Parenting time - drawing	1.306 (0.0618)	1.288 (0.0582)	0.0183 (0.0849)	0.8297
Parenting perception (15-item scale)	4.334 (0.0225)	4.308 (0.0225)	0.0265 (0.0319)	0.4059
COVID-19 Pandemic				
Extent of economic loss	1.907 (0.0443)	1.917 (0.0443)	-0.0095 (0.0627)	0.8793
Television in the household	0.525 (0.0300)	0.52 (0.0301)	0.00532 (0.0425)	0.9003
Child's regularity in home education	1.495 (0.0345)	1.495 (0.0345)	0 (0.0489)	1
Hours given to the child in studying English	2.589 (0.0616)	2.584 (0.0604)	0.0048 (0.0862)	0.9557
Hours given to the child in studying Mathematics	2.548 (0.0652)	2.49 (0.0639)	0.0582 (0.0913)	0.5253
Private tutor - at present	0.624 (0.0239)	0.583 (0.0239)	0.0405 (0.0338)	0.231

1. Standard errors in parentheses; 2. *** p<0.01, ** p<0.05, * p<0.1

3.6 Outcomes

To test our hypotheses mentioned in section 3.3, we estimate the following OLS regression specification:

$$Y_i = \alpha + \beta_T T_i + X' \zeta + \epsilon_i \quad (1)$$

Here, β provides an estimate for the intent to treat (ITT) effect — an average of the causal effects of receiving tele-mentoring on the outcome variables. Y_i is the outcome of individual (child or either parent) i measured at the end-line. T_i is an indicator for children and parents who received the tele-mentoring treatment. X is a vector of controls that includes age, education, occupation, loss of household income during COVID-19, number of household members, number of children under 15, and increase in household chores.¹¹ We list and briefly explain these controls in the next section.

Besides ITT, we would also estimate treatment on the treated (TOT) effect, which is straight forward to calculate in this case i.e. β/α_T . Here, α_T is the intervention completion rate.

Furthermore, there is a secondary interest of this intervention, which is the predictors of intervention completion (i.e. the households who complete the tele-mentoring program after

starting it). We would estimate the following equation to identify this—

$$D_i = \gamma X' + u_i \quad (2)$$

Here, D_i is the dichotomous variable to indicate whether parents-child pair i complete the treatment, X is a vector of explanatory variables (demographic and other characteristics of the households) and u_i is the error term. This equation 2 will be used to analyze the factors affecting likelihood of completion of the tele-mentoring program. Additionally, we would estimate treatment effects using intensity of the participation (number of sessions attended).

Control Variables

- Age of the children (in years)
- Household monthly income (pre and during COVID-19)
- Household head's occupation (dummy for various occupation)
- Household assets (homestead and farmland)
- Parents' education (number of years of education)
- Teaching skills (Index variable of writing ability, reading ability and numeracy ability)
- Number of household members (total members and number of siblings)
- Level education of the sibling(s)
- Other educational input during school closure

3.7 Heterogeneity Analysis

To explore heterogeneity, we would estimate the following interaction model:

$$Y_i = \alpha + \beta_1 T_i + \beta_2 H_i + \beta_h (T \times H)_i + X' \zeta + \epsilon_i \quad (3)$$

where H_i is alternatively (i) gender of the children, (ii) gender of the recipients, and (iii) grade level at the beginning of 2020.

We would also explore the factors of mentors associated with better mentee's performance using the following OLS regression model:

$$Y_i^M = \alpha + \beta_h^M H_i^M + X' \zeta + u_i \quad (4)$$

Where, Y_i^M is the outcome variables of the mentored children, H_i^M is alternatively (i) gender of mentors, (ii) academic result, (iii) experience of tutoring or mentoring, and (iv) motivation in mentoring. β_h^M estimates the heterogeneous effect based on the mentors' heterogeneity.

¹¹The baseline analogue of the outcome may be included as an additional control variable in some regression specifications to help reduce the standard errors of estimates 3.2.2. We would use baseline analogue in equation 1 only in the case of cognitive ability, perception about child's future education, and confidence about parental involvement. In the case of other outcome variables, we do not have comparable baseline information.

3.8 Analysis of the Channels of Treatment Effect

We would also seek to identify possible channels by which this tele-mentoring intervention lead to improvement in the children's outcome. In the post-intervention period, we will estimate the children's outcome by controlling parental knowledge and perception about mentors to understand how much improvement in children outcome are likely due to these intermediaries or how much due to other things (like supervision, guidance etc. that might not directly related to the intermediaries). Likewise, we would survey the mentors to know their opinion about the children and mothers, their level of support in mentoring, and quality of communication over the phone to know whether children's outcome is the result of these factors. We also investigate whether academic results of the mentors are correlated with the performance of the mentees. Though these estimates are not causal, these provide some guidance to policymakers whether to focus more on parental knowledge or not, or provide input directly to children.

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Appendix A Cognitive assessment question

A.1 Sample question for grade 3 students

Literacy

- (l3-1) How many letters are there in English language? Which letter comes after 'F'? [26 and 'G']
- (l3-2) What you will do if I say "Stand up and raise your hand"?
- (l3-3) What does it mean "Go to sleep early"?
- (l3-4) Today is _____
- (l3-5) Take your English for Today book and go to page 46. Read the paragraph 'B'. Now tell me whether following statements are true or false.
- The cat gets up early in the morning. [False]
 - The cat is lazy in the morning. [True]
 - The cat is active in the afternoon. [True]
- (l3-6) Similar questions will also be asked from Bangla book.

Numeracy

- (n3-1) Which number is greater, 3,680 or 5,400? [5,400]
- (n3-2) Add $34+21$ and Subtract $50-15$. [55 and 35]
- (n3-3) In a cricket game, Bangladesh scored 260 runs and India scored 245 runs. Which team scored more runs and how many more runs? [Bangladesh and 15]
- (n3-4) What is $9 \times 2 = ?$ [18]
- (n3-5) Belal bought rice for 80 taka and vegetable for 30 taka. How much did he spend in total? [110 taka]
- (n3-6) How many metres there are in 1 kilometre? [1000 metres]
- (n3-7) Convert 10,000 grams to kilograms. [10 kilograms]
- (n3-8) How many minutes in an hour? [60 minutes]
- (n3-9) In the morning, Mr. Mizan went out at 6:10 for a walk and returned at 6:55. How much time did Mr. Mizan walk? [45 minutes]
- (n3-10) How many sides there are in a triangle? [3 sides]

END

Appendix B Additional Tables

Table B1: Descriptive Statistics of Mentors

	Value	Min	Max
Average age of the mentors	21.69	18	28
Mentors' gender (1=male)	0.486	0	1
Cognitive Flexibility Scale (CFS) ¹	55.30	37	72
General Anxiety Disorder ²	6.88	0	23
% of mentor			
Business discipline	80.48%		
Urban background	62.86%		
Earn money from part-time job	61.22%		
Dissatisfied with academic result	20.48%		
Dissatisfied with monthly expenditure	27.04%		
Prior mentoring experience	75.56%		
Prior tutoring experience	60.00%		

Note:

1. Cognitive Flexibility Scale is a self-reported questionnaire to measure the ability of the respondent to switch between different thoughts and actions. As our mentors are coming from different educational institutions with inter-institutional grading and assessment difference, we use this scale to generalize their cognitive ability. This scale is designed by Martin & Rubin (1995) [13].

2. General Anxiety Disorder is measured by the Bengali version of the 9-item Patient Health Questionnaire. This scale is adapted from PRIMEMDTODAY, developed by Drs. Robert L. Spitzer, Janet B.W. Williams, Kurt Kroenke, and colleagues, with an educational grant from Pfizer Inc. [Click here for more details](#)

Table B2: Balance Table - Mentor's vs. Mentree's Characteristics

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	ASQ Score	Literacy	Numeracy	Operational Span Score	Something Same Score	ASQ Score	Literacy	Numeracy	Operational Span Score	Something Same Score
Mentor's Cognitive Flexibility Scale (CFS)	-0.132 (0.372)	0.0161 (0.0401)	-0.0255 (0.0251)	-0.0341* (0.00450)	-0.0372 (0.0128)					
Mentor's Academic Result						0.486 (0.584)	0.119 (0.154)	-0.0717 (0.324)	-0.0803 (0.182)	-0.0814 (0.105)
Constant	268.5** (18.15)	15.19* (2.369)	16.12** (1.180)	14.19*** (0.0482)	12.40** (0.709)	260.7*** (0.210)	15.69** (0.550)	15.01** (0.841)	12.71** (0.652)	10.60** (0.356)
Observations	354	354	354	354	354	346	346	346	346	346
R-squared	0.000	0.001	0.002	0.003	0.006	0.000	0.001	0.001	0.000	0.001

1. Standard errors in parentheses; 2. *** p<0.01, ** p<0.05, * p<0.1