Improving Hygiene and Sanitation through Parental Skill Training

Asad Islam* Umair Khalil† Tabassum Rahman‡

Abstract

We implement a parental skill training intervention with a particular focus on hygiene and sanitation in rural Bangladesh. Treatment divides mothers into two arms: i) learning module only, and ii) learning plus individualized home-visits. Mothers in both arms (learning, home visit) show substantial increase in knowledge-base, translating into good hygiene practice (0.58, 0.66 SD); handwashing (0.33, 0.61 SD), as well as balanced-food provision (0.28, 0.46 SD). Two extensions show long term gains in better childcare practice during the Covid-19 pandemic and substantial within family spillovers with improvement of parenting practices towards older siblings.

Keywords: parenting knowledge; parenting skill training; early childhood development; RCT; Covid-19

JEL Codes: C93, D8, I12, I15, O15

*Corresponding author: Centre for Development Economics and Sustainability (CDES) and Department of Economics, Monash University, Australia, and J-PAL. Email: asadul.islam@monash.edu

†CDES, Monash University, 900 Dandenong Road, VIC 3145, Australia. Email: umair.khalil@monash.edu

‡School of Medicine and Public Health, University of Newcastle, Australia. Email: tabassum.rahman@uon.edu.au.
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1 Introduction

Cross-country evidence from low- and middle-income countries has indicated that among children under the age of five, over 250 million or 43% can be at risk of developmental delays (Lu et al., 2016). In 2016, close to 300,000 diarrhea-related deaths in this group were attributable to inadequate access to safe drinking water, poor sanitation, and hygiene practice (Prüss-Ustün et al., 2019). Previous research has also established that better household and/or community level sanitation can lead to improvements in child health outcomes like height (Gertler et al., 2015; Spears, 2020), anemia (Coffey et al., 2018), infant mortality (Geruso and Spears, 2018), as well as cognitivie outcomes (Cameron et al., 2021).

While these gains are well established, gaps in parental knowledge regarding maintaining adequate hygiene and sanitation remain, particularly in developing countries.[1] In a recent survey, Evans et al. (2021) show that less than 5% of studies published from 2005 to 2019 with interventions designed towards improving early childhood development study household-level sanitation practices. There is also limited understanding of how, if at all, such interventions generate within household spillovers in improving targeted behaviors.[2] In this paper, we design and implement an intervention in Bangladesh geared at filling the above gaps in the literature. We lay a particular focus on improving hygiene and sanitation practices among rural households. This has taken renewed importance in light of the COVID-19 pandemic and the United Nations estimates that 29% of the global population lacks basic hygiene (Sachs et al., 2021). We also include components to our intervention revolving around nutrition and feeding practices, as well as child engagement activities.

A vast literature has established the pivotal importance of the first few years of life on child health and development (Heckman, 2006; Cunha and Heckman, 2007) as well as on adult outcomes (Almond et al., 2018). A fundamental aspect of the early life of a child is parenting knowledge and parental inputs in the production function of child development (Doepke et al., 2019). Parenting skill training, arguably, takes even greater significance in developing countries where literacy rates are low, welfare systems are weak, and health and education infrastructure is nascent (Currie and Vogl, 2013). Recent research even from developed countries has shown substantial returns from interventions designed to enhance parental skills by profoundly improving child skills, health, and developmental outcomes (Kim et al., 2018; Doyle, 2020; Sylvia et al., 2021).

Our focus population is mothers of children aged 12 to 36 months at the time of the baseline survey. We implement two distinct treatment arms in about 140 Bangladeshi villages: i) a learning

[1] Indeed in our setting of rural Bangladesh previous knowledge of correct and recommended practices in the baseline surveys was the lowest for our hygiene and sanitation modules. See below and in section 5 for more details.

[2] For instance, only 7 out of 478 studies reviewed by Evans et al. (2021) reported impacts on other members of the household who were not directly treated.

module and a refresher session 3 months later administered by trained fieldworkers (T^L) ; ii) including i) plus fortnightly home visits for six months (T^{LH}). Our hygiene modules focused on the following themes: i) adequate hand washing practices; ii) general hygiene guidelines like use of disinfectant, clipping/cleaning nails, washing fresh produce; and iii) water safety. Other childcare domains focused on age-appropriate balanced food provision, feeding practices, and parent-child engagement activities. To study the effect of the intervention, we conduct two endline surveys, one and two years after the intervention. In the second survey we also capture parental behavior related to siblings (aged 5 to 12 years) of our initial sample of children allowing us to study within family spillovers of informational interventions. Additionally, this latter survey was conducted during the Covid-19 pandemic induced lockdowns and thus also provides a crucial window into assessing whether maternal skill training better equipped mothers in dealing with strenuous childcare needs.

We first establish that our intervention had profound impacts in improving maternal knowledge regarding good parental practices. We find that mothers in the learning arm have 0.82 standard deviation (SD) higher hygiene knowledge while mothers in the learning and home visit arm fair around 1 SD better compared to control mothers.[3] We explore whether this increased knowledge base actually translates into better maternal practice as well. T^L- mothers' good handwashing practice increases by 0.33 SD while the increase for T^{LH}- mothers is almost twice as high. For general hygiene practice, we see similar increases across the two arms of around 0.60 SD. Similarly, for safe drinking water practices, mothers in the learning and homevisit arm report increases of 0.42 SD compared to 0.26 SD for the learning module only arm. We dig deeper into the source of these hygiene and sanitation improvements and dichotomize the individual items comprising the above indices by defining practice of 'often/always' as success. We document profound gaps in existing practice among control group mothers with only 66% reporting adequately cleaning the child after urination or defecation, only 40% wash clothes with disinfectant and just under 50% maintain proper nail hygiene. In all these dimensions, our treated mothers report profound improvements, with relative effect sizes (over the control group) ranging from 40% for hygiene after child toilet use to 70% for maintaining mother's own nail hygiene.

We uncover improvements in other domains of childcare that were part of the intervention as well. For instance, for good feeding practice, although over 80% of mothers in the control group already had correct existing knowledge, nevertheless we still document modest gains of our intervention with T^L- mothers scoring 9% higher and T^{LH}- mothers 10% higher relative to the control group. These gains also translate into reported better feeding practice as well. On the other hand, for child engagement and enrichment activities although we document substantial gains

[3]The outcomes variables comprise indices constructed from survey responses taking the following values: 0 = Never; 1 = Seldom (1-2 days); 2 = Sometimes (3-4 days); 3 = Often (5-6 days); and 4 = Always (7 days). Section 4 provides further details.

of around 0.2 to 0.3 SD increases in awarenes about the importance of these activities for child development, we uncover no reported change in actual practice from parents in our first endline survey.

We conduct a heterogeneity analysis around our baseline estimates as well and uncover some interesting patterns. The variables we employ for the heterogeneity analysis were collected in the baseline survey. Mother's with lower educational attainment seem to benefit only from the learning and home-visit arm, while mothers with above secondary education report substantial benefits even from the learning only arm. This makes intuitive sense as less educated mothers might require more hands on training in implementing some childcare routines. We also observe that households where mothers have autonomy in making childcare decisions benefit more from the intervention across both hygiene and sanitations as well as the nutrition based modules. Together these two findings provide unique contributions in understanding the efficacy and future success of maternal skill training programs.

Finally, we extend the above primary results along two distinct dimensions. Growing empirical evidence has documented increased parental stress, both physical and mental, owing to childcare needs due to extended lockdowns (Vlassopoulos et al. (2021);Yamamura and Tsustsui, 2021; Huebener et al., 2021). A substantial amount of this increased need of childcare is likely to be borne by the mother (Sevilla and Smith, 2020). In India, women have particularly been shown to suffer from worse mental health due to pandemic containment policies (Bau et al., 2022). We conduct a second endline survey one year into the pandemic in May of 2021. Mothers in our learning and homevisit arm reported 0.42 SD higher satisfaction with their ability to provide adequate care to their young children but we documented no discernible effect for mothers in the learning module arm only. However, in terms of their subjective evaluation of their child's health, women in the learning arm reported 0.23 SD higher compared to other children of the same age, while T^{LH}- mothers reported 0.47 SD higher. This provides suggestive evidence that skill training exercises can provide mothers with complementary tools that can help improve childcare provision and potentially enhance maternal mental health through a higher satisfaction with childcare and child health.

Second, we also explore whether the imparted skills lead to within household spillovers in childcare towards older siblings (5 to 12 years) of the focal child, i.e. those aged between 1 to 3 years at baseline. While this is a natural dynamic to study given parenting knowledge from such interventions can be readily applicable to older children as well, the past literature has rarely explored this dimension (Evans et al., 2021). Our findings show that beneficial spillovers to older siblings are large and impactful. Mothers report 0.55 (T^L) and 0.85 (T^{LH}) SD higher subjective health evaluation of their older child compared to the control group. They also had around 0.30 SD increased involvement in the education of the older sibling during the prolonged pandemic induced

school closure in our setting.

Compared to the previous literature, this paper makes four main contributions: i) our focus on hygiene and sanitation practice documents substantial gaps in basic knowledge in rural, resource-poor settings but also demonstrates that relatively small number of focused learning sessions and/or home visits can profoundly improve parental knowledge; ii) these improvements can readily translate into practice, even within household across individuals (for instance, in handwashing practices); iii) parental skill training helped improve maternal response to increase childcare requirements during the Covid-19 pandemic; and iv) evidence of spillovers within families as general parenting knowledge focused on care of young children is also easily transferable and implementable towards the needs of older children as well.

The rest of the paper is organized as follows: section 2 provides a review of the previous literature. Section 3 outlines our treatment design and provides balance checks, while section 4 discusses the methods and outcome measures we employ. Section 5 presents our results and section 6 concludes.

2 Previous Literature

There is a relatively limited literature studying the impact of parental skill training interventions targeted on hygiene and sanitation in developing countries (Evans et al., 2021). Cameron et al. (2019) study the scaling up of a governmental sanitation intervention in Indonesia but concluded limited success in improving hygiene related health outcomes. However, Cameron et al. (2021) show that financial incentives with community involvement helped improve toilet-use practices in Laos. In an at-scale field experiment across four countries, India, Indonesia, Mali, and Tanzania, Gertler et al. (2015) show an increased use of sanitation facilities and a reduction in open defecation as a result of behavioral nudges and governmental subsidies. Promoting healthy hygiene behaviour has been associated with reduction in episodes of diarrhea among young children in Kenya (Mulatya and Ochieng, 2020), while poor hand hygiene were found to be a major risk factor for diarrhea in Bangladesh(Dey et al., 2019). In addition, previous research (Geruso and Spears, 2018) has also documented substantial neighborhood spillovers due to better sanitation that can have profound impacts on improving child health outcomes like infant mortality. Given the potential benefits, raising awareness of mothers about better sanitation and hygiene practices directly might be a more promising avenue as opposed to community driven initiatives, which can have limited success due to lack of household demand (Cameron et al., 2021).

On the other hand, raising awareness of mothers about balanced nutrition and nutrition related health issues are common avenues of improving nutrition outcomes in young children (Imdad et al., 2011; Webb and Block, 2004). Poor maternal nutritional knowledge and feeding practice

can predispose children to malnutrition early on in their lives (Victora et al., 2010). Knowledge interventions appear to have significant effect on children's physical development i.e. increase in height and weight (Bhutta et al., 2013). For instance, short nutrition counseling with repeated reinforcement was found to be effective in improving awareness and infant feeding practice in a slum setting in India (Sethi et al., 2003). One of the modules we implement in our skill training intervention focuses on adequate nutritionaly awareness and health feeding practice. While it is true that there is a higher preexisting knowledge among mothers regarding best practices in this domain, we still find gaps in exact knowledge of types of food, i.e., fruits, some vegetables, etc. and their associated nutritional benefits. Our intervention thus holds promise in improving this domain as well.

A recent string of papers have implemented interventions similar to ours in low to medium income countries but have largely focused on nutrition and feeding practices. We also cover these aspects in our intervention but lay a more detailed focus on hygiene and sanitation practices. Luoto et al. (2021) found that an early childhood development (ECD) intervention conducted with mother-child dyads in Kenya can be effective and scalable in resource poor settings. Similarly, Justino et al. (2020) report an increase in maternal time investment in Rwanda because of a 17-session radio drama and village-level discussion led by trained facilitators on parental time investment. Amaral et al. (2021) implement a digital parenting program in El Salvador and show reductions in physical violence towards children perpetrated by parents. ECD interventions have also been shown to have large long run gains. Gertler et al. (2014) report that psychological stimulation intervention administered in childhood (1986-87) with growth stunted toddlers increased their income in adulthood in Jamaica with benefits persisting up to 20 years later as well.

3 The Intervention and Balance Checks

3.1 Treatment Details

Our intervention was focused on mothers who had a child aged between 12 and 36 months. The intervention was implemented in collaboration with a local research partner Global Development and Research Initiatives (GDRI).[4] The study locations were chosen based on GDRI's engagement and reach. They prepared a list of villages in the five sub-districts where the study was conducted and identified 140 villages considering the concentration of low-income households. Next, all households in those villages were listed to identify potential participant mother-child pair. Each household with a child in the above age group was invited to the study. From each village, 6

[4]GDRI is a research-focus local non-government organization with extensive experience in implementing RCTs on early childhood development, maternal and child health, and education. The organization has been working in the southwest part of Bangladesh since 2015.

to 8 mother-child pairs (one per household) were recruited into either treatment or control arms, depending on village level allocation, using simple random sampling. Socioeconomic and demographic information were collected at baseline.

Our treatment design imparted knowledge via information sessions on nutrition and feeding of young children, maintaining hygiene in all aspects of child-caring and imperatives of child development at home. The information sessions were facilitated using specially developed modules based on Fernald et al. (2017) and focused on the following: 1) aspects of child nutrition and feeding practice i.e. balance diet for infant and young and children, way of feeding (frequency, time and attention, utensils used), breastfeeding, and complementary feeding; 2) importance of maintaining hygiene in child caring, daily cleanliness, safe food handling, and overall cleanliness in and around the house; and 3) home environment favorable to child development i.e. parent-child engagement (e.g. talking to, playing with, reading to children), interaction with elder siblings and other family members, and growth stimulants (e.g. toys, story books).

Three half-day refresher sessions were held after three months since the commencement of the intervention. A second more intensive treatment arm complemented the information sessions with fortnightly home visits by trained fieldworkers to support mothers to put learning into practice. The field staff who facilitated the sessions had Bachelor's degrees at the minimum and were experienced in working in the field of maternal and child health. All facilitators received a week-long training on the module contents prior to the start of the project. The intervention included two arms:

1. T^L arm: Learning modules + Refresher sessions
2. T^{LH} arm: Learning modules + Refresher sessions + Fortnightly Home visits for 6 months (12 visits).

Appendix figure A.1 presents a graphical illustration of the timeline of our surveys and intervention. Randomization was carried out at the village level; with 80 treatment and 60 control villages. Treatment villages have been further divided randomly into two groups equally and allocated either T^L or T^{LH}, with around 500 mothers in each. No intervention was given to the control group, which had around 730 mothers. The intervention lasted from November 2018 to May 2019, while the post intervention evaluation was conducted in April 2020. Although the evaluation was originally planned to happen in January 2020, the commencement of the evaluation was delayed due to the Covid-19 pandemic. In compliance with the Covid safe health directives, the endline evaluation was conducted over the phone.[5]

[5] Although the lockdown in Bangladesh started in late March, there were considerable uncertainties and out of an abundance of caution given the evolving situation of the pandemic, we decided to delay our survey and to move it over the telephone.

We conducted a second endline survey in May 2021, over a year after pandemic induced lockdowns and school closures with two facets in mind: 1) to measure whether our intervention built parenting skills that helped mothers cope better with increased childcare demands due to school closures; 2) to study spillovers in parenting practice towards older siblings (5 to 12) of the focal child. Past evidence shows that ECD interventions in resource poor settings may positively influence mothers mental health as they feel more empowered with knowledge and skills they acquire by participating in such interventions (Evans et al., 2021).

3.2 Balance Checks and Attrition

In this section we provide evidence for the balance of predetermined covariates across treatment and control observations to check the efficacy of our randomization exercise as well as studying attrition between our baseline and endline surveys. We run simple regressions of the following format,

$$X_{iv} = \alpha_1 + \gamma T_{iv}^{k} + \varepsilon_{iv} \quad if \quad C_{iv}/T_{iv}^{k'} = 0 \tag{1}$$

where X_{iv} represent relevant baseline covariates of interest for mother i in village v . We run equation (1) pairwise dropping the sample of individuals that belong to the arm not being compared. For instance, when T^{L}- mothers are compared with the control group we drop T^{LH}- mothers, and so on. Figure 1 presents results from this exercise. The dashed lines represent the 95% confidence intervals. As is evident, we have good covariate balance across treatment and control for both treatment arms as well as between treatment arms themselves. This holds true for representative variables of a wide variety, such as maternal education and labor force participation, autonomy in making decision about household finance and childcare; whether father stays with the family full-time, and household income.[6]

In appendix table A.1 we also perform an attrition analysis. In Panel A, only 2 to 4.5% of women in our sample across arms drop out by Endline - I, although understandably these number are much higher (between 20 to 31%) for Endline-II, which was conducted via phone and during the COVID-19 pandemic. However, as Panel B and C show we find no evidence for differential attrition based on the same covariates at baseline as used in Figure 1 and are as follows: log household income, binary indicators for mother below 25 years of old, has less than secondary education, is a housewife, has own savings, contributes to household finances, has autonomy over financial decisions, over childcare decisions, and lives in a joint family setup; binary indicators for

[6]Whether the family lives in a joint family setup is marginally significant at the 10% level for T^{LH} but results in section 5 remain full robust if we add this as a control in our estimation equations.

father below 30 years, does not stay at home all year, and is a day labourer/farmer. The dependent variable here takes the value one if we do not observe outcomes at the respective endline survey for the respondent and zero otherwise. We then regress this over the treatment status, the set of covariates and an interaction between the two. The joint p-value in Table A.1 is for the interactions.[7] As is evident, we estimate large p-values for all pairwise comparisons across the three arms and this helps allay concerns about potential differential attrition in our setting.

4 Methods and Outcome Measures

Since we have a randomized design, the methods employed are straightforward. We estimate the following empirical specification using ordinary least squares (OLS) to explore the treatment effects of our intervention,

$$Y_{iv} = \beta_0 + \beta_L T_{iv}^{L} + \beta_{LH} T_{iv}^{LH} + \varepsilon_{iv} \tag{2}$$

where Y_{iv} corresponds to an outcome measure like an index of hygiene knowledge, or a measure of maternal practice like handwashing. T_{iv}^{L} and T_{iv}^{LH} are treatment indicators as defined above. The coefficients on these variables, β_L and β_{LH} give us the relevant treatment effects of our intervention. We cluster the standard errors at the village level. For robustness, we also implement a specification where we include an expansive set of predetermined covariates measured at the baseline. Our results remain quantitatively similar to those based on equation (3), hence we conduct the rest of the analysis with specifications similar to equation (2) as well.

We explore four measures of maternal knowledge and awareness: 1) *Importance of Hygiene*: focuses on significance of maintaining adequate hygiene for avoiding preventable diseases[8]; 2) *Nutritious Food Knowledge*: basic information about age appropriate food provision and breast-feeding practice, types of food that are good sources of proteins, vitamins, iron and those that are beneficial in building muscle and providing energy; 3) *Good Feeding Practice*: supplemental food with breast milk, age-appropriate food, avoidance of junk foods, frequency of meals, and food safety; and 4) *Importance of Child Engagement*: significance of enrichment activities with the child including talking, playing and reading to the child.[9]

[7] This analysis is also implemented pairwise similar to the balance exercise.

[8] Aggregate of six questions that record maternal responses on an agreement scale, where 0 = Totally disagree and 4 = Totally agree. The individual questions focus on cleanliness of the child, caretaker, house, and importance of neither the child nor adult household members walking barefoot, especially to the toilet.

[9] This aggregates 10 individual questions that focus on the following: importance of talking, playing, and reading to the child; if child is upset the caretaker should be calm; dissuading from harsh parenting; importance of other household members interacting with the child; family bonding during meal times, importance of learning at school, and reading of storybooks at home.

Similarly, we construct seven outcomes that measure maternal practice of improved childcare provision. These measure how many times an activity is performed on a typical day. Responses take the following values: 0 = Never; 1 = Seldom (1-2 days); 2 = Sometimes (3-4 days); 3 = Often (5-6 days); and 4 = Always (7 days). The practice measures include (number in parentheses following the index heading gives the number of questions aggregated in each index): 1) *Handwashing* (4): mother and other family members wash hands before handling the child, preparing and feeding food to the child, after cleaning child post urination/defecation, and adult handwashing practice after toilet use; 2) *Good Hygiene Practice* (9): washing fruit/vegetables before eating, use of disinfectant for washing clothes of the child, nail hygiene of child and the mother, etc.[10] 3) *Safe Drinking Water Practice* (7): use of purified drinking water for feeding and bathing the child, their toys and kitchen utensils. 4) *Clean House Maintenance* (5): sweeping the floor, yard, and kitchen and use of disinfectant in cleaning. 5) *Balanced Food Provision* (14): frequency of provision of various types of foods to the child like fresh vegetables and fruit, meat and poultry, rice and pulses, etc.[11] 6) *Good Feeding Practice* (12): maternal behavior while feeding the child including bonding, patience if child is picky or sick, using separate utensils for feeding the child etc.[12] and 7) *Child Engagement Activities* (11): talking, playing and reading to the child by both the mother and other adult household members, provision of colorful books and toys, etc.[13]

We construct the above aggregated indices from individual questions in the following way: i) standardize each question by the mean and standard deviation of the control group; ii) create weights based on the procedure outlined in Anderson (2008) to ensure that highly correlated questions are given small or negative weights, while less correlated outcomes receive higher weights (Schwab et al., 2020); iii) calculate the weighted, aggregate index based on ii); and finally iv) normalize the aggregate index again by the control group mean and standard deviation.

[10]This index comprises the following 9 individual questions: child urination at a fixed place; child doesn't walk barefoot; washing fruit/vegetable before eating; maintenance of maternal and child finger and toenail hygiene; bathing child in hot, clean water; using disinfectant to wash child's clothes; wiping child with warm water in case of sickness precluding bath; teeth hygiene; and mother's clothes hygiene.

[11]The complete list includes the following: fresh green vegetables; seasonal fruit; egg, fish, and meat; rice, potato or bread; porridge; carrot or pumpkin; sweet potato; banana; citrus fruits; papaya; nuts; milk; and butter.

[12]The 12 questions cover the following themes: feeding child yourself; talking to the child; if child picky or sick offer favorite food; patience in feeding; feed often if sick; separate utensils for the child; encourage if child eats by hand; breastfeed if sick; and keep child food covered all the time.

[13]The 11 questions cover the following: talking, playing, and reading with the child by mother and other adults (7 questions); calming the child if they cry; family meal time; taking child on walks outside and for play dates; provision of colorful toys.

5 Results

5.1 Main Findings - Endline I

We now present our main findings based on the first endline survey conducted around 11 months after the receipt of treatment. Table 1, Panel A presents the results for improvement in hygiene and sanitation outcomes as a result of the intervention. Column (1) reports the mean of the aggregated index before final standardization by the control group mean and standard deviation as outlined in section 4. Mothers enrolled in only the learning arm, T^L, record a 0.82 SD higher index of hygiene knowledge while mothers administered both the learning module and the supplementary home-visit, T^{LH}, have slightly over 1 SD better knowledge compared to control mothers. The square brackets report p-values based on procedures developed in Westfall and Young (1993) treating the knowledge outcomes as belonging to the same family of hypothesis.[14] Column (4) provides the randomized inference based p-value for the joint test of significance for the two treatment arms which is robust to multiple testing as developed in (Young, 2019). Finally, column (5) present the p-value for the equality of the coefficients on the two treatments, β_L and B_{LH}, which is marginally significant for hygiene knowledge. These knowledge gains also translate into practice. We see the large gains for hygiene related practices with home-visit arms showing over a 0.6 SD increase for both handwashing and general hygiene practice. However, for the latter the point estimates for both arms are very similar, signifying that for easily implementable changes even the administration of a learning module can induce changes in practice. This is particularly likely to be true if the impediment for practice was just lack of awareness. Similarly, we document a 0.42 SD increase in safe water practices for the more intensive treatment arm, which is around 0.17 SD higher than T^L but the difference is not statistically significant.

In Panel B we explore the other domain of childcare covered in our intervention. Our survey measures for nutritious food knowledge and good feeding practice had only one correct answer for each individual question, therefore, for ease of interpretability we do not convert these into indices and instead consider the proportion of correct responses as our outcome measure. A little less than 70% of control group mothers answered questions about nutrition knowledge correctly, while we see a 6.5 percentage points (pp) and 8.9 pp increase in correct answers for the T^L and T^{LH} arm, respectively. For feeding practices, over 80% of mothers in the control group give correct answers primarily driven by accurate preexisting knowledge about breastfeeding practices. Nevertheless, we still document substantial gains from the treatment with a relative effect to the control group mean of 9% and 13% for the learning and learning and home visit arms, respectively. We document much smaller increase in awareness regarding child engagement and enrichment activities but the

[14] Results are robust if we consider all outcomes in Table 1 as belonging to the same family.

coefficient sizes are still non-trivial at 0.23 (T^L) and 0.29 (T^{LH}) SD.

Although the knowledge and information about nutrition and feeding was fairly high in the control group as outlined above, we still find substantial improvements in practice for these categories. For instance, T^{LH}- mothers record 0.46 SD higher for nutritious food provision index, while T^L-mothers record a 0.28 SD increase. When we focus on individual questions, we find that these are primarily driven by huge gains in provision of individual types of fruits and vegetables, like sweet potatoes, bananas, citrus fruit, the benefits of which our intervention specifically highlighted. This makes sense since these are less likely to be part of the original knowledge base. This again underscores the importance of targeted nutritional awareness and its potential for profound impacts on child outcomes. However, we uncover no improvement in child engagement practices even though we document improvement in awareness of the importance of these activities. However, we start seeing substantial effect sizes in our second endline survey, which was conducted a year and a half after prolonged school closures. We defer the discussion of those findings to section 5.3.

In Table 2 we delve deeper into the individual components of our focal intervention: handwashing and general hygiene practice. We report only those individual questions where the knowledge base in the control group was particularly low to help us directly study how filling existing knowledge gaps can improve maternal practice. Columns (1) to (4) of Table 2 create binary variables for each question which take the value 1 if the mother reports performing the activity regularly or 'Often/Always'. For brevity, we only report those questions where the control group proportion is less than 70%. In Panel A, we document relative effect sizes of 30 to 50% compared to the control group mean for handwashing after cleaning the child post urination/defecation or before handling the child. The latter result is regarding practice of all adult household members not just the mother. This provides suggestive evidence of within family information spillovers leading to overall improved practice. Columns (5) to (8) also report results for standardized variables where each questions is standardized by the control group mean and standard deviation.

In Panel B, we see that only a little over 40% of mothers in the control group regularly use disinfectant to wash their child's clothes but treated mothers report 47 to 61% higher frequency. Similarly, we see large increases in nail hygiene practice. Although mothers have higher awareness of keeping the nails of young children clean (around 63%), less than 50% report maintaining their own nail hygiene. We record particularly large effects for the latter with T^L- mothers reporting 73% higher practice and T^{LH}- mothers reporting 54% higher, albeit the difference is not statistically significant.

One concern about the findings presented above can stem from the self-reported nature of our outcome measures. Respondents, particularly those treated, might be expected to give inflated answers which can bias our estimates upwards. We implement a sensitivity check, in the vein of Bandiera et al. (2020), to address the concern regarding social desirability bias. In our second

endline survey, we ask the respondents on a scale of 1 to 10 whether they would like to be a respectful person in the village which we use as a social desirability scale (SDS). Appendix Table A.2 presents results from a model where we interact our treatment variables with SDS and the results are largely stable with the interaction term for both T^L and T^{LH} being small and statistically insignificant for all outcomes.

We close the analysis of our main findings by providing a brief mediation analysis for our hygiene outcomes. Due to the structure of our intervention, we can empirically investigate what proportion of the increases in practice that we documented in Table 1 is because of an enhanced knowledge base of the mother. The randomization of treatment helps with a formal mediation analysis. We focus on only outcomes in the domain of hygiene to conserve space and because we observe continuous indices for both knowledge base and practice. We implement methods developed by Imai et al. (2010) which correspond to estimating two distinct specifications: 1) the mediator (knowledge index) on to the treatment (with coefficient β); and 2) the outcome (practice index) on to the treatment and the mediator (coefficient δ). The interaction $\beta\delta$ then gives the average causal mediated effect (ACME). For handwashing, we estimate an ACME of 0.17 SD for T^L- mothers, implying that a little over 50% of the total effect estimated above is mediated by better knowledge of hygiene practices whereas the corresponding number is 32% for T^{LH}- mothers. This makes sense since the latter had a more intensive practical demonstration based session as well in terms of the home visit so one would naturally expect the effect of only the knowledge base to be slightly diminished.[15]

5.2 Treatment Effect Heterogeneity

In this subsection we provide a brief heterogeneity analysis with respect to some key predetermined characteristics of interest. We report results for four of our seven practice indices, the ones where our intervention had the largest effect. Columns (1) to (4) of Table 3 first splits the sample by the gender of the child and explores whether son-preference in South Asia (Jayachandran and Pande, 2017) plays a part in our findings. We find generally similar results across gender except slightly higher point estimates for balanced food provision for boys, although these differences are not statistically different. This aligns with recent evidence that son-preference does not seem to be a major concern in Bangladesh Begum et al. (2018). Similarly, we find no appreciable differences across age of the child while splitting the sample around 2 years of age.

Panel B next explores whether educated mothers find it easier to implement changes in their childcare practice or not. We uncover interesting heterogeneity here. Among the learning only

[15]We employ the Stata command developed by (Hicks and Tingley, 2011) to implement the mediation analysis. Since analytical statistical inference is complicated they employ quasi-Bayesian Monte Carlo approximation of (King et al., 2000), which provide confidence bounds as reported in Table 3 instead of conventional standard errors.

arm, mothers with less than secondary education fail to improve practice while mothers with secondary education demonstrate appreciable gains. However, in the more intensive arm where field workers conduct homevisits and teach better childcare practice, both less and more educated mothers gain equally. This arguably provides a crucial policy implication in terms of the importance of on-site training as opposed to just learning based interventions for more disadvantaged women. Finally, a large literature has documented the importance of female autonomy in household decision making for female empowerment (Anderson and Eswaran, 2009; Khalil and Mookerjee, 2019) and also for child outcomes (Arulampalam et al., 2016). We show that our intervention has particularly salient effect when mothers have autonomy over childcare decisions, particularly in nutrition related outcomes. For instance, columns (5) and (6) show that almost the entire treatment effect is concentrated among mothers who have a say in decision making regarding childcare. We repeat this analysis by mother's financial autonomy but treatment effect in that case are strong and positive across both sets of mothers. This highlights the multifaceted nature of female autonomy within household decision making and provides important insights into the mechanisms of success for parenting interventions.

5.3 Beyond Endline I

We extend the above results in two dimensions beyond the endline survey. First, we consider whether the maternal skill training imparted by our intervention helped mothers cope better with increased childcare demands due to Covid-19 enforced lockdowns and school closures. Second, we study spillover within the family by measuring parental practices towards older siblings of the focal child. Since our skill training taught general parenting skills one can anticipate the existence of potential improvements in childcare needs of older siblings, between 5 to 12 years of age, as well.

5.3.1 Covid-19 Pandemic and Childcare Needs

Extensive lockdowns and school closures due to the pandemic have increased parental childcare responsibility substantially across the world. In patriarchal, developing societies, the bulk of the onus of these increased demands is borne by the mother. This has the potential to impact both maternal mental health and child physical and mental needs (Rahman et al., 2021;Yamamura and Tsustsui, 2021). However, if mothers are equipped with adequate skills they can better handle stressful and demanding childcare situations along with allaying parental concerns about how adequately they are taking care of their children (Evans et al., 2021). Indeed, in Table 4 we document that T^L- mothers at Endline-II held 0.23 SD higher beliefs of the subjective evaluation of their children's health compared to other children of the same age, while T^{LH}- mothers held 0.47 SD

higher.[16] We see no corresponding effect for the same measures at endline-I. Similarly, although we found no impacts on child engagement and enrichment activities earlier, now we observe substantial impacts with both arms showing substantial effect sizes. This could be driven by parents trying to substitute or make-up for the loss of school and outside inputs into the child production function (Dizon-Ross, 2019). Finally, we also document that treated mothers, albeit only those in the home visit arm, also report higher satisfaction and adequacy of childcare, around 0.42 SD, compared to control mothers implying parental skill training can indeed prove helpful in the longer term and in high-stress childcare settings.

5.3.2 Sibling Spillovers

Columns (9) to (12) presents results for parental practices towards older siblings.[17] We observe data on around 570 mothers who also have a child in the 5 to 12 years age. We again document large treatment effects for the subjective health index with T^{LH}- mothers reporting 0.3 SD bigger effects compared to learning only arm, which itself is around 0.5 SD higher than the control group. Our balanced food provision module was expressly geared at educating mothers about general knowledge on nutritious food, which is readily applicable to older siblings as well. We see precisely such effects, especially for T^{LH}- mothers who report 0.9 SD higher numbers compared to the control group. We also see large effects for engagement activities with older children for both treatment arms. Furthermore, these seem to translate into parental involvement and time spent in child education activities. Bangladesh has gone through one of the longest school closures around the world, with all educational institutions remaining shut between March 2020 to September 2021. This can indeed have profound impacts on child human capital accumulation and long term outcomes. We find that as a result of the skills imparted by our intervention, parents are around 0.3 SD higher involved in child education of their older children as well.[18]

[16] The subjective health index aggregates three questions that ask the mother about her satisfaction with her child's weight, height, and overall health compared to children of similar age. The scale varies from 0 = Not satisfied to 4 = very satisfied.

[17] Since our initial survey was focused on children between 12 and 36 months, those that were 31 months or older at baseline will be older than 5 years by the time of our second endline survey, and can hence contaminate our measures of 'older' siblings other than the focal child. We therefore drop all mother-child observations where the focal child was above 31 months at the baseline.

[18] The parental involvement in education index is based on the following 7 questions: parental time spent on education due to school closures; school teach involvement; parental concern about education due to school closures; drawing and painting with the child; overall satisfaction with child education.

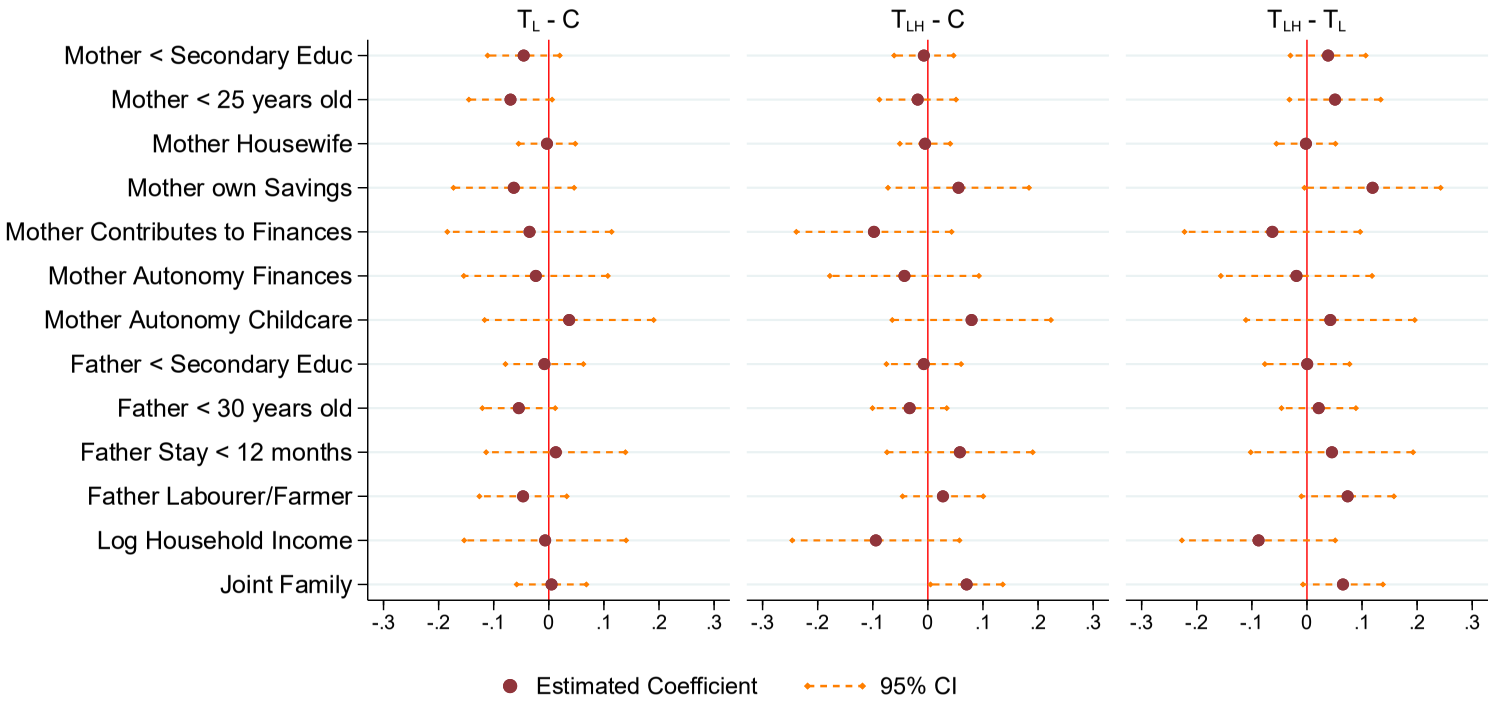
6 Discussion and Conclusion

It is important to translate the above reported findings in terms of a back-of-the-envelope welfare gains analysis. The total cost for conducting the learning sessions for both arms amounted to around USD 17 per participant. This covered the cost for the venue, training materials, and salaries of the field workers. The T^{LH} mothers were additionally provided with bi-weekly homevisits by trained field workers and this raised the cost per participant to around USD 28, over 60% more than the learning only arm.[19] However, for most outcomes we studied we do not uncover statistically significant and economically meaningful differences between the treatment effects across the two arms suggesting that providing information in a group session may be cost-effective in improving the knowledge and application of hygiene, sanitation and general childcare practices. However, we do uncover that less educated mothers are less likely to benefit from learning only interventions and may require more intensive hands-on support, implying that policy options for scaling up such programs should be mindful of the needs of the target population.

We implemented an intervention geared at enhancing maternal childcare skills with a focus on three broad areas: hygiene and sanitation, nutrition and feeding practices, and child engagement activities. Our intervention is relatively less intensive compared to most previous studies and yet produces substantial treatment effects. They are particularly strong in areas where there were previous gaps in maternal knowledge, like handwashing, disinfectant use, and nutritional information about specific food types. However, we find limited effect in enrichment activity practices in the short run but they bear out in the medium term. The latter result, though, can be a result of the extreme childcare stress created by the Covid-19 pandemic. We conducted a second survey over a year into pandemic related disruptions and document that our skill training program equipped mothers to deal with increased childcare needs better. Finally, we also provide evidence of substantial spillovers within family with better parenting practices geared towards older siblings of the focal child as well. Overall, our design underscores the importance and efficacy of parental skill training in improving quality of childcare and therefore future child outcomes as well.

[19] Around 10 fieldworkers in 40 villages made a total of 12 visits to each household over six months for this arm.

Figure 1: Covariate Balance



Note: Each point plots a coefficient estimate on the treatment dummy for individual regressions where the dependent variable is the covariate of interest, at the time of the baseline survey, given on the vertical axis. C denotes the control group, T_L refers to the learning only arm, while T_{LH} refers to the learning and home visit arm. Standard errors are clustered at the village level.

Table 1: Treatment Effect on Maternal Knowledge and Practice Indices

Dependent Variable	(1)	(2)	(3)	(4)	(5)
	Control	Learning	Learning	Joint	$\beta_L =$
Panel A: Hygiene and Sanitation	Mean		and Visit	Test	β_{LH}
Hygiene Knowledge	-0.298	0.823***	1.021***	0.000	0.095
(Index)	(0.021)	(0.010)	(0.089)		
		[0.000]	[0.000]		
Handwashing Practice	-0.137	0.333**	0.606***	0.002	0.096
	(0.021)	(0.132)	(0.123)		
		[0.084]	[0.001]		
Good Hygiene Practice	-0.141	0.583***	0.663***	0.001	0.624
	(0.014)	(0.142)	(0.127)		
		[0.004]	[0.001]		
Water Safety Practice	-0.092	0.258*	0.423***	0.004	0.329
	(0.019)	(0.138)	(0.143)		
		[0.277]	[0.047]		
Panel B: Other Domains of Childcare					
Nutritious Food Knowledge	0.697	0.065***	0.089***	0.001	0.171
(Proportion Correct)	(0.009)	(0.017)	(0.013)		
		[0.001]	[0.000]		
Good Feeding Awareness	0.824	0.094***	0.104***	0.000	0.208
(Proportion Correct)	(0.007)	(0.009)	(0.008)		
		[0.000]	[0.000]		
Child Engagement Knowledge	-0.089	0.232**	0.290***	0.004	0.611
(Index)	(0.571)	(0.106)	(0.095)		
		[0.028]	[0.008]		
Balance Food Provision	-0.129	0.284**	0.455***	0.002	0.154
	(0.017)	(0.111)	(0.106)		
		[0.084]	[0.002]		
Good Feeding Practice	-0.042	0.125	0.241***	0.036	0.304
	(0.018)	(0.109)	(0.090)		
		[0.606]	[0.073]		
Actual Child Engagement	-0.042	-0.045	0.020	0.899	0.574
(Talk, Read, Play)	(0.018)	(0.121)	(0.115)		
		[0.946]	[0.946]		

$N = 1,730$. ***,**, and * represent significance at the 1%, 5%, and 10% level, respectively. Column 1 reports mean and (standard error) of the unscaled index for the control group. Columns (2) and (3), [Westfall and Young (1993) p-values for multiple hypothesis testing]. Column 4 shows randomized inference and multiple hypothesis testing robust p-values for joint significance of the treatments (Young, 2019). Column 5 shows p-values for the equality of coefficients for the two treatment arms. The outcomes are constructed as follows: i) standardize all individual components by control group mean and standard deviation. ii) construct weights based on Anderson (2008) to increase efficiency by down weighting highly correlated measures, iii) calculate aggregate index by taking weighted average of individual components and restandardizing it by control group mean and standard deviation. Standard errors are clustered at the village level.

Table 2: Treatment Effect on Individual Elements with Knowledge Gaps - Washing Hands and Hygiene Practice

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Binary for Often/Always				Standardized Variables			
Panel A: Handwashing	Control Mean	Learning	Learning and Visit	$\beta_L = \beta_{LH}$	Control Mean	Learning	Learning and Visit	$\beta_L = \beta_{LH}$
Before preparing Food	0.644	0.048	0.051	0.959	2.872	-0.016	0.068	0.559
	(0.033)	(0.052)	(0.058)		(1.024)	(0.124)	(0.135)	
Relative Effect (%)		7.38	7.89					
After cleaning Child	0.663	0.207***	0.261***	0.063	2.772	0.452***	0.652***	0.031
urination/defecation	(0.028)	(0.036)	(0.034)		(1.139)	(0.090)	(0.082)	
Relative Effect (%)		31.18	39.39			31.18	39.39	
Before holding/	0.230	0.123**	0.093*	0.672	1.467	0.225	0.170	0.787
carrying Child	(0.026)	(0.093)	(0.053)		(1.211)	(0.166)	(0.163)	
Relative Effect (%)		53.36	40.50					
Panel B: Hygiene Practice								
Wash Clothes with	0.405	0.250***	0.189***	0.225	2.204	0.561***	0.487***	0.473
Disinfectant	(0.024)	(0.037)	(0.048)		(1.036)	(0.083)	(0.095)	
Relative Effect (%)		61.16	46.69					
Cut and clean	0.634	0.175***	0.116*	0.313	1.599	0.342***	0.255**	0.466
Child Nails	(0.040)	(0.056)	(0.059)		(1.313)	(0.111)	(0.059)	
Relative Effect (%)		27.65	18.33					
Cut and clean	0.481	0.351***	0.260***	0.113	2.302	0.682***	0.574***	0.404
Own Nails	(0.041)	(0.055)	(0.060)		(1.134)	(0.117)	(0.132)	
Relative Effect (%)		72.97	54.01					

$N = 1,730$. ***,**, and * represent significance at the 1%, 5%, and 10% level, respectively. Column 1 and 5 report mean and (standard error) of the control group. Column 4 and 8 show p-values for the equality of coefficients for the two treatment arms. The outcomes in columns (1) - (4) create binary variables that take the value 1 for the two highest frequency measures of 'Often' and 'Always', while columns (5) - (8) standardize each individual question by control group mean and standard deviation. The third row for each variables presents the treatment effect relative to the control group mean. Standard errors are clustered at the village level.

Table 3: Treatment Effect on Indices of Interest - Heterogeneity

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Learning	Learning and Visit	Learning	Learning and Visit	Learning	Learning and Visit	Learning	Learning and Visit
Panel A: Child Characteristics	Boys		Girls		Age $\leq$ 24 months		Age $>$ 24 months	
Handwashing	0.429***	0.580***	0.239*	0.627***	0.353**	0.655***	0.307**	0.544***
	(0.154)	(0.131)	(0.135)	(0.149)	(0.155)	(0.124)	(0.133)	(0.156)
Good Hygiene	0.659***	0.609***	0.557***	0.665***	0.504***	0.630***	0.647***	0.692***
	(0.130)	(0.162)	(0.149)	(0.149)	(0.151)	(0.156)	(0.166)	(0.138)
Balanced Food Provision	0.363***	0.524***	0.204*	0.386***	0.319***	0.341**	0.260*	0.546***
	(0.120)	(0.116)	(0.123)	(0.128)	(0.122)	(0.131)	(0.134)	(0.121)
Good Feeding	0.165	0.189*	0.086	0.288**	0.044	0.136	0.195	0.330***
	(0.128)	(0.102)	(0.122)	(0.114)	(0.122)	(0.111)	(0.133)	(0.104)
Panel B: Mother Characteristics	Education $<$ Secondary		Education $\geq$ Secondary		Childcare Autonomy		No Childcare Autonomy	
Handwashing	0.214	0.691***	0.357**	0.603***	0.354**	0.646***	0.263*	0.512***
	(0.178)	(0.185)	(0.136)	(0.129)	(0.174)	(0.148)	(0.145)	(0.147)
Good Hygiene	0.240	0.609**	0.658***	0.697***	0.659***	0.741***	0.396***	0.545***
	(0.210)	(0.243)	(0.139)	(0.129)	(0.184)	(0.158)	(0.130)	(0.144)
Balanced Food Provision	0.157	0.490***	0.315***	0.441***	0.323**	0.584***	0.188	0.142
	(0.174)	(0.168)	(0.114)	(0.108)	(0.125)	(0.120)	(0.197)	(0.158)
Good Feeding	0.040	0.233	0.144	0.269***	0.216**	0.293***	-0.100	0.101
	(0.173)	(0.146)	(0.108)	(0.092)	(0.105)	(0.083)	(0.181)	(0.163)

$N = 1,730$. ***,**, and * represent significance at the 1%, 5%, and 10% level, respectively. The outcomes are constructed as follows: i) standardize all individual components by control group mean and standard deviation. ii) construct weights based on Anderson (2008) to increase efficiency by down weighting highly correlated measures, iii) calculate aggregate index by taking weighted average of individual components and restandardizing it by control group mean and standard deviation. Standard errors are clustered at the village level.

Table 4: Temporal and Within Family Spillovers

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Focal Child - Endline-I				Focal Child - Endline-II				Older Siblings - Endline-II			
	Control Mean	Learning	Learning and Visit	$\beta_L = \beta_{LH}$	Control Mean	Learning	Learning and Visit	$\beta_L = \beta_{LH}$	Control Mean	Learning	Learning and Visit	$\beta_L = \beta_{LH}$
Subjective Health Index	0.008	0.011	0.027	0.865	-0.177	0.234**	0.473***	0.014	-0.281	0.499***	0.797***	0.026
	(0.031)	(0.085)	(0.090)		(0.037)	(0.092)	(0.084)		(0.051)	(0.111)	(0.119)	
Balance Food Provision	-0.117	0.169	0.447***	0.063	-0.146	0.163	0.657***	0.001	-0.198	0.299	0.881***	0.006
	(0.023)	(0.136)	(0.120)		(0.027)	(0.117)	(0.108)		(0.034)	(0.181)	(0.160)	
Engagement with Child (Talk, Play, Read)	0.004	-0.083	0.072	0.207	-0.398	0.684***	0.839***	0.229	-0.309	0.823***	0.755***	0.712
	(0.025)	(0.128)	(0.117)		(0.038)	(0.130)	(0.133)		(0.045)	(0.157)	(0.167)	
Satisfaction and Adequacy of Childcare	-	-	-	-	-0.073	0.083	0.415***	0.012	-0.043	0.146	0.181	0.793
					(0.021)	(0.125)	(0.115)		(0.028)	(0.124)	(0.121)	
Parental Involvement Concern wrt Education	-	-	-	-	-	-	-	-	-0.068	0.263**	0.383***	0.403
									(0.024)	(0.119)	(0.132)	

N is around 1300 mother-focal child pairs while we have data on 570 mother-older sibling pairs. ***,**, and * represent significance at the 1%, 5%, and 10% level, respectively. The outcomes are constructed as follows: i) standardize all individual components by control group mean and standard deviation. ii) construct weights based on Anderson (2008) to increase efficiency by down weighting highly correlated measures, iii) calculate aggregate index by taking weighted average of individual components and restandardizing it by control group mean and standard deviation. Standard errors are clustered at the village level.

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A.1 Online Appendix

Figure A.1: Survey and Intervention Timeline

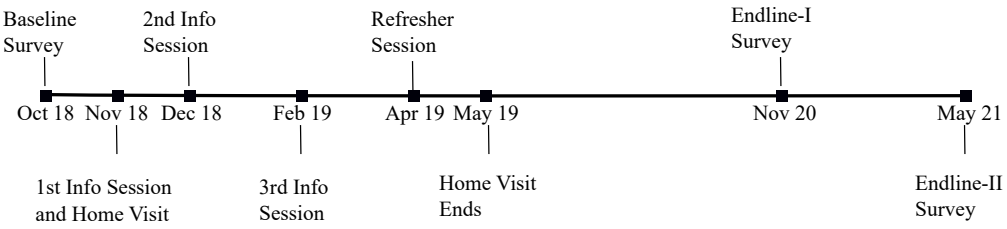

Table A.1: Attrition Analysis by Treatment Status

	(1)	(2)	(3)
Panel A: Sample Sizes	Control	T^L	T^{LH}
At Baseline	772	514	516
At Endline-I	737	501	502
(Attrition Rate)	(0.045)	(0.025)	(0.027)
At Endline-II	535	409	399
(Attrition Rate)	(0.307)	(0.204)	(0.227)
Panel B: Correlates of Attrition at Endline-I	T_L v C	T_{LH} v C	T_{LH} v T_L
Treatment Indicator	-0.042	0.116	0.158*
	(0.097)	(0.089)	(0.079)
Joint p-value on characteristics at Endline-I	0.54	0.82	0.45
Panel C: Correlates of Attrition at Endline-II	T_L v C	T_{LH} v C	T_{LH} v T_L
Treatment Indicator	-0.175	0.118	0.293
	(0.312)	(0.347)	(0.295)
Joint p-value on characterstics at Endline-II	0.24	0.37	0.61

Panel A provides sample sizes of each treatment arm as well as the control group. T_L refers to the learning only arm, while T_{LH} refers to the learning and home visit arm. Numbers in parentheses in Panel A give the attrition rate with respect to the baseline sample. In Panel B, we report p-values for joint significance for potential correlates of attrition. The dependent variable takes the value 1 if outcome variables at the respective endline are missing. We regress this on the same set of covariates used for the balance checks in section 3.2 and are as follows:

Table A.2: Treatment Effect on Maternal Knowledge and Practice Indices

Dependent Variable	(1)	(2)	(3)	(4)	(5)
	Learning	Learning	SDS	Learning*	Learning
Panel A: Knowledge		and Visit		SDS	and Visit*SDS
Hygiene Knowledge (Index)	0.872***	0.933***	-0.011	-0.010	0.012
	(0.204)	(0.187)	(0.018)	(0.027)	(0.026)
Nutritious Food Knowledge (Proportion Correct)	0.045	0.059**	-0.003	0.003	0.004
	(0.031)	(0.027)	(0.003)	(0.004)	(0.004)
Good Feeding Awareness (Proportion Correct)	0.089***	0.099***	-0.001	0.001	0.001
	(0.019)	(0.022)	(0.003)	(0.003)	(0.003)
Child Engagement (Index)	0.076	0.134	-0.007	0.022	0.044
	(0.216)	(0.230)	(0.022)	(0.031)	(0.142)
Panel B: Practice					
Handwashing	0.152	0.587**	-0.025	0.028	0.006
	(0.264)	(0.256)	(0.017)	(0.034)	(0.030)
Good Hygiene	0.746**	0.549**	0.013	-0.029	0.015
	(0.291)	(0.263)	(0.014)	(0.034)	(0.034)
Water Safety	0.222	0.649**	0.021	0.007	-0.031
	(0.262)	(0.257)	(0.017)	(0.033)	(0.030)
Balance Food Provision	0.182	0.713***	0.011	0.017	-0.039
	(0.206)	(0.201)	(0.021)	(0.030)	(0.026)
Good Feeding	0.184	0.283	0.004	-0.008	-0.005
	(0.205)	(0.181)	(0.018)	(0.027)	(0.025)
Child Engagement (Talk, Read, Play)	-0.054	0.154	0.007	0.005	-0.017
	(0.209)	(0.203)	(0.017)	(0.025)	(0.068)

$N = 1,639$. ***,**, and * represent significance at the 1%, 5%, and 10% level, respectively. The social desirability scale (SDS) takes values from 1 to 10 for the question: "I want to be a respectful person in my village." The outcomes are constructed as follows: i) standardize all individual components by control group mean and standard deviation. ii) construct weights based on Anderson (2008) to increase efficiency by down weighting highly correlated measures, iii) calculate aggregate index by taking weighted average of individual components and restandardizing it by control group mean and standard deviation. Standard errors are clustered at the village level.

Table A.3: Mediation Analysis for Hygiene Outcomes

	(1)	(2)	(3)	(4)
	Learning		Learning and Visit	
Panel C: Mediation Analysis	ACME	Direct	ACME	Direct
Handwashing	0.168	0.164	0.192	0.413
95% Confidence Interval	[0.118, 0.226]	[0.040, 0.286]	[0.132, 0.258]	[0.288, 0.537]
Mediated Effect (%)		50.46		31.70
Good Hygiene Practice	0.212	0.371	0.246	0.417
95% Confidence Interval	[0.159, 0.273]	[0.243, 0.498]	[0.182, 0.317]	[0.285, 0.547]
Mediated Effect (%)		36.29		37.02

$N = 1,730$. ***,**, and * represent significance at the 1%, 5%, and 10% level, respectively. The outcomes are constructed as follows: i) standardize all individual components by control group mean and standard deviation. ii) construct weights based on Anderson (2008) to increase efficiency by down weighting highly correlated measures, iii) calculate aggregate index by taking weighted average of individual components and restandardizing it by control group mean and standard deviation. Standard errors are clustered at the village level.