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Father involvement and early child development in a low-resource setting

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Abstract

Evidence on the role of father involvement in children's development from low-resource settings is very limited and historically has only relied on maternal reports of father's direct engagement activities such as reading to the child. However, fathers can also potentially influence their children's development via greater positive involvement with the mother, such as by offering interpersonal support or sharing decision-making duties. Such positive intrahousehold interactions can benefit maternal mental health and wellbeing, and ultimately children's development. We use data collected from mothers, fathers and children in the context of the cluster randomized controlled trial evaluation of *Msingi Bora*, a responsive parenting intervention implemented across 60 villages in rural western Kenya, to explore the various pathways through which fathers may influence their children's outcomes. In an endline survey in Fall 2019 among a sample of 681 two-parent households with children aged 16–34 months, fathers reported on measures of their behaviors towards children and with mothers, mothers reported on their wellbeing and behaviors, and interviewers assessed child cognitive and language development with the Bayley Scales. In adjusted multivariate regression analyses we found that greater father interpersonal support to mothers and greater participation in shared household decision-making were positively

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Author statement

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Declaration of competing interest
We declare no competing interests.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2022.114933>.

associated with children's development. These associations were partially mediated through maternal wellbeing and behaviors. We found no association between fathers' direct engagement in stimulation activities with children and children's outcomes. Inviting fathers to the program had no impact on their involvement or on any maternal or child outcomes, and fathers attended sessions at low rates. Overall, our results show the potential promises and challenges of involving fathers in a parenting intervention in a rural low-resource setting. Our findings do highlight the importance of considering intrahousehold pathways of influence in the design of parenting interventions involving fathers.

Keywords

Early childhood development (ECD); Parenting intervention; Rural western Kenya; Father involvement

1. Introduction

Parenting behaviors and the quality of the home environment are major contributors to early childhood development (ECD) outcomes and can have long-lasting consequences for children (Bornstein, 2001; Cunha and Heckman, 2007). Parenting interventions that promote responsive stimulation and early learning have been shown to be effective in mitigating risk factors associated with poor ECD outcomes, such as poverty and poor parenting skills, across numerous high- and low-income country settings (Black et al., 2017; Britto et al., 2017; Jeong et al., 2021). Yet to date, these interventions have focused almost exclusively on mothers, who are the primary caretakers in the majority of families worldwide (Aboud and Yousafzai, 2015; Bornstein and Putnick, 2016).

Over 70% of households in low- and middle-income countries (LMICs) have a father present (United Nations, 2017), and the father is often the household head with significant decision-making power and influence on family dynamics (Baland and Ziparo, 2017). To date, however, 93% of all rigorously-evaluated parenting interventions worldwide targeting children aged 0–3 have exclusively focused on mothers, without any attention to fathers (Jeong et al., 2021). Though a growing body of evidence from high-income countries (HICs) largely based on observational data has recently demonstrated the important contributions of fathers for promoting ECD and family wellbeing (Cabrera et al., 2007; Cowan et al., 2009; Panter-Brick et al., 2014), our knowledge about the contributions of fathers in LMIC settings remains very limited and relies on maternal reports of father involvement (Bornstein and Putnick, 2016; Jeong et al., 2016). Both the existing theoretical and empirical research suggest the need for more studies on the role of father involvement in child development from LMIC settings.

1.1. Theoretical frameworks

Since the mid-1980s, sociodemographic and cultural transitions in HICs have changed the role of fathers in the family from the traditional “provider” role to having greater involvement in family wellbeing and child-rearing (Flouri, 2005). Similar trends have taken place more recently in LMIC settings (Richter et al., 2011). As fathers become more

engaged with their families, researchers have created conceptual models based on the Family System theory that identify the father's direct as well as indirect pathways of influence on their children (Lamb and Tamis-LeMonda, 2004). Direct pathways typically refer to father's engagement in positive interactions with children; indirect pathways typically refer to intrahousehold processes in which the father indirectly affects the child, for example by influencing the mother's emotional and physical availability to the child. In this paper we refer to these as "child-directed" engagement and "intra-household" involvement (Fig. 1). Though we recognize fathers' child-directed behaviors also occur within the household, we use the term "intra-household" to refer to involvement in other household matters that might impact the child.

There is little debate about the importance of measuring direct effects of fathers on children, for example, through cognitive or language stimulation, as well as engagement in warmth or disciplinary practices (Pleck, 2010). Interest in measuring intra-household pathways is more recent and has included positive support or negative conflict between spouses (Newsom et al., 2008), provision of material and social capital to the family (Pleck, 2010), or help with housework (Altintas and Sullivan, 2017). The importance of measuring such intra-household pathways is further supported by social support theories (Heaney and Israel, 2008) that elucidate how the father's provision of instrumental, informational, and emotional support to the mother can facilitate the mother's direct engagement with her child. Fathers in Africa are often portrayed as social supports for the family, with potentially both positive and negative aspects (Nsamenang, 2010). Their positive intra-household involvement, whether determined by economic or cultural factors, have positioned the father as a protector and a provider of financial support, a social network of family and friends, and support to the mother (Abubakar et al., 2017; Nsamenang, 2010).

Alongside conceptual frameworks of the role of the father in child development, international agreements such as the United Nations Convention on the Rights of the Child (Nations, 1989) claim it is a child's right to receive responsible parenting from both parents. A more recent guideline on Early Childhood Development (WHO, 2020) recommends that both parents provide responsive care and stimulation to their young children, and considers fathers as important stakeholders in the promotion of maternal and child health.

1.2. Empirical evidence for fathers' effects on children

Determinants of Father Involvement: The evidence on the determinants of father involvement is richer in HICs and shows a clear positive link between education and family wealth with father's direct engagement with children (Cabrera et al., 2007; Lin et al., 2017). Conversely, existing studies from LMICs do not find consistent evidence on such associations (Jeong et al., 2016; Maselko et al., 2019), as well as no consistent differences by sex of the child (Bornstein and Putnick, 2016; Maselko et al., 2019). Moreover, while there is evidence that mothers tend to engage in more stimulation practices with healthier and more developed children (Attanasio et al., 2020), there is less evidence about how children's development influences father's direct engagement from LMIC settings. Finally, very little is known about the determinants of father intra-household involvement in LMIC settings.

Fathers' Child-Directed Engagement.—In most societies, mothers spend more time caring for young children than fathers, but the gap appears to be greater in LMICs. A recent study including 15 high-income countries shows a steady increase in fathers' engagement in direct caregiving and housework since 1970 (Altintas and Sullivan, 2017). In LMICs, meanwhile, a study including 39 countries shows that only 27% of fathers played with their under-5 year old children in the past three days compared to 57% of mothers; similarly, 30% of fathers took their child outside the home while 59% of mothers did so (Bornstein and Putnick, 2016). Societal gender norms are a strong determinant for what fathers do with their young children, and fathers are more likely to conform to social norms than mothers (Bornstein and Putnick, 2016).

Evidence of fathers' direct influence on children's development also comes primarily from HICs. Recent meta-analyses of parenting interventions involving fathers show that greater father-child engagement can improve children's cognitive and socioemotional development (Henry et al., 2020; Rollè et al., 2019), early learning (McWayne et al., 2013), and behavioral outcomes (Sarkadi et al., 2008). Much less work has been done in LMICs, with a few notable exceptions. Using MICS data from 38 countries, Jeong et al. (2016) find that fathers' engagement in stimulation practices such as reading and playing with the child were positively associated with child development among 3 and 4 year-olds. These findings stand in contrast to two other studies from Honduras and from six Caribbean countries that find no robust effects of paternal stimulation on children's outcomes (Urke et al., 2018; Yildirim and Roopnarine, 2017). In another study from Pakistan, Maselko et al. (2019) find that father involvement during the first year of life in activities such as playing or soothing the infant predicted child socioemotional development at 6 months of age, but not cognitive development at 12 months.

Fathers' Intrahousehold Engagement.—Existing evidence on the effects of fathers' intrahousehold involvement on children's outcomes is also richer from HICs. It emphasizes the importance of fathers' instrumental support (e.g., financial contribution), interpersonal support to the mother, and coparenting to improve maternal wellbeing and behaviors, which in turn lead to improved child outcomes (Cowan et al., 2009; Goeke-Morey and Mark Cummings, 2007). In LMICs, interventions have successfully engaged fathers in household and childcare tasks, in prevention of intimate partner violence, as well as in the improvement of maternal mental health and gender equity (Abramsky et al., 2014; Doyle et al., 2018). However, none of these studies analyzed whether these improvements translated into better child outcomes.

1.3. Kenyan context

Our setting of rural Kenya is characterized by high rates of poverty, the highest rates of spousal violence in Kenya (DHS, 2009), as well as pervasive and restrictive gender norms (Aberman et al., 2018). The "traditional" role of the father in these settings is as a provider and protector for the family, with little involvement in the active parenting of young children, which is left to mothers (Lasser et al., 2011; Mwoma, 2015). Previous evidence on the role of fathers in their children's lives in Kenya is limited. A qualitative study involving Kenyan parents and health workers confirms the traditional role of the

father and highlights that fathers spend most of their time searching for work and ways to make financial contributions (Lindland et al., 2018). Another qualitative study of fathers and mothers from coastal Kenya also confirms this traditional view of fatherhood, but notes a recent openness towards more egalitarian roles (Abubakar et al., 2017). Importantly, this study also finds that poor marital relations was a barrier to father involvement and that the father's support for the mother serves as a model for children's social-emotional behaviors.

The goal of this study is to examine the various pathways through which father involvement is associated with child outcomes in rural Kenya and in the context of the cluster Randomized Control Trial (cRCT) evaluation of *Msingi Bora*, an ECD responsive parenting intervention that targeted both mothers and fathers. The curriculum included messages on responsive interactions with children and strategies to improve love and respect within the family, so we hypothesized that both parents would improve their responsive parenting behaviors and involvement in respectful communications and mutual support. Unfortunately, an earlier analysis of the impacts of *Msingi Bora* showed no added benefit from inclusion of fathers into the intervention on maternal and child outcomes, as well as on father's direct involvement in stimulation practices with children (Luoto et al., 2021), a result potentially driven by low attendance of fathers to the sessions. In this paper, we add to these analyses by limiting ourselves to the subset (64%) of two-parent households and by including measures of father's intrahousehold involvement not reported in earlier analyses such as fathers' interpersonal support offered to the mother and participation in shared decision-making by the couple. We hypothesized that such intrahousehold pathways, often going through the mother, might be relevant in our rural setting characterized by rigid gender norms and where parenting duties still largely fall under the purview of mothers. We use our collected data on father's child-directed and intrahousehold involvement to further explore intervention impacts on father involvement, as well as to explore its determinants. Furthermore, by examining associations between our various measures of father involvement with maternal and child outcomes, we investigate the potential child-directed and intrahousehold pathways of father influence on their children in a rural Sub-Saharan African context. A key novelty of our approach is that our data of father involvement come directly from fathers themselves, rather than based on second-hand reports from the mother, which is unique from a LMIC setting.

Learning more about how father involvement is associated with child and family wellbeing in LMIC settings is crucial to understand the potential added benefits of engaging fathers into parenting programs. Our research questions are:

1. What are the determinants of father involvement and impacts of *Msingi Bora* on father's child-directed and intrahousehold involvement?
2. How does father's child-directed engagement relate to children's outcomes?
3. How does father's intrahousehold involvement relate to maternal and children's outcomes?
4. Do maternal wellbeing and behaviors mediate the relationship between father intrahousehold involvement and children's outcomes?

2. Methods

2.1. Background of research trial

The data for this manuscript came from the cRCT community effectiveness evaluation of Msingi Bora implemented between October 1, 2018, and November 1, 2019, that tested two alternative delivery models for a responsive parenting intervention across 60 villages in rural western Kenya. Full details of the sample, study setting, and trial design are described elsewhere (Luoto et al., 2021). Briefly, 1152 mothers with children aged 6–24 months were recruited to participate in a baseline survey (October 1 to November 12, 2018). If married or in established relationships, fathers were also eligible to participate, and we collected data from 500 of 714 fathers (70 percent) reported by the mother as living in the household at the time of baseline data collection. Mothers and fathers provided written informed consent at the baseline survey. Ethics approval was obtained from the ethics committee at Maseno University in Kisumu, Kenya, and the RAND Corporation.

The responsive parenting interventions lasted from mid-November 2018 to mid-July 2019 and have been described in detail previously (Luoto et al., 2021). They consisted of a total of 16 fortnightly sessions over 8 months delivered by local Community Health Volunteers (CHVs) across 40 intervention villages in the counties of Homa Bay and Vihiga in western Kenya. The 40 intervention villages were randomly allocated to one of two intervention groups, where half (20 villages) received only group-based sessions, and the other half (20 villages) received 12 group sessions combined with 4 home visits. The remaining 20 villages received no intervention and comprised a comparison group.

Among the 40 intervention villages inviting mothers and children, 20 villages (10 from the group-only and 10 from mixed-delivery villages) were randomly selected to also invite fathers to participate in all 16 sessions. Four of these sessions were held separately only for fathers as a way to encourage their attendance, and the remaining 12 sessions were joint with mothers and children. Father-only sessions emphasized topics of respectful communication between spouses, resolving conflicts, father involvement in childcare and household tasks, and interpersonal support between spouses.

Between August 5 and October 31, 2019, we conducted an endline survey across all 60 villages participating in the study, and collected data from 1070 of the original 1152 mother-child dyads with no evidence of selective attrition (Luoto et al., 2021; Table A2 Supplementary Appendix), as well as from 635 of the 681 (93 percent) fathers reported by mothers as living in the household at the time of the endline survey. In intention-to-treat (ITT) analyses, the main interventions (group-only and mixed-delivery arms) successfully improved child cognitive, receptive language and socioemotional outcomes as well as maternal stimulation practices at endline relative to the control group. However, we saw no added impacts on maternal or child outcomes, or on paternal stimulation practices with children among villages that additionally invited fathers into the program (Luoto et al., 2021; Table A3 Supplementary Appendix).

Rural Kenya is characterized by high rates of rural-urban temporary migration, particularly among fathers looking for work (Agesa, 2004). For our own sample, nearly half (46%) of

households had fathers who were not present at one or both surveys (497 of 1070), many of whom had likely migrated. Because of this, mothers were our first point of contact and the ones who would report whether the child's father was living in the household at both survey waves. At baseline, mothers, fathers and children were interviewed during the same household visit if the father was available. In practice, this meant only 70 percent of fathers reported as living in the home were successfully interviewed. At endline, we modified our data collection strategy to split interviewers into teams, one to interview the mother and father, and another to assess the child. The parent-interview team was also allowed to interview the father either in a separate visit from the mother or by phone, which resulted in a much higher survey completion rate (93%) for live-in fathers.

Because we are interested in associations between measures of father involvement and maternal and child outcomes, in all subsequent analyses we focus on exclusively two-parent households with present fathers at endline ($N = 681$). We focus on the endline sample because of the high rate of turnover in father presence across waves and lower survey completion rate of fathers at baseline. Appendix Table A1 presents summary statistics for households with and without a present father.

2.2. Data and measures

2.2.1. Father involvement measures—As part of the survey administered directly to fathers, we collected two measures of father involvement. Our measure of *father's child-directed engagement* was focused on the age-eligible child in the household and based on six items from the Family Care Indicators (FCI) adapted to the African context (Kariger et al., 2012). We asked fathers if, over the past 3 days, they had engaged in activities with the child that included reading books, telling stories, singing songs, named/counted or drew things with the child, playing with, or taking the child outside the home. Binary responses to these items were summed with equal weight to create a summary index on a 0–6 scale for fathers (mean: 4.54 ± 1.48 ; Cronbach's alpha: 0.67).

Our first measure of father's intrahousehold involvement asked fathers how many days over the previous week they had engaged in 10 different behaviors that can express either positive support for their wives such as praising them or helping with household chores, or negative behaviors towards their wives. Available responses were zero, one, two, or three or more days, and we reverse coded the five negative items to create a composite positive index of *father's interpersonal support to the mother* on a 0–30 scale (mean: 26.50 ± 3.32 ; alpha: 0.60), where each item was given equal weight (Newsom et al., 2008; Singla et al., 2015).

In addition to these father-reported measures, we asked mothers five questions about *who makes decisions in the household* using modifications to the Demographic and Health Survey (DHS) measures of family decision-making (Kishor and Subaiya, 2008). The questions included what foods to give children, whether to seek medical care if the child is sick, what food is purchased for the family, or who decides if the mother can go to the clinic if sick or to visit relatives. There were three exclusive categories of responses to each of these questions: i) only the mother decides, ii) only the father decides, and iii) the decision is made jointly by the couple. For each of these three response categories, we created a summary index equal to the number of times (from 0 to 5) the mother chose that

category across the five decisions. Because *shared household decision-making* by the couple has been linked to better home environments (Pruett et al., 2017; Story and Burgard, 2012), we use the index for joint decision-making as a second measure of father's intrahousehold involvement (mean: 1.20 ± 1.79 ; $\alpha = 0.89$), as has been done previously (Betancourt et al., 2018). We did not include a measure of father's financial support because our survey indicated that over 99% of fathers reported making financial contributions to the family, leaving no variation for subsequent analysis.

2.2.2. Maternal wellbeing—We collected several measures of maternal wellbeing in our survey administered to mothers. We measured *maternal received interpersonal support from the father* by asking identical questions as we did to fathers about their interpersonal support but now from the perspective of the mother. The composite score (mean: 25.38 ± 4.53 ; $\alpha = 0.72$) exhibits high concurrent validity with the father's offered interpersonal support ($r = 0.404$).

Maternal depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CESD) adapted to the African context (Singla et al., 2015), which asks mothers to rate on a 0–7 scale the number of days in the past week they felt lonely, sad, unhappy, etc. The raw score aggregates over 20 items with a range of 0–60 (mean: 14.60 ± 8.94 ; $\alpha = 0.84$).

Maternal stress was measured using the Daily Stress Index (DSI) (Abidin, 1990), which asks mothers to rate on a 0–7 scale the number of days in the past week they experienced various stressors such as too many demands by their children or spouses, too many responsibilities, etc. The raw score is aggregated over 15 items with a range of 0–105 (mean: 15.72 ± 12.54 ; $\alpha = 0.77$).

Maternal perceived self-efficacy was measured using the short-form of the Self-Efficacy for Parenting Tasks Index-Toddler Scale (SEPTI-TS), a 13-item questionnaire to assess parental self-efficacy in parents of toddlers (Van Rijen et al., 2014). Each item is rated on a 1–4 scale where 1 means “strongly disagree” and 4 “strongly agree”. The aggregate raw score ranged from 13 to 65 (mean: 39.97 ± 4.05 ; $\alpha = 0.66$) and higher scores indicate stronger parental self-efficacy.

Maternal Perceived Social Support was measured using a shortened version of the Lubben Social Network Scale (LSNS), a self-reported measure of social engagement including from family and friends (Lubben et al., 2006). We selected four items on a scale from 0 to 5 that measure the size, closeness and frequency of contacts of a respondent's social network. Scores ranged from 0 to 20 (mean: 10.16 ± 2.30 ; $\alpha = 0.51$).

These five maternal wellbeing scales exhibit moderate concurrent validity when correlated with each other (range 0.05–0.43).

2.2.3. Maternal behaviors—*Maternal child stimulation practices* were assessed at endline using the Home Observation for Measurement of the Environment (HOME) inventory, a 45-item measure combining mother-report and enumerator observation

(Caldwell and Bradley, 2003). Binary responses to items were aggregated to obtain a raw score with a range from 0 to 45 (mean: 29.82 ± 5.21 ; $\alpha = 0.71$).

We measured *maternal nutrition practices* using a child dietary diversity scale where parents report of food eaten by the child in the past 24 h is categorized according to 7 food categories, following WHO recommendations for child feeding (Daelmans et al., 2009). Scores ranged from 0 to 7 (mean: 4.15 ± 1.14).

2.2.4. Child developmental outcomes—Child language and cognition were assessed using the Bayley Scales of Infant Development third edition (Bayley, 2006), a commonly used direct child assessment previously adapted and validated in many African countries (Hanlon et al., 2016; Singla et al., 2015). Standardized scores ranged from 0 to 19 (cognition: 9.09 ± 1.59 ; receptive language: 10.14 ± 1.96 ; expressive language: 8.79 ± 1.64). Socioemotional development was assessed using the Wolke scale (Wolke et al., 1990), which required observational ratings on a 1–5 scale of children’s behavior during testing along seven dimensions (e.g., emotional tone, cooperation, emotional security). The aggregate score ranged from 7 to 35 (mean: 25.21 ± 5.19). We found good concurrent validity of the raw Bayley cognitive and receptive language scores with age (cognitive scores $r = 0.842$, receptive language scores $r = 0.768$) and with HOME scores (cognitive scores $r = 0.235$, receptive language scores $r = 0.204$). Inter-rater reliabilities measured with Cohen/Conger’s κ during field testing were high to moderate (cognition: $\kappa = 0.81$; receptive language: $\kappa = 0.88$; expressive language: $\kappa = 0.71$; socioemotional: $\kappa = 0.49$).

2.2.5. Household socio-demographics and CHV data—During maternal surveys, we collected socio-economic data for all households that included information about family composition, characteristics of the eligible child such as age, sex and birth order, maternal and paternal age and education, and household wealth information including the main materials used for the household’s floor, roof and walls, as well as whether the household owned the homestead, land for production and other assets such as a bicycle, radio, mobile phone, etc. With these inputs, we estimate a household asset index constructed with Principal Component Analysis (PCA). We also collected information about CHV’s age, sex, education, and years of experience as a CHV.

2.3. Statistical analyses

To account for the inherent differences in parental and child measures due to age of the child and for ease of interpretation, we internally standardized all child, mother and father measures using 2-month age bands relative to the control group. None of our findings was sensitive to this standardization. We estimated cross-sectional multivariate linear regressions using ordinary least squares (OLS) models of our standardized measures of father involvement as a function of treatment assignments (group-only delivery, mixed-delivery, and fathers invited), to estimate ITT impacts of Msingi Bora on father involvement and to assess the determinants of father involvement. Similar models were used to examine the associations between father involvement with maternal and child outcomes at endline. All regressions were adjusted by child sex, birth order, mother’s and father’s age and education, strata fixed effects, and our index of household wealth. For the study of

determinants of father involvement, we additionally included child outcomes measured at baseline to examine associations between fathers' behaviors and child's prior developmental status, and we controlled for potential village-level unobserved characteristics by including CHV characteristics such as sex, age, education, and experience. Finally, following the conceptual Fig. 1, we performed a mediation analysis using structural equation modelling to examine the extent to which relevant maternal wellbeing and behaviors together mediate associations between father involvement and child outcomes. We follow standard mediation methods to identify our pool of relevant mediators that show 1) a statistically significant individual association with father involvement, and 2) a statistically significant individual association with the child outcome after controlling for father involvement (Baron and Kenny, 1986).

We corrected for multiple hypothesis testing among our potentially correlated measures of maternal and child outcomes (Romano and Wolf, 2005). For the mediation analysis, we also estimated a composite index of overall child development using a PCA that combined age-standardized measures of child cognition, receptive language, expressive language, and socioemotional scores. In all regression models, standard errors were clustered at the village level (the unit of randomization) to account for intra-cluster correlation. Due to our standardization procedure, all results can be interpreted in terms of standard deviation (SD) shifts. All analyses were conducted using Stata version 16.1 (StataCorp, LLC, College Station, TX).

3. Results

3.1. Father involvement and impacts of Msingi Bora

Among the 681 households with present fathers at endline, 52% of eligible children were female and 26 months old on average; the average mother was 28 years old and had 8.8 years of education; the average father was 35 years old and had 9.3 years of education (Table A1, column 2). For these two-parent households, we successfully collected father-reported measures of father involvement for 635 (93%) fathers, and mother-reported measures of father involvement in household decision-making for 675 (99%) households.

The Msingi Bora intervention had no impacts on the father-reported measures of child-directed or intrahousehold involvement for this sample, either from our main interventions targeting the mother-child dyads (group-only or mixed-delivery) or from inviting fathers into the program (Table 1). However, mothers in villages that invited fathers to the sessions reported a non-significant trend of greater levels of joint decision-making by the couple than did mothers in villages that did not invite fathers (0.30 SD, $p = 0.06$).

Among fathers invited to attend sessions, just 51% attended at least one session, and the median father attended only one session. Despite these low overall attendance rates, higher attendance was associated with higher father FCI scores (Table 1, column 1), though not of father interpersonal support to the mother or shared household decision-making (Table 1, columns 2 and 3). In practice, fathers were much more likely to attend one of the four father-only sessions than joint sessions with mothers and children. For example, the first two

father-only sessions had overall average attendance rates of 35 and 36 percent, while father attendance to the 12 joint sessions with mothers and children was nearly zero (Figure A1).

Household wealth was positively associated with father's FCI scores and interpersonal support to the mother, but not with shared decision-making. Baseline child developmental status and having a male CHV delivery agent were positively associated with father's FCI scores at endline, though not with measures of father intrahousehold involvement. No consistent patterns arise for other determinants of father involvement (Table 1).

3.2. Father's child-directed engagement and child outcomes

Greater child-directed involvement from fathers as measured with the FCI was not significantly associated with any measure of child outcomes or with our summary child development index (Fig. 2).

3.3. Father intrahousehold involvement and maternal and child outcomes

Father's interpersonal support to the mother was associated with small but statistically significant improvements in overall child development (0.08 SD, $p = 0.035$), receptive language (0.10 SD, $p = 0.019$), and expressive language (0.11 SD, $p = 0.005$), though not with cognition or socioemotional development (Fig. 2). Shared decision-making by the couple was even more strongly positively associated with overall child development (0.20 SD, $p < 0.001$), receptive (0.22 SD, $p < 0.001$) and expressive language (0.18 SD $p < 0.001$), as well as child cognition (0.15 SD, $p = 0.013$). Again, no difference was observed for children's socioemotional development.

Father's interpersonal support to the mother was associated with statistically significant improvements in maternal received interpersonal support (0.38 SD, $p < 0.001$), general social support (0.12 SD, $p = 0.054$), self-efficacy (0.132 SD, $p = 0.001$), as well as reduced levels of depressive symptoms (0.213 SD, $p = 0.001$) and stress (0.081 SD, $p = 0.017$) (Fig. 3). Associations between shared decision-making and maternal wellbeing were generally weaker, though still statistically significant in the case of maternal received interpersonal support (0.11 SD, $p = 0.035$), and significant at the 10% level for maternal depressive symptoms (0.084 SD, $p = 0.090$). All of these individual relationships are robust to correcting for multiple hypothesis testing.

Fathers' interpersonal support was also associated with improvements in HOME (0.123 SD, $p = 0.035$), and maternal nutrition practices (0.085 SD, $p = 0.040$); shared decision-making was similarly positively associated with both measures of maternal behaviors (HOME 0.146 SD, $p = 0.019$; Nutrition practices 0.126 SD, $p = 0.007$) (Fig. 4). All of these individual associations were robust to correcting for multiple hypothesis testing.

3.4. Mediation analysis

A mediation analysis using structural equation modelling shows that the majority (53%) of the positive association between father's interpersonal support and a child development index can be explained by the combined indirect effect of maternal stimulation, nutrition practices and depressive symptoms, while the direct effect becomes insignificant (Table

2). Meanwhile, only 16% of the association between couple's shared decision-making and children's development can be explained by the combined indirect effect of maternal stimulation and depressive symptoms, the only two relevant mediators for this association. Moreover, the direct effect remains significant, suggesting that shared decision-making is associated with children's outcomes either through a predominantly direct effect or through unmeasured maternal outcomes.

4. Discussion

This paper explores how father involvement is associated with children's development in a low-resource, rural setting. Using data on paternal, maternal and child outcomes from the subsample of two-parent households collected in the context of a responsive parenting intervention implemented in rural Kenya, we examine the various pathways through which fathers' behaviors relate to children's outcomes. Our results suggest that intrahousehold pathways of influence are an important channel through which fathers' behaviors may be associated with children's development in our setting. Specifically, we find that greater father interpersonal support offered to the mother and greater participation in shared household decision-making are associated with small but significant improvements in children's development. In the case of interpersonal support, we find this relationship is greatly mediated by maternal wellbeing and parenting behaviors. In contrast, we find that father's child-directed involvement in stimulation activities is not associated with children's outcomes. Finally, inviting fathers to the intervention did not have any added impacts beyond those achieved from intervening directly with mothers and children.

Our observed null program impacts of inviting fathers to the ECD parenting intervention on maternal and child outcomes was disappointing but perhaps not surprising given the low overall program attendance by fathers. The higher attendance by fathers at the few father-only sessions than to joint sessions with mothers and children suggests the presence of strong gender norms in our setting on activities related to childcare (Nsamenang, 2010). In qualitative interviews conducted during the program's piloting phase, fathers said they would not attend sessions where children were present. In response, we increased the number of father-only sessions and arranged more convenient times for father sessions (e.g., evenings or weekends), and met in a place convenient to them. Post-program interviews with fathers revealed that they would not come unless paid; earning a wage was their main pre-occupation. Male CHVs also confirmed the negative reactions they received when engaging in play and regular routines with children.

Similar to other studies, we do not find consistent patterns for the relationship of father education or sex of the child with father involvement (Aboud et al., 2008; Bornstein and Putnick, 2016; Maselko et al., 2019), but family wealth was an important predictor of father-reported measures of involvement. And similar to other studies that focus on maternal engagement, we find that fathers tend to directly engage more with children of higher ability, which suggests that paternal behavioral responses tend to be reinforcing rather than compensatory in our setting (Attanasio et al., 2020).

Our findings have several implications for the design of future ECD parenting interventions in LMIC settings that are in line with recommendations from a systematic review of these interventions (Panter--Brick et al., 2014). First, the strong associations found between father intrahousehold involvement and child developmental outcomes, as well as the partially mediating role of maternal wellbeing and behaviors, further reinforce the potential benefits of positive father involvement on family wellbeing. These findings suggest that parenting interventions should not ignore the role played by fathers. RCT evaluations of parenting interventions targeting low-income families in HICs have found the greatest success intervening with the couple (Cowan et al., 2009; Pruett et al., 2017), suggesting one possible avenue for further research in LMICs as well. Second, it may be advisable for interventions focused on fathers to place relatively greater emphasis on father intrahousehold involvement in offering interpersonal support to the mother and participating in shared decision-making, which may be at least as important as their child-directed involvement in stimulation practices to improve maternal and child outcomes. Third, our reported low rates of father's participation in the Msingi Bora intervention demonstrate the importance of understanding local gender norms and gender differences in parent expectations and experiences to inform the design of a curriculum and targeted recruitment and mobilization strategies for both sexes.

Our study is among the first to examine how father involvement relates to child development from a LMIC that uses measures of fathers' child-directed and intrahousehold involvement collected from fathers themselves. In contrast to two earlier studies (Jeong et al., 2016; Maselko et al., 2019), we do not find significant associations between father's child-directed stimulation activities with child developmental outcomes. However, these previous studies are based on maternal reports of father behaviors, which are potentially subject to biases, drawing into question the validity of their findings (Hernandez and Coley, 2007). Yet we also recognize the possibility that our father-reported measures of their own engagement activities may be inflated, which could potentially explain why they are not associated with children's outcomes.

Other strengths of our study include that it is the first to link a father-reported measure of interpersonal support offered to the mother to multiple measures of maternal wellbeing and behaviors and to child outcomes, and that enable us to examine potential mediating pathways. Though Maselko et al. (2019) examine the relationship between father's direct involvement with children and maternal depression, they do not examine such forms of intrahousehold support, find inconsistent patterns, and do not perform a mediation analysis. Second, to the best of our knowledge, our study is the first to examine father involvement in the context of a parenting intervention from a LMIC setting that, in addition to mother-child dyads, explicitly invited fathers to test the added benefits of their inclusion. Although inviting fathers did not affect our primary outcomes of interest, our analysis uncovers potential avenues for successfully including fathers into a parenting intervention that can inform future research. Finally, our study covers children's ages during a highly formative period of brain development (16–34 months at endline) and our measures of child outcomes are based on direct assessments, versus maternal report.

Limitations of our study include that we can only examine the role of father involvement on maternal and child outcomes based on correlational analyses due to the absence of intervention effects on father involvement. This limitation leaves open the possibility for reverse causation if fathers are more motivated to engage with mentally healthier mothers or with more mature children. We also only have a single measure of fathers' child-directed involvement based on their engagement in stimulation practices, but it is possible that other types of unmeasured interactions (e.g. warmth, discipline) could provide more evidence of this pathway of influence. Our reliance on information collected directly from fathers at endline necessarily leaves out the experiences and outcomes among households with non-resident fathers. Though we find these families are similar to those with resident fathers, we cannot say what potential bias this could introduce to our findings. In settings characterized by rigid gender norms such as ours, presence of fathers in the home may not necessarily imply greater positive engagement with children or intrahousehold interactions. Moreover, whether non-resident fathers previously played active roles in parenting or fathers who migrate are also less involved remain open questions. Our study area is characterized by high rates of temporary migration for fathers, and a more complete data collection effort that can capture ways in which non-resident fathers interact with the family would be needed to shed light on these questions. Finally, though we collected paternal measures at baseline, this data covered a limited sample of present fathers, restricting our ability to study the evolution of father involvement for a sufficiently representative sample of present fathers.

5. Conclusion

In this paper we show the potential promises and challenges of involving fathers in an ECD parenting intervention in a rural LMIC setting characterized by strong gender norms, as well as the promising potential role for fathers in improving maternal and child outcomes. Our results, though based on correlational analyses, strongly suggest that greater father intrahousehold involvement in offering interpersonal support to the mother and sharing household decision-making duties can improve maternal wellbeing and behaviors, as well as children's development. However, greater father-child direct engagement in stimulation activities did not translate into added benefits for children. Overall, our results suggest that fathers matter for family and child wellbeing in LMIC settings, and parenting interventions that successfully engage fathers in positive intrahousehold interactions could result in improvements in parental behaviors and child development beyond what interventions that focus only on mother-child dyads may achieve. Future research in ECD programming would greatly benefit from testing such interventions in similar low-resource settings to gain a deeper understanding of the causal impact of fathers in children's lives.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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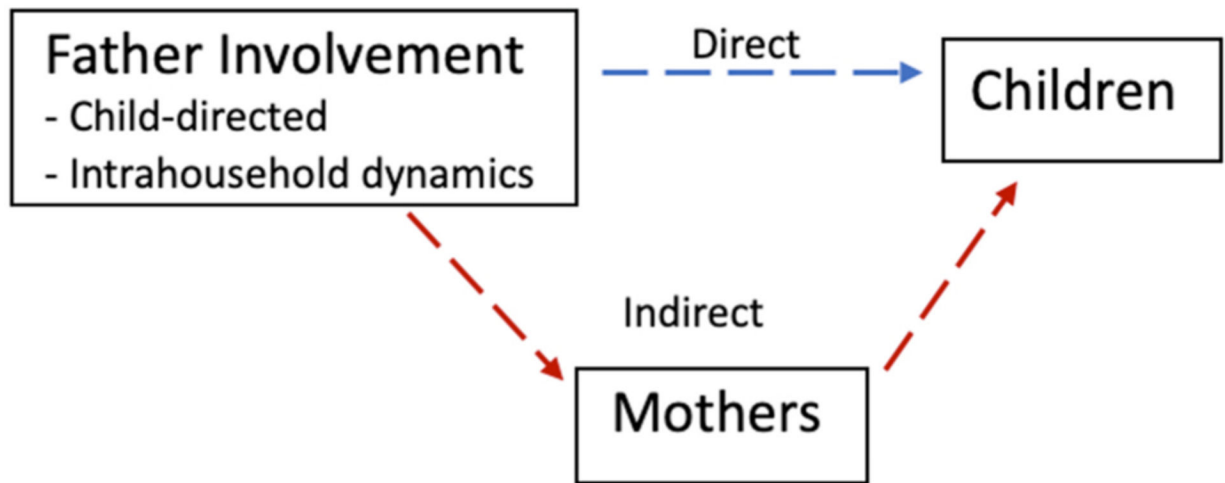


Fig. 1. Conceptual Model for Father Pathways of Influence on Children. Note: Figure shows how father's child-directed (e.g. stimulation practices) and intrahousehold involvement (e.g. support to the mother) can influence children's development either directly or indirectly through the mother.

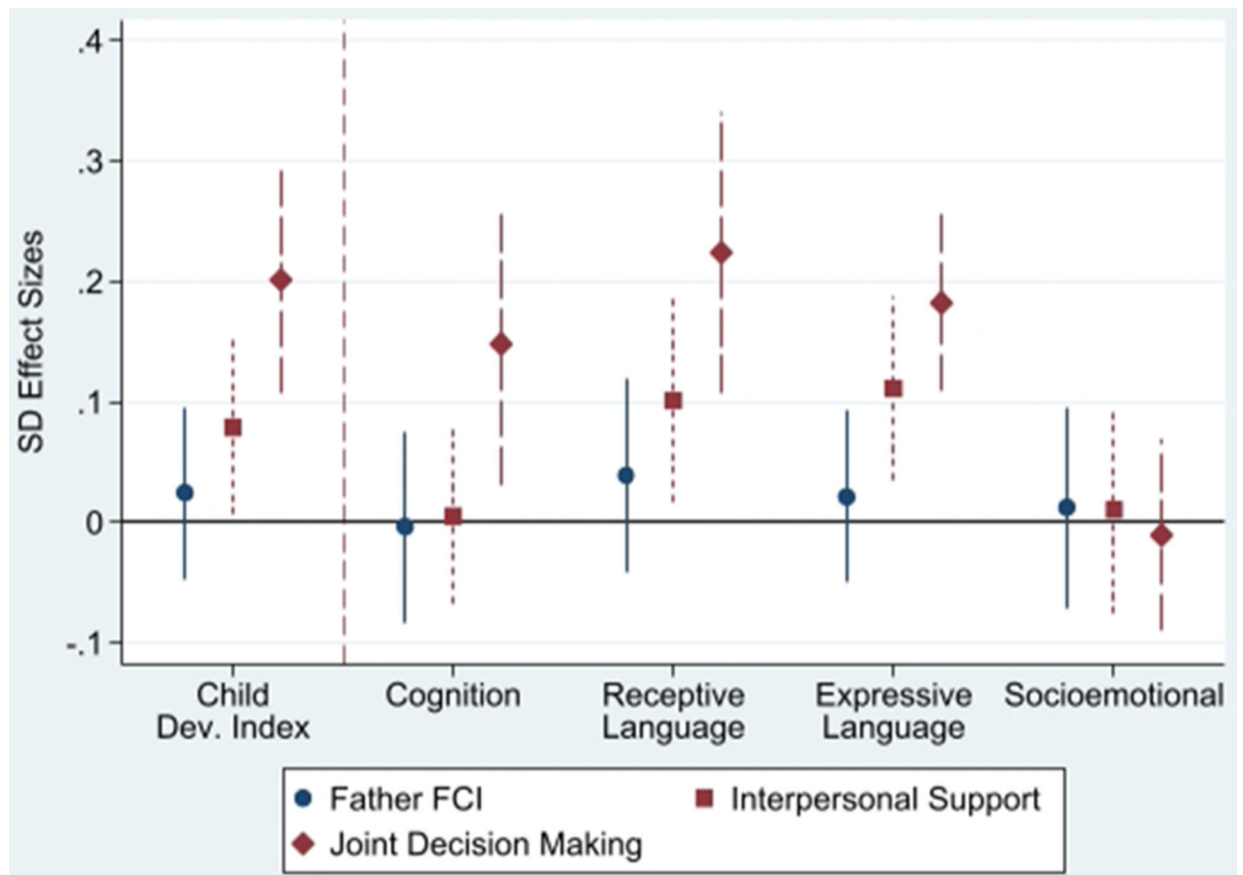


Fig. 2. Father's Child-directed and Intrahousehold Involvement and Child Development. Note: Figure plots coefficients and 95% CIs estimated with OLS regressions of each age-standardized child outcome on a given measure of father involvement, dummy variables for treatment assignments, and household characteristics as explained in Methods. FCI = Family Care Indicators. Sample sizes reported in Table 1. Standard errors clustered at the village.

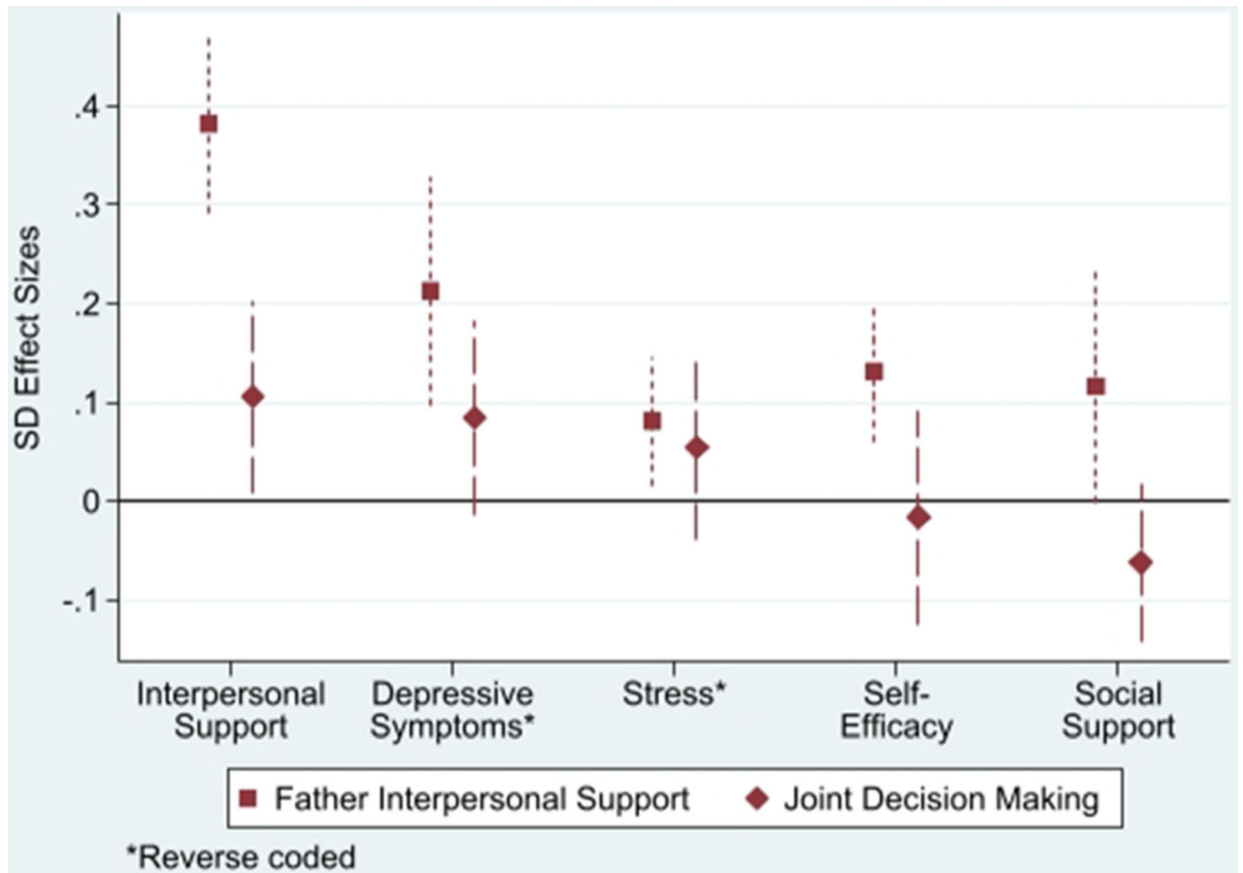


Fig. 3. Father Intra-household Involvement and Maternal Wellbeing. Notes: Figure plots coefficients and 95% CIs estimated with OLS regressions of each maternal wellbeing outcome on a given measure of father’s intra-household involvement, dummy variables for treatment assignments, and household characteristics. Standard errors clustered at the village.

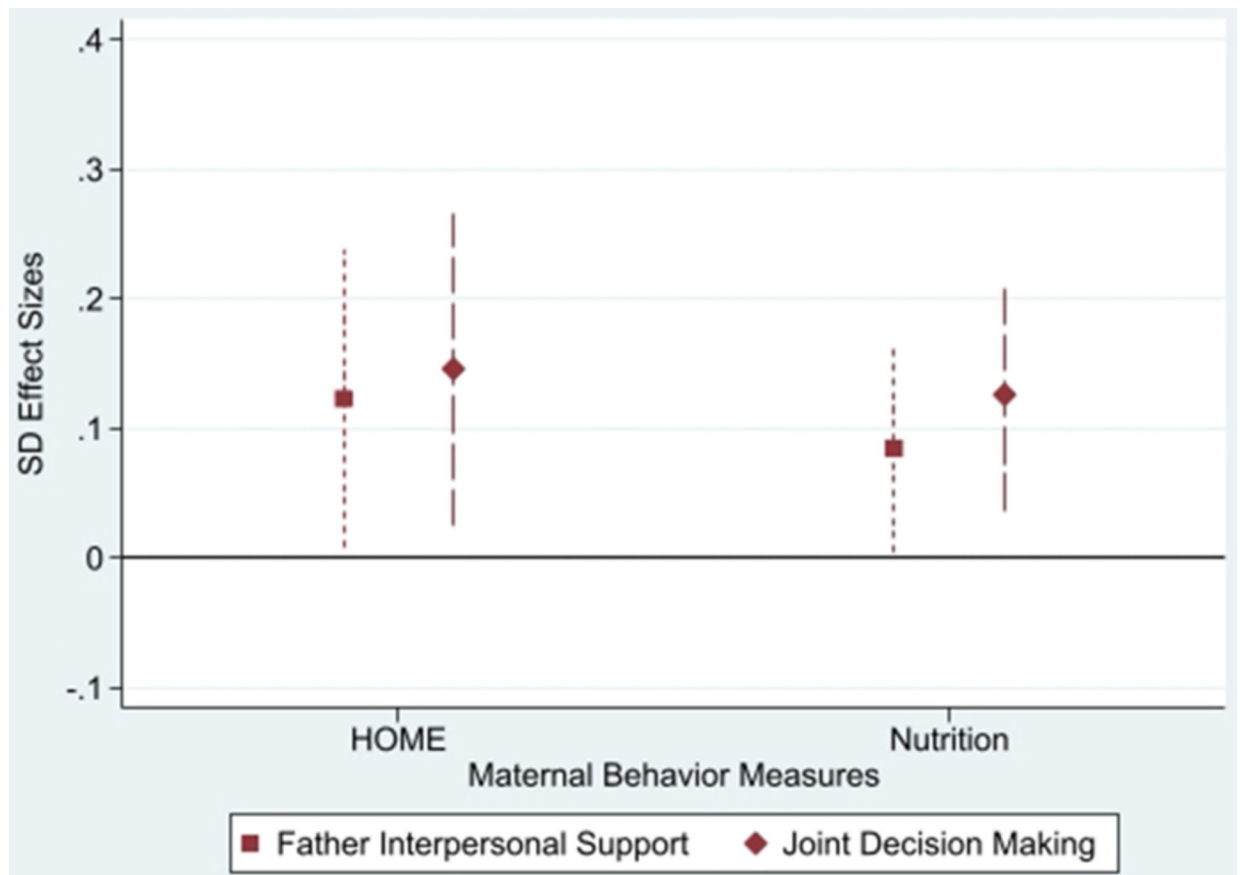


Fig. 4. Father Intra-household Involvement and Maternal Behaviors. Notes: Figure plots coefficients and 95% CIs estimated with OLS regressions of each maternal behavior on a given measure of father's intra-household involvement, dummy variables for treatment assignments, and household characteristics. Standard errors clustered at the village. Variables defined in Methods.

Table 1

Determinants of father involvement and shared household decision making.

	(1)	(2)	(3)
	Father FCI score	Father Interpersonal Support	Joint Decision-Making
Group-only model	0.037 (0.106)	-0.136 (0.127)	0.070 (0.146)
Mixed-delivery model	0.116 (0.101)	-0.176 (0.112)	-0.143 (0.148)
Fathers Invited	-0.105 (0.112)	0.059 (0.104)	0.295* (0.161)
Father attendance (#sessions)	0.085** (0.036)	-0.009 (0.051)	-0.036 (0.038)
Wealth Index	0.087** (0.038)	0.061* (0.036)	-0.039 (0.036)
Mother years of schooling	0.010 (0.067)	0.073 (0.059)	0.134** (0.064)
z-score Child Development Index Baseline	0.096** (0.041)	0.003 (0.036)	0.022 (0.041)
CHV is male	0.170** (0.084)	-0.001 (0.093)	0.134 (0.145)
Number of Observations	635	635	675

Note: Results from OLS regressions of each age-standardized measure of father involvement on household characteristics at baseline and CHV characteristics for the sample of two-parent households at endline. All models include additional controls for child sex, birth order, father education and age, mother age, CHV education and experience; none of which were statistically significant.

p < 0.01,

**
p < 0.05,

*
p < 0.10.

Table 2

Mediation analysis of father intrahousehold involvement, maternal outcomes, and child development.

Dependent Variable: Child Development Index (CDI)	Effect Size (95% CI)	p-value
Father Interpersonal Support		
<i>Relevant Mediators: HOME, Depressive Symptoms, Nutrition Practices</i>		
Total Effect	0.079 (0.008; 0.149)	0.028
Direct Effect (Father Interpersonal Support → CDI)	0.037 (-0.041; 0.115)	0.349
Indirect Effect (Father Interpersonal Support mediator(s) → CDI)	0.046 (0.013; 0.079)	0.005
% Indirect Effect	53.1%	
Shared Decision-making		
<i>Relevant Mediators: HOME, Depressive Symptoms</i>		
Total Effect	0.210 (0.116; 0.304)	0.002
Direct Effect (Shared Decision-making → CDI)	0.176 (0.081; 0.270)	p < 0.001
Indirect Effect (Shared Decision-making → mediator(s) → CDI)	0.034 (0.009; 0.059)	0.008
% Indirect Effect	16.2%	

Notes: Table reports the direct effect of father involvement measures on outcomes that don't go through the relevant mediator(s) (father involvement → outcome), the indirect effect of father involvement that go through the relevant mediators (father involvement → mediators → outcome), and the total effects. Relevant mediators are defined in Methods. Direct and indirect effects were estimated using Structural Equation Modelling (SEM) with Stata 16. Controls include dummy variables for treatment assignments, child sex and birth order, maternal and paternal education and age, household wealth, and subcounty (strata) fixed effects. Standard errors clustered at the village.