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Targeting men, women or both to reduce child marriage

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Targeting men, women or both to reduce child marriage.*

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Abstract

We ask whether it is more effective to target men, women, or both — with the same intervention in the same context — to improve women's and girls' outcomes when behaviour is governed by gendered social norms. We conduct a cluster-randomized controlled trial of an edutainment intervention aimed at delaying marriage of adolescent girls — in two provinces of Pakistan, where community norms favour early marriage. We find that targeting men, alone or jointly with women, reduces child marriages in households directly targeted by the intervention. Targeting women, alone or jointly with men, leads to sustained reductions in child marriages at the village level. To rationalize this pattern of results, we build on a model of Bayesian persuasion in the household, where women are more hesitant to deviate from social norms. We extend this by allowing for gender-segregated information transmission from targeted spouses to other households in the village.

Keywords: Social Norms, Targeting, Gender, Child Marriage, Edutainment

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1 Introduction

Social norms that prescribe the behaviour and actions of women and girls are widespread and persistent.[1] A common explanation for this persistence is that men are dominant decision-makers, and face fewer private incentives to improve outcomes of women (Bernhardt et al., 2018). Interventions that aim to change outcomes for women by targeting men's beliefs about conservative norms can be effective — for example, to improve female labour force participation (Bursztyn et al., 2020). Targeting women or adolescent girls themselves can also be effective (Andrew et al., 2024; Ashraf et al., 2020; Buchmann et al., 2023; Edmonds et al., 2021). However, women and girls often face backlash from their families and communities when they engage in behaviour that deviates from gendered norms (Aizer, 2010; Beaman et al., 2009; Chakraborty and Serra, 2023; Leibbrandt et al., 2018; Macmillan and Gartner, 1999).[2] In some settings, while women and girls would experience private gains from changing their outcomes, these gains may be outweighed by the expected disutility from social sanctions resulting from norm deviations. This trade-off raises the question whether interventions to change behaviour that is governed by gendered social norms should target men or women.

We experimentally test the impacts of targeting men, women or both in the same context with the same intervention about a high-stakes household decision. In particular, we study decisions by parents to delay marriage of adolescent girls, in the presence of age-of-marriage norms that favour early marriage for girls. Early marriage is widespread and persistent in our study context of rural Pakistan. In the parents' generation, 47% of women were married before 18; and in our baseline, 89% of parents still say that marrying a girl before 18 is acceptable. The negative welfare consequences of early marriage for health, education, domestic violence and labour market participation for women and their children are well documented (e.g., Chari et al. (2017); Field and Ambrus (2008); Hicks and Hicks

[1]For example, norms relating to marriage (e.g., Bicchieri et al. (2014); Buchmann et al. (2023); Bursztyn et al. (2017)), taking up work outside the home (e.g., Bertrand et al. (2015); Jayachandran (2021)), domestic responsibilities and caregiving (e.g., Breen and Cooke (2005)), female genital cutting (e.g., Bellemare et al. (2015); Fors et al. (2021); Gulesci et al. (2021)). See also Jayachandran (2015) and Bursztyn and Jensen (2017) for an overview.

[2]See also Buchmann et al. (2023), Edmonds et al. (2021) and Andrew et al. (2024) who show that girls who change behaviour and deviate from gendered norms experience backlash from families or communities — for example through a negative penalty in the marriage market, less favorable assessments by parents of the behaviour of their daughters, and reduced mental health of girls in a context of community sanctions.

(2019); Jensen and Thornton (2003)). Fathers and mothers in our study households are aware of these costs, and have comparable beliefs about the returns to delaying marriage. Mothers, however, are systematically less likely than fathers to want to deviate from age-of-marriage norms.[3] Even if the potential private benefits to women and their daughters from delaying marriage are large, women may still be more reluctant to delay marriage if their concerns about social repercussions dominate — and targeting men could be more effective.

We conduct a cluster-randomized controlled trial (RCT) of an educational entertainment ("edutainment") intervention that discusses the costs and benefits of early marriage. We test across 177 villages in two provinces of Pakistan — where the relevant marriage market is the village[4] — whether the intervention is more effective at delaying girls' marriages when targeted at men, women or both. The intervention consists of a mobile cinema screening of a street-theatre performance, developed by local NGOs and performed by local actors. The screening was followed by facilitated group discussions.

The content was informed by the literature on benefits and costs to the household of early marriage (Adams and Andrew, 2024; Anderson, 2007; Buchmann et al., 2023; Chari et al., 2017; Corno et al., 2020; Corno and Voena, 2023; Jensen and Thornton, 2003). In our context, based on extensive piloting and focus group discussions, potential benefits to delaying marriage in terms of *health and spousal quality*, and potential costs in terms of *deviation from age-of-marriage norms* were selected as relevant, and were included in the intervention.[5]

To implement the RCT, in each village we randomly selected ten households with unmarried adolescents (henceforth: "target households"). We estimate that, on average, we treated 15% of the households with children on the marriage market in each village.[6] Next,

[3]Our baseline data show that mothers have a systematically stronger preference for complying with community age-of-marriage norms than fathers (Table 1). Similar patterns have been confirmed in the literature on female genital cutting (e.g. Bellemare et al. (2015); Gage and Van Rossem (2006); Sagna (2014)).

[4]Our village-level marriage data show that 90% of marriages observed in our study happen between spouses from the same village.

[5]In our context, unlike in Buchmann et al. (2023) and Andrew et al. (2024) there are no immediate gains in terms of the adolescent girls' education outcomes from delaying marriage, as the large majority of girls do not complete any education beyond the age of 13 — implying that marrying off a girl early has no direct repercussions for her education.

[6]In our 177 villages we observe 1383 marriages over 26 months, and thus 3.6 marriages per village per year. Over that same period of time, we observe 188 marriages in our targeted households, so that is roughly 0.53 marriages in a year. So 15% of the "village marriage market" is treated.

we randomly assigned villages to treatment arms — offering the edutainment intervention to the women in the target households, the men, both, or no one (control group villages). Other households in our study villages did not participate in the edutainment intervention.

We conducted a baseline, midline, and endline panel survey with 1,700 target households and 5,100 individuals within these households: an adolescent boy or girl aged 13-17, plus their primary male and female caregivers (henceforth "fathers" and "mothers"). The midline took place six months after the intervention and the endline approximately eighteen months after the intervention. We collected data on marriage outcomes, beliefs about health risks and spousal quality (e.g., expected education of the future spouse conditional on the girl's age-of-marriage), and incentivized measures of beliefs about age-of-marriage norms (e.g., beliefs regarding other community members' acceptability of early marriage). We also collected monthly observational data on all marriages in the 177 villages — including the age of marriage and origins of the brides and grooms — during the entire study period.

In the control group, we see that 11% of adolescent girls in target households were married by midline, and 22% by endline. Focusing on child marriage, 6% of girls at midline and 12% at endline were married at ages below 18. These figures translate into an annual child marriage hazard rate of 2.9 percent at midline and 4.2 percent at endline. We find that targeting the intervention at *women only* does not lead to significant impacts on the probability of child marriage for girls — either at midline or at endline — when compared to the control group. Targeting *men only* leads to significant reductions in the probability of child marriage for girls. We observe a 4.1 percentage points decrease by midline — a 66% reduction relative to the control mean, and 5.3 percentage points decrease by endline — a 43% reduction relative to the control mean. The reductions in the annual hazard rate are comparable and significant when estimating impacts using a hazard model. When *women and men are jointly* treated, we do not observe a significant impact on girl child marriage at midline. However, at endline we find a significant reduction of 5.2 percentage points – 42% relative to the control mean. Reductions are comparable and significant when using a hazard model. Comparing the effect sizes between treatment arms, we find that at midline in the Male arm, the reduction in the probability of child marriage is marginally significantly larger as compared to the Female+Male arm, and significantly larger as compared to the Female arm. At endline, we cannot reject the null that the estimates in all three treatment arms are the same. Our results are robust to reporting of marriage by either the father, mother, or adolescent child. Furthermore, because girls move out of the household after marriage, we can verify the marriage status by observing where the girl resides.

At the village level, the pattern of results we observe across treatment arms is markedly different from the results in our target households. In contrast to the household results, we find that targeting women — alone, or jointly with men — leads to significant reductions in village-level child marriages at both midline and endline. At endline, targeting *women only* amounts to a significant reduction of 20 percentage points in the probability of observing a girl child marriage in the monthly village-level data — equivalent to a 49% reduction compared to the control mean. Targeting *women and men jointly* leads to a decrease of 24 percentage points — equivalent to 58% of the control group mean. Targeting *men only* leads to impacts at midline, but these are no longer significant at endline. Comparisons of the effects sizes at midline versus endline suggest that effects when targeting *men only* fade out over time.

To rationalize these results, we build on a model of Bayesian persuasion between spouses about marrying their daughter early or delaying their daughter's marriage, developed in this paper's companion paper, Anderberg et al. (2024).[7] To explain the difference between the child marriage results in target households and at the village level, we extend the model of Anderberg et al. (2024) to consider equilibrium child marriage outcomes at the village level, arising from gender-segregated information transmission by targeted spouses to other households in the village.

The model of Anderberg et al. (2024) assumes that parents trade off uncertain potential benefits to delaying marriage with potential social sanctions generated by deviation from community age-of-marriage norms. Parents systematically differ in the weight they attach to these sanctions, with mothers incurring a higher cost of stigma when deviating from the norm than fathers. The edutainment intervention introduces *new* information to one or both parents about the potential health and spousal quality benefits of delaying marriage, potentially changing their preferred marriage choice. If only one parent receives the intervention, that parent may leverage the new information to persuade their spouse and align the marriage decision with their preferred choice. Given mothers' stronger reluctance

[7]This model connects to a literature on information-sharing within households, e.g., Ashraf et al. (2014, 2022); Conlon et al. (2021); Fehr et al. (2022); Lowe and McKelway (2021), see Anderberg et al. (2024) for further discussion.

to deviate from the norm, treated mothers may sometimes persuade untreated fathers to marry early, while treated fathers may sometimes persuade untreated mothers to delay. Anderberg et al. (2024) shows that this set-up leads to the predictions that – in the short-run, immediately after the intervention and when the norm in the community is unchanged – targeting fathers alone should increase the likelihood of marriage delay the most, followed by targeting fathers and mothers jointly. Targeting mothers alone should have a smaller impact on marriage delay than targeting fathers alone or fathers and mothers jointly, or no impact at all relative to the control. These predictions are borne out by our data at midline, as discussed above.

To rationalize the village-level child marriage results, we extend the model of Anderberg et al. (2024) by assuming that parents who receive new information from the intervention transmit this information to other individuals in the community through gender-segregated networks. We also assume that mothers — given their relatively stronger hesitancy to deviate from community age-of-marriage norms — experience stronger incentives than fathers to change these norms and transmit information about potential benefits of marriage delay to others in the community.[8] Indeed, in the control group, women report higher engagement in community group activities then men, and women who attended the edutainment intervention report a significantly higher likelihood of having discussed the content of the intervention with other households in the community compared to men. We also provide empirical evidence that the impacts at the village level in arms where women are targeted, either alone or jointly, are driven by villages where women in our target households have "high agency" in their communities. We proxy agency by women's ability to leave their compounds of residence, their education, and their attendance at community meetings. The gender-segregated nature of information transmission implies that, for plausible transmission rates from targeted parents to others in the community, the transmission of this new information could fade over time in arms where men are targeted — while it could reach all households in the community when women are targeted, either alone or jointly with men. We show that the latter can lead to a new equilibrium with delayed marriages, consistent

[8]It is important to note that we are assuming that the behaviour that is regulated by the age-of-marriage norm is the *choice to delay a daughter's marriage* and not the *choice to talk about the intervention*. In fact, given that women face a higher cost of deviating from *early* age-of-marriage norms, they may face stronger incentives to communicate about the intervention, including *new* information that may change that norm to a *delayed* age-of-marriage norm, as that would lower or remove costs of stigma from delaying marriage.

with our village-level results.

Finally, we provide further support for the mechanisms in our model by leveraging the dynamics of our empirical results over time. In our model, the stronger hesitancy of mothers to deviate from age-of-marriage norms drives the differing predictions of marriage delay in target households across treatment arms at midline. Empirically, in the arms where we observe the sustained reduction in village-level child marriages, i.e., Female and Female+Male arm, we also find that mothers expect other community members to be less accepting of child marriage. If we take this as an indication of a "weakening" or "shifting" of age-of-marriage norms, the child marriage predictions at the household level for midline may no longer hold at endline. Mothers may now perceive marriage delay as less of a deviation from the norm, as they observe behaviour and attitudes in the community that are consistent with a less conservative age-of-marriage norm. This may explain why we observe no significant differences at household-level across treatment arms at endline.

These findings have strong policy implications. In contexts such as Pakistan where child marriage is prevalent, even if parents wish to deviate from the prevailing norm and delay their daughter's marriage, they may get "stuck" marrying off their daughters early due to coordination failure across households. In theory, a signal to coordinate on a new norm could shift the norm in the community to later marriage (Buchmann et al., 2023). We provide evidence that a community-based intervention can act as a signal and facilitate coordination on a new norm when delivered to the right decision-makers (in our case, audiences involving women). Such mechanisms pertain not only to child marriage but potentially also to other practices that are harmful for women and girls, such as female genital cutting (Bellemare et al., 2015; Fors et al., 2021; Gulesci et al., 2021).

We expand a literature that aims to **change outcomes for women and girls in a context where gender norms prescribe their behaviour** (Bellemare et al., 2015; Bertrand et al., 2015; Bicchieri et al., 2014; Buchmann et al., 2023; Bursztyn et al., 2017; Efferson et al., 2020; Fors et al., 2021; Gulesci et al., 2021; Jayachandran, 2021). While women and girls are commonly targeted, a nascent body of work has started targeting men (Bursztyn et al., 2017; Dhar et al., 2022). We contribute to this literature by providing a first clean test of whether to target men or women with the *same* intervention in the *same* context.

We also connect to a literature on **norm change in communities** over time. Studies show that community engagement (Andrew et al., 2024), social signalling (Buchmann et al., 2023; Karing, 2024) as well as the introduction of an intermediate, less harmful norm (Corno and La Ferrara, 2022; Gulesci et al., 2021) can be effective to facilitate coordination on a new norm. Our study provides an alternative explanation — that the transmission of new information from individuals targeted by the intervention can endogenously result in non-targeted households also changing behaviour.

We also contribute to the literature on **interventions that seek to reduce child marriage;** see Malhotra and Elnakib (2021) for a review. Laws prohibiting child marriage — where they exist — often suffer from implementation issues in low-resource contexts, and have limited to no impact on delaying child marriage (Collin and Talbot, 2017; McGavock, 2021; Wilson et al., 2022). The same can be said for many such harmful practices towards women and girls that remain persistent despite being legally banned, e.g., dowry, female genital cutting, and domestic violence. Economists have typically focused on poverty and consumption-smoothing as drivers of early marriage (Corno et al., 2020; Corno and Voena, 2023; Tapsoba, 2023). Many interventions address these drivers by easing households' financial constraints, for example through cash transfers and education subsidies (Baird et al., 2010, 2011, 2019; Duflo et al., 2015). While such interventions have been shown to delay marriage, they require relatively large upfront costs, and are typically conditional on schooling. Such interventions may have less impact in contexts such as Pakistan where girls leave school very early. Instead, we evaluate an intervention that addresses information and beliefs. Our intervention is low-cost, and does not depend on financial transfers or girls being in school. It can be straightforwardly replicated by local NGOs elsewhere. It produces sizeable impacts on delaying marriage, with spillovers at the village level.

Finally, we contribute to a growing literature on the effectiveness of **edutainment interventions** in enhancing outcomes for women, e.g., health, education, women's empowerment, as well as broader social cohesion (Armand et al., 2020; Banerjee et al., 2019; Donati et al., 2022; Glennerster et al., 2023; Green et al., 2020; Jensen and Oster, 2009; La Ferrara et al., 2012; Roy et al., 2019; Siddique et al., 2024). We compare the impact of broadcasting the same content to different groups of individuals.

2 Context and child marriage intervention

Rates of early marriage remain high in Pakistan: even among girls currently aged 20-24, 21% were married before 18 (UNICEF, 2019). Our study takes place in the provinces of Sindh and Punjab, where the legal age of marriage for girls and boys is 18 years. In our study villages, in particular, early marriage is widespread and persistent – in the parents' generation 47% of women were married before 18, and 89% of parents at baseline state that marrying a girl before 18 is acceptable.

In our study areas, marriage is a decision made jointly by parents. In 90% of households, fathers are expected to make final decisions about marriage, but mothers are highly involved in 70% of households. These marriage decisions are made in the presence of community age-of-marriage norms that strongly favour early marriage, especially for girls. Our village-level marriage data shows that 90% of marriages observed in our study happen between spouses from the same village – making the village the relevant marriage market – and nearly all parents believe other community members find it acceptable to marry off a girl below 18. Both mothers and fathers are aware of these norms, and do not significantly differ in their beliefs about such norms at baseline. Mothers are, however, significantly more averse to deviating from the community age-of-marriage norm than fathers. Table 1 reports gender differences in parents' preferences for compliance with community age-of-marriage norms and expected community responses to child marriage for girls. Mothers have a stronger preference for complying with community age-of-marriage norms: significantly more mothers than fathers report considering traditions, community opinions and family customs when deciding on the marriage age of their daughter and agreeing that marriages should not happen if the community disapproves. Consistent with their valuation of community opinion, mothers also report to participate more in community group meetings than fathers.[9] Mothers also expect community members to be more accepting of early marriage than fathers. Mothers are more likely than fathers to expect community members to do nothing, and think that fewer community members would expect the community to tell the police or pressure the families when a girl is married off at a young age.

Our intervention, which took place during the first six months of 2019, consisted of a

[9] In the control group at midline 21% of mothers report attending community and micro-finance meetings with other members of the village in the past month, compared to 13% of males. This difference is statistically significant.

mobile cinema screening of an educational and entertaining (edutainment) street-theatre performance. Street theater is a popular art form in South Asia, and uses emotion, immersion, and perspective-taking to address sensitive social and political themes, whilst raising awareness among the public in an entertaining way. To ensure standardisation of the content across communities, the play was pre-recorded and screened to target households as a mobile cinema. The movie of the street theatre lasted approximately 10 minutes.

The play was written and directed by local NGOs and performed by local actors. Our local partner organizations led the content development — combining evidence about households' decisions about the timing of daughters' marriage[10] with their own experience working in the study areas, and focus group discussions (FGDs) they held separately with men, adolescent boys, women, and adolescent girls in pilot communities. For our context, health benefits, spousal quality benefits and costs in terms of deviation from community age-of-marriage norms were selected as relevant. The script stressed the rights of women and girls; the costs of early marriage in terms of health and education for both the young married couple and their children and the perceived costs of deviating from prevailing age-of-marriage norms. The latter were included since the literature on edutainment emphasizes the need to portray struggles that individuals may face in changing behavior, and how they overcome them, rather than focusing solely on benefits (e.g., Banerjee et al. (2019)). This content was conveyed through characters embodying various positions on early marriage and enacting the identified everyday situations. Our local partners obtained approval for their programming, and we received approval for our study from the local governments of Punjab and Sindh after review of the protocols and questionnaires.

A first example of a scene in the play that highlights the *potential benefit of marriage delay* for the girl and her future household is a scene where a highly educated boy arrives back to the village. He is seen arguing with his parents that he wants to marry a girl that is at least 18, because he has had a realization, during his time away from the village, that marrying a young girl might lead to marriage failure and she might not be mature enough to take care of herself, their children or their household. A second example of a scene about potential benefits of marriage delay shows an old man reminiscing on the tragic memory

[10]e.g., household income, such as dowry and bride price (Chari et al., 2017; Corno et al., 2020; Corno and Voena, 2023; Jensen and Thornton, 2003), health of children and grandchildren (Chari et al., 2017; Jensen and Thornton, 2003), spousal and match quality (Adams and Andrew, 2024), and norms governing the age of marriage (Anderson, 2007; Buchmann et al., 2023).

of his deceased first wife. He tells a community member that she was only 15 when she succumbed to complications during childbirth. He further explained that he remarried when he and his wife were both 19, and he has had a good marriage with many offspring.

Table 1: Gender differences in parents' reluctance to deviate from age-of-marriage norms

	(1) Female	(2) Male	(3) Difference	(4) Observations
Consider tradition, community opinion, or family custom when deciding about daughters' marriage age	0.152 (0.360)	0.084 (0.278)	0.068 (0.005)***	736
Agree that marriage should not happen if the community disapproves	0.576 (0.495)	0.416 (0.494)	0.160 (0.000)***	736
Expect that no one in community would support daughter if she wants to delay marriage	0.611 (0.488)	0.582 (0.494)	0.030 (0.532)	736
Expect that community would do nothing if they found out a girl is married young	0.804 (0.397)	0.538 (0.499)	0.266 (0.000)***	736
Community members out of 10 that believe the community will tell the police if a girl is married young	2.067 (2.102)	4.045 (2.522)	-1.978 (0.000)***	736
Community members out of 10 that believe the community will pressure the families if a girl is married young	2.488 (2.322)	4.304 (2.398)	-1.817 (0.000)***	736

Notes: The table shows baseline variables answered by mothers and fathers of adolescent girls from Sindh Province only. Columns 1 and 2 present the means and standard deviations (in parentheses) of the variables for mothers and fathers respectively. Column 3 presents differences in means for fathers and mothers, with p-values in parentheses from robust standard errors clustered at the village level (unit of randomisation) using bivariate regressions of gender on the variables of interest. Column 4 shows the total number of observations for mothers and fathers combined. The upper panel shows variables of which a higher value is associated with a higher preference for norm compliance, where a positive difference between mothers and fathers indicates mothers to be more conservative than fathers. Respondents were asked the most important thing they take into account when deciding when to marry off their daughter. The first row presents a binary variable that is equal to one if the respondent indicated either tradition, community opinion, or family custom to be most important, and zero otherwise. The second row presents a binary variable that is equal to one if the respondent agrees or strongly agrees with the statement "If the community disapproves of a marriage, then the marriage should not go ahead even if the parents want it to," and zero otherwise. The third row presents a binary variable that is equal to one if the respondent answered "nobody" to the question "who from the community would support her if your daughter would want to delay a suggested marriage?" The fourth row presents a binary variable that is equal to one if the respondent answered "nothing" to the question "what would the community do if they found out that a girl was about to be married before the legal marriage age?" The bottom panel shows variables of which a higher value is associated with a lower preference for norm compliance, where a negative difference between mothers and fathers indicate mothers to be more conservative than fathers. The fifth row presents the respondents' beliefs about how many community members out of 10, averaging over men and women, think that the community would tell the police if they found out that a very young girl was about to be married. The sixth row presents the respondents' beliefs about how many community members out of 10, averaging over men and women, think that the community would speak to or pressure the families if they found out that a very young girl was about to be married. The number of observations refers to the total number of 368 females and 368 males in all households with adolescent daughters in Sindh at baseline. Stars indicate: * 1 percent ** 5 percent * 10 percent level of significance.

A scene that highlights *potential costs of marriage delay resulting from community norms about the age-of-marriage* shows a marriage ceremony, where the bride is only 12 years old. Community members attending the ceremony are deliberating whether this is an appropriate age of marriage for the girl. In this scene, the adult women and men claim that marrying at this age is what they have always done in this community. A woman then speaks up and says that they want to stick to traditions because they are concerned about the opinions of the community if they delay a girls' marriage. A young nephew then convinces them that delaying marriage for girls reduces health risks, and that traditions need to be reconsidered when they are harmful to young brides.

The movie screening was followed by a group discussion that followed a standardised format, facilitated by a gender specialist from the local NGOs. Community discussion, sometimes with facilitation, is common after a street-theatre performance. The facilitator followed a carefully scripted list of questions about the experience of participants with the movie, the positions of the various characters, and the consequences of early marriage. The discussion lasted for 30 minutes and facilitators encouraged active participation from all attendees. In the second visit to each village approximately three months later, the local NGOs again conducted structured group discussions based around the content of the movie with the same participants. These discussions were led by the same gender specialist and lasted 50 minutes.

3 Experimental design

We conducted a cluster-randomized controlled trial of the edutainment intervention in 177 villages in Sindh and Punjab provinces in Pakistan. The villages were randomly assigned into four treatment groups:

1. Female arm: Targeting women only;
2. Male arm: Targeting men only;
3. Female+Male arm: Targeting the intervention at both genders simultaneously; or
4. Control arm: No intervention.

The screening of the theater performance and the group discussions were held in communal areas in the village: typically a compound or a room of a community building. In most villages men and women were not allowed to attend the intervention jointly in the

Female+Male arm. Therefore, in this arm, men and women attended separately but simultaneously. Care was taken to inform both groups that the other group would be watching the same screening and would be discussing the same topics at the same time.

Our target households in treatment arms were mobilised to participate in the intervention a few days prior to the screening of the theatre performance, by a designated focal person from the village. The gender of the invited individual from target households was according to their village's treatment status — men, women, or both. The intervention was mainly held indoors, and spaces were limited to twenty participants, and only individuals from our target households were invited. Other households in our study villages did not participate, and we estimate that, on average, we treat 15% of the households with children of marriageable age.[11]

3.1 Sampling and randomization

We conducted the sampling and randomization in three stages. First, the local NGOs selected villages for inclusion in the study. To minimize the risk of contamination across villages, we excluded villages that had less than 1.6 kilometers between their outer boundaries, based on a mapping exercise conducted with the local NGOs and local government offices. This left 80 eligible villages from Sindh Province and 97 eligible villages from Punjab Province. Next, we collected baseline village-level data on key village characteristics including presence of and distance to primary and secondary schools, presence of female teachers, distance to nearest town, presence of a health center and tea shop, population size, and mobility of women in the village.

We next conducted a household listing exercise to obtain a census of households in each village that were eligible to participate in our study. The eligibility criteria were that households needed to have at least one unmarried adolescent son or daughter aged 13-17 years and needed to have at least one adult father or male caregiver and one adult mother or female caregiver in the household. Ages of adolescents were verified either through National Identity Card (NIC), or a Birth Registration Certificate (B-Form) where applicable.[12] From

[11]In our 177 villages we observe 1383 marriages over 26 months, and thus 3.6 marriages per village per year. Over that same period of time, we observe 188 marriages in our targeted households, so that is roughly 0.53 marriages in a year. So 15% of the households with children of marriageable age are treated.

[12]In Pakistan, citizens who are age 18 years and older are eligible for a National Identity Card.

the census of eligible households, we randomly selected ten households per village to participate in our study: five households with an adolescent boy ("boy households") and five households with an adolescent girl ("girl households"). As a result, the planned sample size was 1,770 households (10 households in each of the 177 villages – with three respondents per household: father, mother, and either an unmarried adolescent boy or an unmarried adolescent girl). Some villages did not have a sufficient number of households meeting the selection criteria due to their small size, leading to a final sample size of 1,687 households (5,061 respondents): 756 households (2268 respondents) in Sindh province, and 931 households (2793 respondents) in Punjab province.

After the baseline survey, we randomly assigned villages to one of the four treatment arms, after stratification first by district and second by Mahalanobis distance matching on village-level characteristics.[13] 44 villages were assigned to receive the Male intervention; 45 villages were assigned to receive the Female intervention and 44 villages the Female+Male intervention. The remaining 44 villages were assigned to the Control arm.

4 Data and descriptive statistics

Baseline data were collected in July and August 2018, before the intervention was introduced in the treatment villages. In Punjab Province, we were able collect village-level data and to conduct the baseline household listing exercise (including adolescent's gender, age and marital status) and select our target households; but we were unable to conduct a full baseline survey due to the security situation at the time of the baseline. Randomization of

It is possible, given that our villages are remote and rural, that not all households have applied for these cards. Birth Registration Certificates (B-Form) are issued by the local government at the time of birth. They contain the name and date of birth (DOB) of the individual in question and the name and DOB of their parents as well as siblings.

[13]Our study area covered two districts in Sindh, and two in Punjab. Within each district, the Mahalanobis distance score was computed for each of our sample villages based on the following list of village-level baseline variables: boys only primary school; girls only primary school; mixed gender primary school; girls only secondary school; distance to nearest primary girls' school (in minutes); distance to nearest girls' secondary school (in minutes); are girls allowed to leave the compound; distance to the nearest town (in minutes); presence of teashop; whether the village is a main village or sub-village; total number of households; availability of female teachers in girls' school; and presence of a primary health care center. If in a district, the variable had less than or equal to 2 observations or a correlation >= 0.6 with other variables it was not included in its score computation. Villages were grouped into groups of 8 villages based on the Mahalanobis distance score, and these 8 villages were subsequently randomly assigned to either one of the treatment arms or the control arm.

villages into treatment arms was conducted after the baseline survey, and before the start of the interventions. The security situation in Punjab subsequently eased, and allowed the intervention to go ahead in Punjab according to the assigned treatment arms. The midline survey was conducted from November 2019 until March 2020, i.e. six months after the intervention had ended in the treatment villages and just before the start of the COVID-19 pandemic. When we visited the target households in Punjab for the midline survey, we included retrospective baseline questions on some outcomes of interest. An endline survey was conducted between September 2020 and March 2021, i.e., 18 months after the intervention and during the later stages of the COVID-19 pandemic. We pre-registered the RCT and submitted pre-analysis plans for the analysis of the midline and endline data.

4.1 Household survey data

Household survey data were collected at baseline in Sindh, and at midline and endline in both provinces with three respondents per household: father, mother and adolescent child. From the father we collected data on household demographic information; education, employment, and marital status of all household members; household financial and wealth indicators; and expenditures. From the father we collected data on members' marital history and on decision-making in the household. From all three respondents we collected data on preferences, attitudes, expectations, and beliefs about marriage, with a focus on child marriage (i.e., marriage before age 18). We also asked all three household members about the adolescent child's education, marital status, and (conditional on marriage) the age at the time of marriage and spousal characteristics. Enumerators were extensively trained in asking sensitive questions (e.g., surrounding child marriage), in first responder and referral procedures.[14]

4.2 Village-level observational data on marriages

Throughout the study period from September 2018 until March 2021, we collected monthly village-level marriage data in both Sindh and Punjab provinces. We do not use official administrative data on marriage registrations, since pilot investigation showed that few

[14]IRB approval was obtained from University of Oxford, Approval No. R56430/RE001. No Objection Certificates from local authorities were obtained in Sindh (No.SO(LE-II)HD/Misc-64/2018) and Punjab (No.21(11)/MISC/PSPAP&D/2017).

marriages are registered, and we would especially expect child marriage to remain unregistered due to its illegal nature. Instead, our research field coordinators visited a central location in each village at monthly intervals. The field coordinator mapped out all marriages that happened in the village since their last visit by interviewing a series of individuals independently, and continuing to question different individuals until they had cross-checked that the information was complete and correct. Village-months after and including July 2019 are considered post-treatment months, i.e., after completion of the intervention; while village-months before (not including) July 2019 are considered pre-treatment months, i.e. before or during intervention. The data provide a listing of each marriage that took place in that month, the age of the bride and groom, and the origin of the bride and groom as either from the village or another village.

4.3 Balance

Table 2 shows descriptive statistics and balance checks for household-level variables,[15] while Online Appendix Table O1 shows the same for a pre-specified list of village-level variables. We report the mean and standard deviation in each experimental arm, the p-value for the test that the difference in means between each combination of experimental arms is zero, and the normalized differences between each combination of experimental arms. Our household- and village-level variables are well balanced across treatments. The p-value on the difference in means for each household-level variable is never statistically significant. Only one out of 72 tests for village-level variables has a p-value of less than 0.10. The p-value of the F-statistic of joint significance is never significant. Normalized differences in means are never above 0.13 for the household-level variables; and mostly below the rule of thumb of 0.25, as suggested by Imbens and Rubin (2015), for the village-level variables.

[15] Adolescents' age and gender were the only household-level variables pre-specified for balance checks, since there was only a pre-survey listing in Punjab rather than a full baseline survey due to the security situation. In case there were inconsistencies between adolescents' age at midline compared to their age at baseline (Sindh province) or pre-survey listing (Punjab province), age was verified at midline by the enumerator using National Identity Card or Birth Registration Certificate as applicable. For adolescent age, we report balance checks on this verified midline age minus one year. For 32 adolescents we do not have their age at midline, so we use their baseline age instead. Robustness checks using different ways to address inconsistencies in adolescent age are available from the authors upon request. In Punjab, during the midline survey we asked 'retrospective baseline' questions. For non-pre-specified variables in the table, we use the baseline values for Sindh, and the responses to the retrospective baseline questions for Punjab. These variables are primarily presented for descriptive statistics, and not balance checks.

Table 2 confirms that, by construction, 50% of target households had an adolescent girl surveyed ("girl households") and 50% of target households had an adolescent boy surveyed ("boy households"). The average age of the surveyed adolescent was 15.3 years, and consistent with our selection criteria, their ages ranged from 13 to 17 years at baseline. 36% of the surveyed adolescents were promised/engaged to be married at baseline, but as per our selection criteria none were married. 56% of adolescents were in school at baseline, with the percentage of girls who are in school much lower than that for boys. Parents' average years of schooling is low: 4.5 years for fathers and just 1.2 years for mothers. The average age of (first) marriage of the father was 22.4 years, and the average age of the father's (first) spouse was 18.4 years. Most of parents' marriages (72%) involved a dowry, i.e., a transfer of money or property by the family of the bride to the family of the groom at the time of marriage. Online Appendix Table O1 highlights that in about 64% of the study villages females can leave their compound of residence unaccompanied by a male family member; and on average sample villages have about 170 households.

4.4 Attrition

Online Appendix Tables O2 and O3 present attrition rates by treatment arm for midline and endline respectively; for fathers, mothers and entire households. In Columns 5-10, we test for differential attrition between each experimental arm. In Sindh, where we conducted a baseline survey, we consider a household or individual respondent to have attrited if they participated in the baseline survey but they were not available during the midline or endline survey respectively. In Punjab, since we were not able to conduct a full baseline survey due to security concerns, we consider a household or individual to have attrited if they were randomly selected at baseline from the household listing to participate in the surveys and intervention, and we were not able to survey them during the midline or endline respectively.

The average attrition rates in the control group are low: 5.3% for fathers, 1.2% for mothers, and 0.7% for households at midline; 13% for fathers, 6% for mothers, and 4.6% for households at endline.[16] We are able to recover detailed information on outcome variables

[16]At midline, even though we find that the p-value of one of the 18 tests is significant at the 10% level and one out of the 18 tests is significant at the 5% level, after correcting for the false discovery rate (FDR) across the 6 experimental arm comparisons at the household or the level of each individual, we find that the q-value is not significant. We also note that for the p-values that are significant, the raw difference in the number of attriters is comparatively low: 13 mothers attrited

Table 2: Household-level descriptives and balance

	(1) C	(2) F	(3) M	(4) F+M	(5) F vs C	(6) M vs C	(7) F+M vs C	(8) F vs M	(9) F vs F+M	(10) M vs F+M
Adolecent is female	0.509	0.488	0.475	0.504	-0.022	-0.035	-0.005	0.013	-0.016	-0.029
	(0.500)	(0.500)	(0.500)	(0.500)	(0.320)	(0.125)	(0.847)	(0.578)	(0.421)	(0.177)
					[-0.043]	[-0.069]	[-0.011]	[0.026]	[-0.032]	[-0.058]
Adolecent's age	15.332	15.448	15.473	15.408	0.116	0.142	0.077	-0.025	0.040	0.065
	(1.170)	(1.243)	(1.251)	(1.173)	(0.212)	(0.107)	(0.457)	(0.774)	(0.655)	(0.456)
					[0.096]	[0.117]	[0.065]	[-0.020]	[0.033]	[0.055]
Adolescent is engaged	0.360	0.279	0.324	0.266	-0.081	-0.035	-0.094	-0.045	0.013	0.059
	(0.481)	(0.450)	(0.469)	(0.443)	(0.297)	(0.651)	(0.194)	(0.533)	(0.841)	(0.385)
					[-0.174]	[-0.075]	[-0.204]	[-0.099]	[0.030]	[0.133]
Adolescent in school	0.561	0.540	0.553	0.584	-0.021	-0.007	0.023	-0.014	-0.044	-0.030
	(0.497)	(0.499)	(0.498)	(0.494)	(0.663)	(0.891)	(0.661)	(0.771)	(0.346)	(0.559)
					[-0.042]	[-0.015]	[0.047]	[-0.028]	[-0.089]	[-0.062]
Years of schooling father	4.464	4.835	5.045	5.052	0.371	0.581	0.588	-0.210	-0.217	-0.007
	(4.821)	(4.759)	(5.091)	(5.104)	(0.333)	(0.158)	(0.229)	(0.650)	(0.669)	(0.957)
					[0.078]	[0.117]	[0.118]	[-0.043]	[-0.044]	[-0.001]
Years of schooling mother	1.187	1.274	1.647	1.511	0.087	0.460	0.324	-0.373	-0.237	0.136
	(3.192)	(3.000)	(3.506)	(3.394)	(0.700)	(0.105)	(0.249)	(0.190)	(0.389)	(0.755)
					[0.028]	[0.137]	[0.098]	[-0.114]	[-0.074]	[0.040]
Marriage age - father	22.386	22.492	22.726	22.054	0.106	0.341	-0.332	-0.235	0.438	0.672
	(4.923)	(5.176)	(5.882)	(5.114)	(0.718)	(0.467)	(0.439)	(0.688)	(0.288)	(0.186)
					[0.021]	[0.063]	[-0.066]	[-0.042]	[0.085]	[0.131]
Marriage age - father's spouse	18.363	18.386	18.540	18.297	0.023	0.177	-0.067	-0.153	0.090	0.243
	(3.467)	(3.707)	(4.042)	(3.967)	(0.855)	(0.552)	(0.831)	(0.677)	(0.731)	(0.489)
					[0.006]	[0.047]	[-0.018]	[-0.040]	[0.023]	[0.061]
Parents had dowry	0.723	0.733	0.718	0.691	0.010	-0.006	-0.032	0.015	0.042	0.027
	(0.448)	(0.443)	(0.451)	(0.463)	(0.878)	(0.933)	(0.630)	(0.815)	(0.522)	(0.700)
					[0.021]	[-0.013]	[-0.071]	[0.034]	[0.093]	[0.058]

Notes: Columns 1-4 show the mean of the variable in each experimental arm – the Female arm (F), the Male arm (M), the Female+Male arm (F+M), and Control arm (C). Standard deviations are indicated in parentheses. Columns 5-10 show the difference in means for each combination of experimental arms. In Columns 5-10, p-values from robust standard errors clustered at the village level (unit of randomization) are indicated in parentheses, using a logit regression for binary variables, and an OLS regression for continuous variables. Normalized differences are reported in square brackets, calculated as the difference between the sample means of experimental arms divided by the square root of the sum of the sample variances. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. "Adolescent is engaged" uses baseline data from Sindh province only, as we did not have a retrospective measure for this in Punjab province. "Marriage age - father" refers to his first marriage, and "Marriage age - father's spouse" refers to his first spouse."Dowry" is a transfer of money or property by the family of the bride to the family of the groom at the time of marriage.

for adolescents from their parents or other household members even when the adolescent is absent, as long as the whole household has not attrited.

4.5 Compliance and participation

Online Appendix Table O4 shows that the gender composition of treatment arms was perfectly complied with. In villages assigned to the Male arm, there were no women that participated in the intervention, and in villages assigned to the Female arm there were no men that participated. We find no evidence that the gender that was targeted had an influence on the number of individuals participating in the intervention. On average, 18 women from target households participated in the Female arm; and on average 16 men from target households participated in the Male arm; and 15 men and 16 women participated in the Female+Male arm. This suggests that it is unlikely that differential participation of men and women across treatment arms will explain our results.

5 Results

5.1 Child marriages in target households

Our pre-specified estimating equation for testing impacts on child marriage is a logit regression for the binary outcome "child marriage:"

$$Y_{ivs} = \alpha + \eta T_v + \rho T_v \times G_{ivs} + \theta G_{ivs} + \delta_s + \mu_{ivs}, \quad (1)$$

where Y_{ivs} is the outcome variable of interest at midline or endline for adolescent i, in village v and in stratum s. Y_{ivs} takes on value one if the adolescent was married below age 18 and zero otherwise. T_v is a vector of dummies for the village being assigned to each of our three treatment arms – *Male*, *Female*, or *Female+Male* – relative to the control group. G_{ivs} is a binary variable that takes on value one if the gender of the adolescent child in the household is a girl. The vector of estimated coefficients η, therefore, represent the intention-to-treat (ITT) effects on households with an adolescent boy, and $\eta + \rho$ represents the ITT effects on households with an adolescent girl. δ_s are fixed effects for randomisa-

in the male intervention versus 5 in the control group; 9 households attrited in the male intervention versus 3 in the control group.

tion strata. Standard errors are robust to village-level heteroskedasticity, as this was the level of randomization. We also report additional p-values for the treatment coefficients as calculated from randomization inference tests (Young, 2019).

An alternative specification for the child marriage data is a discrete approximation of a censored duration model, where we estimate the average annual hazard rate into child marriage for girls aged 13-17 years, taking the method in Corno et al. (2020) as the starting point. Right-censoring occurs in our data because some girls are still unmarried and still under the age of 18 by the midline or endline, whereby they may still experience an unobserved child marriage. The duration we are interested in is, thus, the time after age 13 when they are still unmarried and at risk of being child married, and the moment when she turns 18 and is no longer at risk of child marriage — consistent with the eligibility criteria for adolescents included in our sample.

We convert our data into an adolescent-year panel, where each adolescent contributes at most five observations to the sample, one observation for each at-risk year between 13 and 17 until she is either married and exits the data, or passes the 18-year threshold. We, thus, use the individual marital histories up to the midline or endline survey. Right-censored observations — that is, observations where girls are less than 18 and still unmarried by midline or endline — are coded as missing.[17] Using the adolescent-year panel we then estimate the probability of adolescent i entering marriage at age t, with current age k, in village v and stratum s using the following equation:

$$Y_{iktvs} = \beta T_v + \phi_t + \gamma_k + \delta_s + \epsilon_{iktvs} \tag{2}$$

The dependent variable, Y_{iktvs}, is a binary outcome of interest. Adolescent i will have one of three possible paths for the binary dependent variable, Y_{iktvs}. For an adolescent who is observed to marry between age 13 and 17 at midline or endline, the dependent variable is coded as zero for the ages prior to her marriage and as one for the age at which she marries. When she marries, she exits the data. For an adolescent observed to reach the age of 18 by the midline or endline while still being unmarried, the dependent variable is zero for all of her observations. Finally, for an adolescent still under the age of 18 and unmarried

[17]Note that we observe more completed marital histories at endline than at midline, implying less censoring in the endline analysis. We are, however, interested in short-term and longer-term impacts of our intervention, and therefore conduct the analysis at both midline and endline.

by the midline or endline survey, the observations prior to this censoring point are coded as zero while the post-censoring observations are coded as missing. Other variables are specified as in Equation (1). The vector β is our coefficient of interest and represents the ITT effect of our interventions on the average annual hazard rate of child marriage. ϕ_t is a vector of age fixed effects accounting for the different probability of marriage at at-risk years $\{13, 14..., 17\}$, and γ_k are fixed effects for girls' current age to account for cohort effects. Thus, our identifying variation comes from within-at-risk-age and within-current-age variation in treatment arms and marriage outcomes. We estimate Equation (2) using OLS. Standard errors are again robust to village-level heteroskedasticity, as this was the level of randomisation.

The main difference between the specifications in Equation (1) and Equation (2) is how censored data are accounted for. The child-marriage outcomes in the latter specification codes all girls who are under 18 and not married at the time of the survey as unmarried, thereby not accounting for the continued risk of child marriage in their lifetime.

Table 3 presents the estimated ITT effects on the probability of child marriage for girl adolescents at midline and endline. Columns (1) and (2) present the estimated effects on the probability of child marriage from the logit regression in Equation (1). Columns (1) and (2) show that 6% and 12% of girls are child married in the control group at midline and endline, respectively. In Columns (3) and (4) we present estimated effects on the annual hazard rate into child marriage from estimating the censored duration model in Equation (2) using OLS. The average annual hazard rate of child marriage for girls in the control group is 1.9 percent per year at midline and 3.0 percent per year at endline.

We find that targeting the intervention at women only does not lead to significant impacts on the probability of child marriage for girl adolescents, either in the short- or the long-run, when compared to the control group. We show that targeting the intervention at men only significantly reduces the probability of child marriage for girl adolescents in the short- and in the long-run. At midline, the reduction is 4.1 percentage points, a 66% reduction relative to the control group mean of 6.2 percent. The reduction is similar and significant in both the pre-specified logit specifications and the hazard model (p-value $<$ 0.05). At endline, 1.5 years after the intervention, the reduction is 5.3 percentage points, relative to a control group mean of 12.3% impliying a 43% reduction (p-value < 0.10). The reduction in the average annual hazard rate is similar (p-value < 0.05). When women and men are jointly treated, there is a 5.2 percentage points reduction in the likelihood of child marriage for girl adolescents at endline, implying a similar 42% reduction (p-value < 0.10). The reduction in the average annual hazard rate is also similar (p-value < 0.10). At midline, however, we do not find a significant reduction in the probability of child marriage in this arm. In the Male arm and Female+Male arm, respectively, relative to the Control group, the effect is not significantly different over time – midline versus endline. Comparing the effect sizes between treatment arms, we find that at midline the reduction in the probability of child marriage is significantly larger in the Male arm as compared to the Female+Male arm but only in the hazard model specification (p-value < 0.10), and also significantly larger as compared to the Female arm in both specifications (p-value < 0.05). At endline, we cannot reject the null that the estimates in all three treatment arms are the same.

Our results are robust to using alternative assumptions for estimating the hazard rate model. Column (1) and Column (2) in Appendix Table A1 present results where the duration of interest begins from the individuals baseline age, which is just before the intervention was implemented. Column (3) and (4), present results where censored observations that are still at risk of being child married are coded as the cohort-specific, age-specific, and treatment arm-specific probability of marriage between their current age and below the 18-year threshold. Thereby, accounting for the continued risk of child marriage that girls are exposed to.

Appendix Table A2 shows the estimates from our pre-specified model in Equation (1) for both pre-specified outcomes – "marriage" and "marriage age." The control group mean in Column (1) shows that 11% and 22% of girls are married at midline and endline. We observe significant reductions in marriages (not necessarily child marriages) in the Male arm at midline and endline, and in the Female+Male arm at endline. We can not reject the null hypothesis that estimates between each treatment arm are the same. Columns (3) and (4) show that, conditional on being married, the average age of marriage is 16.6 years at midline and 17.0 years at endline in the control group.[18]

[18]For adolescent boys, we find no impact of the intervention on marriage, age of marriage or child marriage, at midline or endline (Online Appendix Table O6). Boy adolescents aged 13-17 are much less likely to get married than girls: just 3% of boys in the Control arm are married at midline, and 7% at endline. Boys are also much less likely to be child-married: 1% and 4% of boys in the Control arm at midline and endline respectively, compared to 7% and 12% of girls at midline and endline respectively.

Table 3: Target households: Child marriage outcomes for adolescent girls

	Pre-specified Logit		Annual Hazard Rate	
	(1)	(2)	(3)	(4)
	Midline	Endline	Midline	Endline
Female	0.013	-0.025	0.003	-0.006
	(0.671)	(0.493)	(0.671)	(0.542)
	[0.705]	[0.550]	[0.723]	[0.567]
Male	-0.041	-0.053	-0.013	-0.015
	(0.027)**	(0.083)*	(0.016)**	(0.038)**
	[0.048]**	[0.131]	[0.012]**	[0.065]*
Female+Male	-0.015	-0.052	-0.005	-0.013
	(0.498)	(0.081)*	(0.447)	(0.077)*
	[0.488]	[0.092]*	[0.504]	[0.087]*
Observations	828	798	2755	3239
Control Mean	0.062	0.123	0.019	0.030
p-val M $\neq$ F	0.056	0.407	0.023	0.263
p-val FM $\neq$ F	0.361	0.424	0.318	0.383
p-val FM $\neq$ M	0.138	0.948	0.099	0.728
p-val F $<$ C	0.665	0.247	0.992	0.271
p-val M $<$ C	0.014	0.042	0.008	0.019
p-val FM $<$ C	0.249	0.041	0.223	0.039
p-val M $<$ F	0.028	0.204	0.011	0.131
p-val M $<$ FM	0.069	0.474	0.049	0.364
p-val FM $<$ F	0.180	0.212	0.159	0.192

Note: The table presents treatment effects on the probability of child marriage at midline and endline for girl adolescents from our target households. Marriage outcomes are as reported by the adolescent themselves as pre-specified in the pre-analysis plan. Columns 1-2 report marginal treatment effects for girl adolescents ($\eta + \rho$) from the pre-specified logit regression in Equation 1 on child marriage, i.e, a binary variable that takes on value one if the adolescent was less than 18 years old at the time of marriage, for midline and endline respectively. Fixed effects for randomisation strata are included at endline and not at midline due to perfect prediction. Columns 3-4 report the average hazard rate into child marriage, using a discrete approximation of a censored duration model, estimated from Equation 2. Data is an adolescent-year panel, where each adolescent contributes at most five observations to the sample, one observation for each at-risk year between 13 and 17 until she is either married or passes the 18-year threshold after which she exits the data. The dependent variable is a binary variable that is coded as zero for the ages prior to her marriage, and as unity for the age at which she marries. Right censored observations – that is, observations between the current age at the corresponding survey-round and age 18 for girls who are aged less than 18 and still unmarried by midline or endline – are coded as missing. Fixed effects for each age at-risk of marriage, current age and randomisation strata are included. P-values for marginal treatment effects from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Exact p-values for marginal treatment effects from randomization inference tests based on 1000 permutations are provided in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" indicates the probability of child marriage (Columns 1-2) and the average annual probability of child marriage (Columns 3-4) in the control group. P-values for all comparisons of treatment effects between each experimental arm as well as one-sided tests are reported at the bottom of the table: Male arm (M), Female arm (F) and Female+Male arm (FM).

Robustness of marriage reporting: We conduct extensive checks on reporting of marriage outcomes. As explained above, our main specifications in Table 3 and Appendix Table A7 use the reports from the adolescents in the households, and thus not the report from the treated parent. This is common practice in the child marriage literature, as adolescents are assumed to have weaker incentives to misreport. Nevertheless, we triangulate responses from mothers, father and the adolescent in the household and find a rate of consistency above 95%. As presented in Online Appendix Table O5, our results on marriage are robust to using reports by the father, the mother, or any of the three respondents in the household. Furthermore, in our context in Pakistan the dominant practice is patrilocality, i.e., girls move out of the household after marriage. We conducted a verification exercise of the reported marriage status by observing where the girl resides during our midline and endline.[19] Furthermore, in kernel density plots of age of marriage in the control versus treatment arms (Online Appendix Figure O1) we do not see bunching at the 18 year threshold, which is the legal age of marriage. The modal age of marriage remains below 18. These patterns suggest that our results are not driven by demand effects wherein treated individuals begin reporting the legal age of marriage after receiving the intervention.

Finally, a related concern, in reporting or in practice, may be that even if households delay marriages, they might substitute this with engagements. This could be due to the fact that while marriage under 18 is illegal, engagements are not. Reassuringly, we show that for girl adolescents who are unmarried at midline and endline, there is no significant increase in the likelihood of being engaged or newly engaged between survey rounds (Online Appendix Table O7).[20]

5.2 Child marriages at the village level

We use our village-level observational data to estimate impacts on all marriages in our sample villages. As pre-specified, we convert our data into monthly summary statistics at

[19]This was made possible by the fact that 90% of marriages happen between spouses from the same community

[20]We focus on early marriage instead of early engagement, since most of the documented severe negative consequences to girls and to future children arise from practices that take place only after the actual ritual of marriage, such as conjugal living, the girl leaving her birth family's household, and consummation. We note that in this context, girls and boys can be promised or engaged by their families at a very early age or even at birth, while they continue to live with their birth family until the time of marriage.

village-level. We estimate a village fixed-effect regressions of the following form:

$$Y_{vst} = \tau + \kappa T_v + \psi T_v \times post_t + \lambda post_t + \delta_s + \delta_s \times post_t + \xi_{vst} \quad (3)$$

where Y_{vst} is the outcome variable of interest at midline or endline for village v in stratum s at village-month t. T_v is a vector of dummies for the village being assigned to each of our treatment arms — *Male*, *Female*, or *Female+Male* — relative to the control group. $post_t$ is a binary variable that indicates that a village-month falls in the period after completion of the intervention, i.e. after and including July 2019. ψ therefore combines the treatment effect of the intervention on treated households in the village, as well as spillover effects on other households in the village. We estimate ψ for the period up to midline (January 2020) and endline (March 2021). δ_s are strata fixed effects, and $\delta_s \times post_t$ is included for inference since randomization was blocked on strata (Bruhn and McKenzie, 2009). Standard errors are robust to village-level heteroskedasticity, as this was the level of randomization (Abadie et al., 2023).

In Table 4, the variable "child marriage" is a binary variable that takes on value one if in village-month t for village v at least one observed marriage involved a bride below the age of 18, and zero if all observed marriages involved a bride 18 and above. The outcome "average age of marriage" is the average age of all brides who got married in village-month t for village v.[21] In Column 1, at midline, we find a significant reduction in child marriages of girls at the village level across all treatment arms. At endline (Column 2), we see that reductions only remain significant at endline when women are treated alone or jointly, i.e. in the Female and Female+Male arm. We estimate a 20 percentage points (p-value < 0.05) reduction in the likelihood that at least one girl is married below 18 in each month in the Female arm. In the Female+Male treatment arm, the effect is 24 percentage points (p-value < 0.01). For both arms this reduced likelihood is more than a 50% reduction in child marriages as compared to the control mean. The effects at endline in the Female arm are significantly smaller than at midline (p-value < 0.05) and are not statistically different across midline and endline in the Female+Male arm. At endline, we find no significant impacts on girl child marriage when the intervention is targeted at men only. Between midline and endline the estimated effects are significantly different from each other (p-value < 0.01). The evidence, thus, shows that reductions in child marriage in the Male arm fade

[21]By construction, village-months with no marriages are coded to missing for both variables.

out over time, but are sustained in the Female and Female+Male arm. At endline the reduction in the Male arm is significantly smaller than the reduction in the Female+Male arm (p-value < 0.05). We see qualitatively similar effects if we consider average age of marriage in a village-month (Columns 3 and 4 in Table 4), minimum age of marriage in a village-month, or analyze results at the marriage level (Online Appendix Table O8).[22]

The above results are also visually illustrated in Figure 1. The figure decomposes the effect over time by plotting cumulative marriages in each of our post-intervention study months. Immediately after the intervention we observe significant reductions in child marriages in all arms. These initial reductions are, however, only sustained over time in the Female and Female+Male arm. The 95% confidence intervals for the estimated coefficient in each village-month are always below the horizontal red line (zero threshold). We also see that the impact fades out for the Male arm over time, with confidence intervals touching the horizontal red line soon after the intervention.

We find that the intervention does not change the relevant general marriage market – which is the village-level – other than through delaying the age-of-marriage. We find no significant impacts on the likelihood of any marriage nor on the number of marriages per month (Online Appendix Table O9). The large village-level effects are not solely driven by the marriages in our target households, as the number of marriages observed at the village level (N=1383) substantially exceeds the number of marriages observed in our target households (N=188).

Finally, the impacts observed at village level are also consistent with effects on marriage proposals received by girl adolescents in target households as measured in the household panel survey. Online Appendix Table O11 shows a significant reduction in marriage proposals for all girls in the Female+Male arm, as compared to the Control arm; and a significant reduction for girls below the age of 18 in the Female and Female+Male arm, as compared to the Control. Effects are, however, not significantly different between treatment arms. It seems unlikely that effects are entirely driven by proposals from target households: first, in most villages, our households represent only a small fraction of households in the village with adolescents of marriageable age; and second, proposals normally come from boys older than the age of our target adolescent girls. It therefore seems likely that the reduction in proposals to the girls in our target households reflects a shift in behavior by other households

[22] Online Appendix Table O10 presents corresponding tables for boys (grooms).

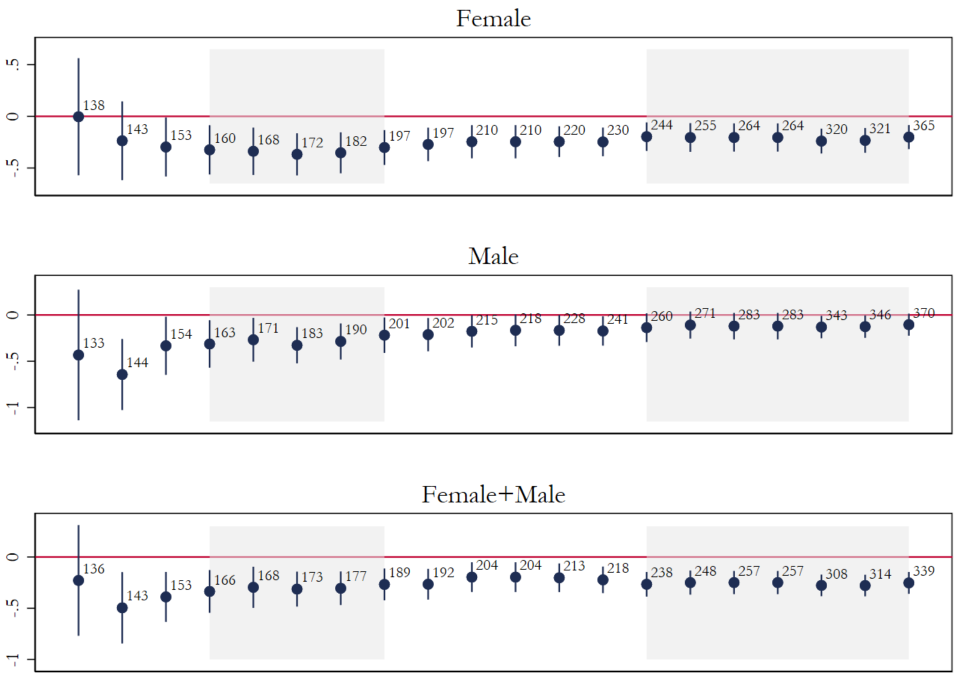
in the village; consistent with the village-level effects observed above.

Table 4: Village-month level: (Child) marriage outcomes for girls

	Child Marriage		Marriage Age	
	(1) Midline	(2) Endline	(3) Midline	(4) Endline
Post X Female	-0.402	-0.201	1.265	0.645
	(0.003)***	(0.015)**	(0.030)**	(0.060)*
Post X Male	-0.335	-0.097	0.725	0.253
	(0.005)***	(0.236)	(0.116)	(0.461)
Post X Female+Male	-0.255	-0.239	0.732	0.831
	(0.028)**	(0.002)***	(0.153)	(0.014)**
Observations	673	1123	673	1123
Control Mean	0.643	0.413	17.333	18.458
p-val M $\neq$ F	0.621	0.218	0.322	0.268
p-val FM $\neq$ F	0.262	0.632	0.337	0.597
p-val FM $\neq$ M	0.505	0.067	0.987	0.101
p-val M > F	0.311	0.109		
p-val M > FM	0.747	0.033		

Notes: The table presents estimates for girls of ψ from Equation 3 using village fixed effects regressions with marriage data aggregated at the village-month level. In Columns 1-2, the binary dependent variable takes on value one if in the village-month at least one observed marriage involved a bride below the age of 18, and zero if all observed marriages involved a bride 18 and above. In Columns 3-4, the dependent variable is the average age of all brides who got married in the village-month. "Midline" counts observations between the pre-treatment months and January 2020 and "endline" counts observations between the pre-treatment months and March 2021. The variable "post" is a binary variable that takes on the value zero if the village-month lies in the period before (not including) July 2019, the period before or during the intervention; and takes on value one if the observation month lies in the period after the intervention was completed. Fixed effects for randomisation strata and their interaction with "post" are included. P-values from standard errors clustered at village level (unit of randomisation), are indicated in parentheses. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" reports the likelihood of child marriage and average marriage age of girls, aggregated to a village-month observation, during the pre-intervention period in the control group. P-values for all comparisons of treatment effects between each experimental arm as well as one-sided tests are reported at the bottom of the table: Male arm (M), Female arm (F) and Female+Male arm (FM).

Figure 1: Village-marriage level: Cumulative child marriage impacts by study month



Notes: Cumulative treatment effects on child marriage for girls using village fixed effects regressions at the level of marriages estimated at each post-intervention observation month. Fixed effects for randomisation strata and their interaction with "post" are included. The binary dependent variable takes value one if the marriage involved a bride below the age of 18, and zero otherwise. The marker represents the point estimate in that month, and the vertical lines above and below the marker the 95% confidence interval based on standard errors clustered at village level (unit of randomisation). The number above the marker indicates the cumulative number of marriages upto that month in the respective treatment arm. The red horizontal line represents the zero threshold. The shaded region on the left corresponds our midline household survey months (November 2019 until March 2020) and the shaded region on the right corresponds to our endline household survey months (September 2020 and March 2021). The panel presents the treatment effects over time – on top is the Female arm versus the Control, in the middle is the Male arm versus the control arm, and on the bottom is the Female+Male arm versus the control arm.

6 Conceptual Framework

In this section we show how a model of intra-household communication and decision-making based on Bayesian persuasion can rationalize our household-level results. This framework, which models spouses who make a decision about marrying their daughter early or delaying their daughter's marriage, is formally developed in this paper's companion paper, Anderberg et al. (2024). To explain differences in outcomes across treatment arms in both target households and at the village level, we extend the model by assuming gender-differential information transmission from targeted spouses to others in the community and by modelling village equilibrium outcomes.

6.1 Household decision in target households

The model is set up as follows. In each household j the father and mother have to make a binary decision, $d_j \in \{0, 1\}$, of either marrying their adolescent daughter *early* or *delaying* her marriage. Delaying marriage ($d_j = 1$) comes with a *potential* benefit $r_j \in \{0, 1\}$. Benefits to delaying marriage can be thought of as arising from improved welfare of the daughter, for example, in terms of improved health or increased quality of her future spouse. Parents, however, have incomplete information about the likelihood of the potential benefit from delaying marriage: the probability of the benefit accruing ($r_j = 1$) can either be low, π_L, or high, π_H. *Ex ante*, all parents hold a common prior $\mu \in (0, 1)$ over the probability of a benefit. Delaying marriage goes against the community age-of-marriage norm and elevates the risk of the household experiencing stigma, indicated by $z_j \in \{0, 1\}$.

Let $\widehat{d} < 1/2$ denote the proportion of households that, historically, have opted for a delayed marriage. It defines the local age-of-marriage norm, with early marriages being relatively common, defining expected behaviour. The risk of stigma for household j is given by $\rho \left(d_j - \widehat{d}\right)^2 > 0$ where $\rho > 0$. Since traditionally marriage delays were rare, $\widehat{d} < 1/2$, choosing delay, $d_j = 1$, increases the household's risk of stigma.

All parents value the potential benefit from delay the same, but differ in their aversion towards stigma, with variation in the stigma-aversion both across and within households. In line with stylized facts in Table 1, it is assumed that fathers (spouse 1) place less weight on community norms than do mothers (spouse 2). Letting $\sigma_{ij} > 0$ denote the stigma aversion of spouse i in household j, the model assumes that, within each household j, $\sigma_{2j} \geq \sigma_{1j}$. The utility of parent i in household j is hence:

$$u_{ij} (r_j, z_j) = r_j - \sigma_{ij} z_j.$$

Whilst all parents share the same prior belief μ about the probability of a benefit to marriage-delay, their beliefs can change if they receive information – either directly themselves or indirectly via their spouse – about the probability of the benefit being high or low. A parent with (updated) belief μ_{ij} and stigma-aversion σ_{ij} will then prefer to delay the daughter's marriage if and only if

$$(1-\mu_{ij})\,\pi_L + \mu_{ij}\pi_H > \sigma_{ij}\rho\left(1-2\widehat{d}\right).$$

That is, their expected benefit to delay exceeds any associated increase in expected disutility from stigma. This may lead the father and the mother in any given household to disagree on the marriage timing decision. Note that if any two spouses share the same beliefs ($\mu_{1j}=\mu_{2j}$), but disagree on the decision, the father prefers delay whilst the mother opposes this, as a result of stronger stigma aversion among mothers than among fathers ($\sigma_{2j}\geq\sigma_{1j}$). Both spouses are assumed to have some influence over the final decision; as a result, each spouse will want their partner to agree with them, if possible.

If both spouses learn the true probability of a benefit to delaying marriage, we say that they are "jointly informed." If on the other hand only spouse i learns this information, we say that spouse i is "privately informed." A privately informed spouse, after learning whether the probability is high (π_L) or low (π_H), can communicate to their partner, but in doing so may report untruthfully that the probability is π_L when it is π_H and vice versa. The purpose of doing so is to manipulate the partner's beliefs in order to forge agreement around the own preferred marriage option ("persuasion"). As fathers are more inclined to favour marriage-delay than mothers, we would naturally expect fathers (mothers) to truthfully report when the probability is π_H (π_L) but to sometimes falsely report π_L (π_H). The partner that receives this signal updates their beliefs about the likelihood of the benefit using Bayes' rule, anticipating that the signal may be truthful or not. For the informed spouse, a privately optimal signal to send to their partner is one that will make their partner's preferred choice align with theirs as often as possible. They choose this signal to maximize their own expected utility – defined by the expected utility from the benefit of delaying marriage and the associated expected disutility from stigma aversion – knowing that their partner will update their belief based on it, following Bayes' rule. Truthful communication will be privately optimal for the informed spouse when – 1) they and their partner's preferred marriage decision are aligned when the benefit is high, and are aligned when the benefit is low, or 2) when the spouses' preferred marriage decision is not aligned for both states of the world. Not communicating the truth is thus only optimal when the spouses are misaligned on one state, but not on the other, and revealing the true state would lead the partner of the informed spouse to prefer a different choice.

The two cases below outline when privately informed fathers and mothers respectively engage in Bayesian persuasion (see Claim 1 in Anderberg et al. (2024)):

Case 1: Persuasion by informed fathers. Suppose that the father (spouse 1) in household j prefers to delay marriage even if the probability of a delay-benefit is low, $\sigma_{1j} < \pi_L/\rho$, but the mother (spouse 2) prefers delay only if the delay-benefit probability is high, not if it is low, that is $\pi_L/\rho < \sigma_{2j} < \pi_H/\rho$. The mother is "persuadable" in that her preferred option depends on her beliefs. The father will then generally falsely claim π_H at π_L. Indeed, if the mother prefers to *delay* marriage based on the prior belief μ, then his optimal communication strategy is to *always* report π_H (both at π_L and at π_H) thereby conveying no information ("information hiding"). Doing so ensures that she does not update her beliefs and hence continues to support marriage delay. If, on the other hand, the mother prefers *early* marriage based on the prior belief μ, then the father *cannot always* persuade her to delay marriage; instead he misreports π_L as π_H with (the largest) frequency that ensures that she prefers delayed marriage when he claims π_H.

Case 2: Persuasion by informed mothers. Suppose that the mother (spouse 2) in household j prefers early marriage even if the probability of a delay-benefit is high, $\sigma_{2j} > \pi_H/\rho$, but the father (spouse 1) prefers early marriage only if the delay-benefit probability is low, not if it is high, that is $\pi_L/\rho < \sigma_{1j} < \pi_H/\rho$. The father is "persuadable" in that his preferred option depends on his beliefs. The mother will then generally falsely claim π_L at π_H. Indeed, if the father prefers *early* marriage based on the prior belief μ, then her optimal communication strategy is to *always* report π_L (both at π_L and at π_H), thereby conveying no information ("information hiding"). If, on the other hand, the father prefers *delayed* marriage based on the prior belief μ, then the mother *cannot always* persuade him to choose an early marriage; instead she misreports π_H as π_L with (the largest) frequency that ensures that he prefers delayed marriage when she claims π_H.

For any household preferences except those described in Case 1 (Case 2) a privately informed father (mother) will report truthfully to their partner. The two cases confirm the key intuition. As fathers are more in favour of delaying marriage than are their partners, they will, if anything, persuade their partners towards delaying marriage. Conversely, as mothers are more in favour of early marriage than are their partners, they will, if anything, persuade their partners towards early marriage. In contrast, when spouses are jointly informed, neither is provided with an informational advantage and no persuasion is possible.

We can now consider what effect information has on marriage timing decisions in target households. By the "effect of information" we mean the change in the probability of delaying marriage compared to when basing the decision on the prior belief. This effect of course depends on what information is provided. Given that the edutainment intervention provided information on the benefits of delaying marriage in order to reduce child marriages, the natural focus is on the case where households are informed that the probability of a marriage-delay benefit is high, π_H. The following result, focusing on information π_H, follows naturally from the above.

Effect of information π_H on marriage delays. The effect of information π_H provided to fathers only or to both spouses jointly is to increase the proportion of (target) households that delay marriage. The effect of the same information, π_H, provided to mothers on the proportion of (target) households that delay marriage is lower and ambiguous in sign.

The lower effect of information π_H when provided to the mothers only reflects that some mothers will falsely claim π_L in order to persuade their partners to choose early marriage. (Some) fathers, in contrast, would have an incentive to falsely report at π_L, but will always truthfully report π_H. As a result, in this very simple model, providing information π_H to fathers only has the same effect on marriage delay frequencies as providing the same information to both spouses jointly. However, as noted in Anderberg et al. (2024) the assumed binary information structure downplays the scope of persuasion. In a more general setting, fathers would be able to "exaggerate" positive information when privately informed, making the effect of positive information potentially larger when the father alone is informed compared to when they are jointly informed.[23] Hence, as noted in Anderberg et al. (2024), the *robust* prediction for how the effect of the intervention on the timing of marriage should be ordered with respect to who is informed:

- Providing positive information (π_H) to either the father only or to both jointly should

[23]Had we assumed that fathers are more stigma-averse than their partners, they could be using persuasion towards early marriage.

increase the proportion of target households that delay marriage, with the effect being potentially larger when the father alone is informed compared to when they are jointly informed.

- Providing the same positive information to mothers only should increase marriage delays less or not at all.

These predictions hold ceteris paribus, immediately after the intervention (at midline), conditional on the age-of-marriage norm staying unchanged. The model also has testable predictions with respect to the parents' belief updating. In particular, parents should update their beliefs the same whenever they themselves are directly informed, either alone or jointly with their spouse. In contrast, belief updating will rationally be lower by parents who are informed only indirectly via their spouse as both mothers and fathers will, for some preferences, strategically misreport information.

6.2 Empirical results – predictions for target households

Our research design exogenously varies who within a target household receives information on the true likelihood of the benefit from delaying marriage: no-one (Control arm, decision on the prior), fathers only (Male arm), mothers only (Female arm), or both father and mothers jointly (Female+Male arm).

Effect on marriage delay. Consistent with predictions of the model, we observe a reduction in the likelihood of child marriage in the Male arm compared to the Female+Male arm and Female arm at midline in the relevant one-sided tests (we emphasize that one-sided tests are generated by the model, rather than pre-specified for the main impact results). Consistent with our predictions for the specific case of our intervention – that parents expect a high likelihood of the benefit from delaying marriage – we also find that targeting the intervention at men only (Male arm) significantly reduces the likelihood of child marriage compared to the Control arm at midline. We also find no significant effects in the Female arm compared to the Control arm at midline.

Effect on belief updating on benefits from delay. We empirically test whether parents update their beliefs between treatment arms across two domains – health benefits and spousal quality. We observe no updating on *health benefits* as a result of our intervention.

Online Appendix Tables O13 and O14 show that there is no consistent pattern of updating on beliefs about health costs, both mental and physical, to the child or grandchild as a result of our treatments. At baseline, however, both fathers and mothers already seem aware of the most extreme risks of early childbearing – namely the risk of death to young mothers and to their children – suggesting limited scope for interventions to make such costs even more salient. Therefore, we argue that our intervention did not provide them with *new* information about health benefits of delaying marriage. With respect to *spousal quality benefits* of delaying marriage, we do observe that parents update their beliefs in response to treatment, as first presented in Anderberg et al. (2024). This suggests that the intervention provided *new* information about these benefits.[24] Table 5 shows impacts on these beliefs if a girl's marriage is delayed until she is 18. We measure spousal quality returns to delaying marriage of a girl adolescent as the expectation that the spouse will have completed secondary (grade 9 or 10) or high school education (grade 11 or 12), conditional on the adolescent girl being married at age 18.[25] It is important to mention that the share of fathers and mothers that expect a future spouse with secondary or high school education increases with the conditional age of marriage of the daughter.[26] We observe that targeted parents in all treatment arms update their beliefs and expect a higher education level of the future groom of their adolescent daughter if they were to delay their daughter's marriage. We also observe, consistent with the predictions of our model, that spouses that are not targeted directly with the intervention also update these beliefs – confirming the existence of intra-household information spillovers – but never more than when directly targeted.

[24]In the literature, the education of grooms is seen as one of the most meaningful indicators of spousal quality that can be readily collected from parents in a short survey. The groom's education as a dimension of the quality of a marriage match for girls is also used in Buchmann et al. (2023).

[25]Results for age 16 and 20 are presented in the Online Appendix B.

[26]Online Appendix Table O16 shows that, conditional on a marriage age of 16, 30%-40% of fathers and mothers expect a future spouse will have completed secondary school and less than 10% expect a future spouse will have completed high school. As the conditional marriage age of the girl becomes higher, at 18 or 20, the share of fathers and mothers that expect a certain education level of the future spouse increases, to 50%-60% and 20%-30% for a marriage age of 18 (See Table 5) , and 70%-80% and 40%-50% for a marriage age of 20 (See Online Appendix Table O15). This suggests a positive correlation in expectations about the age of marriage of a girl, and the quality of the spouse in terms of his education level.

6.3 Model of village-level equilibrium

The reductions in child marriage at village-level imply the existence of spillovers from households targeted by the edutainment intervention to other households in the village.[27] Our village-level results demonstrate a reduction in the probability of child marriage in villages where women are treated, either alone or jointly, in the long-run, 18 months after our intervention. In the Male arm effects fade out over time. This is in contrast to the patterns observed for target households, where reductions in the likelihood of child marriage occur when fathers are treated alone (at midline and endline) or jointly (at endline). If spillovers had simply followed the treatment effects in target households we should have observed reductions in the likelihood of child marriage at village-level when fathers are treated alone or jointly too. This is not the case, and the diverging pattern of results in target households versus the village implies that simple household-level spillovers are unlikely to be the mechanism driving village results.

These patterns suggest a mechanism of spillovers that depends on the gender of the spouse that is informed through the intervention. We already presented descriptives in Section 4 that suggest that female respondents participate more in community meetings than males. We also asked respondents that participated in the intervention who they talked to about the intervention. 34% of mothers that participated in the intervention report that they discussed the intervention with relatives and neighbours that are not in their household, as compared to 25% of fathers, and this difference is statistically significant. Consistent with these statistics, we assume gender-differential information transmission from the informed spouse to other members in the village. To further corroborate this assumption, we also provide evidence of treatment heterogeneity, that shows that the village-level impacts in the Female and Female+Male arm are driven by villages where the women in our target households have "high agency" in their communities. We proxy this by their ability to leave their compounds of residence, their education and their attendance in community meetings. Online Appendix Table O12 shows that for all three proxies, village-level reductions appear driven by villages where directly targeted women have "high agency." This supports an interpretation where women play an active role in transmitting information

[27] In our context, mobility is limited across villages and 90% of marriages happen between brides and grooms from the same village. Thus, the spread of information is likely to be contained within villages.

about the intervention, including *new* information about benefits from delaying marrying in the community. Therefore, we extend the model of household decisions by assuming that parents who receive new information from the intervention transmit this information to other individuals in the community through gender-segregated networks.[28] We also assume that mothers – given their relatively stronger hesitancy to deviate from age-of-marriage-norms – experience stronger incentives to transmit information about potential benefits of marriage delay to other women in the community.

A standard feature of transmission processes – applicable both to information transmission and transmission of infections – is that if anyone who receives the information passes it on to *more than one person* on average, then the information will eventually reach the full population. In contrast, if anyone who receives the information passes it on to *less than one person* on average the transmission process will die out.

Gender-difference in transmission of information. Our model can rationalize the observed results as follows. We can choose the rate of information transmission such that (i) any father who receives information that the likelihood of a marriage-delay benefit is high passes this information on to fewer than one other father on average, and (ii) any mother who receives information that the likelihood of a benefit is high passes this on to more than one other mother on average. Then the transmission of the information will fade out in the Male arm, and the probability of marriage delay at the village level will revert to the equilibrium based on the prior. In contrast, the information transmission will eventually reach all households in the Female arm and the Male+Female arm, and the probability of marriage delay at the village level will revert to a new equilibrium, where the likelihood of a benefit is high (π_H).

[28]The assumption of gender-segregated networks is highly plausible in our context. Women or men rarely engage or are allowed to engage in conversations with individuals of the other gender who are not their spouse, children or close relatives. Public programs, such as by health extension workers, are also typically organized for men and women separately. Similarly, in our Female+Male arm since both genders could not be in the public space jointly, we organized separate simultaneous sessions for men and women.

Table 5: Mothers' and fathers' beliefs about spousal quality benefits from marriage delay to 18

	Secondary School		High School	
	(1)	(2)	(3)	(4)
	Father	Mother	Father	Mother
Female	0.077	0.104	0.054	0.115
	(0.111)	(0.063)*	(0.284)	(0.034)**
	[0.395]	[0.127]	[0.395]	[0.127]
Male	0.115	0.103	0.072	0.141
	(0.019)**	(0.068)*	(0.152)	(0.010)***
	[0.076]*	[0.091]*	[0.203]	[0.020]**
Female+Male	0.082	0.109	0.077	0.116
	(0.082)*	(0.053)*	(0.124)	(0.031)**
	[0.246]	[0.071]*	[0.246]	[0.062]*
Observations	769	814	769	814
Control Mean	0.597	0.566	0.265	0.254
p-val M $\neq$ F	0.447	0.978	0.717	0.646
p-val FM $\neq$ F	0.931	0.928	0.641	0.984
p-val FM $\neq$ M	0.481	0.907	0.923	0.658

Notes: The table presents marginal treatment effects for girl adolescents ($\eta + \rho$) from the pre-specified logit regression in Equation 1 at midline. The binary dependent variable takes on value one if the respondent - mother or father - states that they expect that the future spouse of their adolescent girl will have atleast completed secondary (Grade 10 and above) or high school (Grade 12 and above), if she is married at 18. Fixed effects for randomisation strata are included. P-values for marginal treatment effects from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Q-values correcting for false discovery rate within each family using the Benjamini–Hochberg procedure are indicated in square brackets. The family over which we correct reflects the the four schooling levels per respondent per treatment arm. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" indicates the percentage in the control group stating the above expectation at the given age.

As a final step we compare the likelihood of marriage delay for the equilibrium without new information (equivalent to the control condition) and the equilibrium where mothers are targeted and the new information about benefits to delaying marriage reaches all households in the community (equivalent to the Female and Female+Male arm). We formalize this in Online Appendix B.1. We find that for all but one type of household, the predicted delay frequency is either the same or lower when the community has no new information about these benefits, as compared to the delay frequency with new information disseminated by mothers. The preference profile in this household type is such that fathers want to delay irrespective of whether they receive new information, but mothers – as a result of stronger stigma aversion – never want to delay irrespective of whether they receive new information. In this type of household, mothers may choose to understate the potential benefit from delaying marriage, to persuade the father and align the household decision with her preferred choice. For this household, the likelihood of delay is higher without new information, then when new information is received by the mother. This implies that the comparison of the equilibria is, by nature, ambiguous. However, when averaged over all households with varying preference profiles, it is plausible that marriage delay is observed, consistent with our village-level results in arms where women are treated.

Hence, gender-differences in information transmission are consistent with the following patterns at village level: (i) marriage delay decisions in the long-run reverting back to the pre-intervention level in the Male arm, (ii) marriage delay decisions converging to a new equilibrium with more frequent marriage delays in the long-run in the Female arm and the Male+Female arm.

6.4 Empirical results – predictions at village level

To provide additional empirical support for the mechanisms that generate our village-level results in our model, we leverage the dynamics of our empirical results over time. These show that when only men are treated (Male arm) the reductions in child marriage at village-level fade out, while when women are treated (Female arm and Female+Male arm) reductions in child marriage at village-level are sustained. In these same arms where village-level effects are sustained, we observe effects in target households that become stronger over time. In our model, the stronger hesitancy of mothers to deviate from age-of-marriage norms is the driver of differences in predictions of child marriage delay in target households across treatment arms. We hypothesize that this hesitancy of mothers to deviate from the norm weakens over time as the likelihood of child marriage at village level reduces in arms where mothers are treated. It is, therefore, natural to consider any changes in the beliefs of mothers about age-of-marriage norms in the village across treatment arms.

We asked respondents to guess, out of ten men and ten women in a community just like theirs, how many would agree or strongly agree with a number of statements regarding the best age to marry a girl (e.g., "the best age to marry a girl is under 14") and the acceptability of marrying a girl at a certain age (e.g., "marrying off a girl when she is 12-15 years old is acceptable"). We incentivized fathers and mothers to give their best guess of the correct responses, which were measured through pilot data collected separately from a neighboring community at the start of each survey round.

Table 6 shows that mothers in the Female and Female+Male arm consistently update their beliefs about the attitudes of other men and women in the community.[29] Specifically, mothers are less likely to believe that other community members find early marriage desirable or acceptable, consistent with the changes in village-level reductions in child marriages as observed in Figure 1. These effects remain significant after correcting for multiple hypothesis testing. In the Male treatment arm, there are no significant effects on mothers' beliefs, as compared to the control group.[30] If we take this as an indication of a "weakening" or "shifting" of age-of-marriage norms, the child marriage predictions at the household level for midline may no longer hold at endline. Mothers in the Female and Female+Male arm may now perceive marriage delay as less of a deviation from the village age-of-marriage norm, as they observe behaviour and attitudes in the community that are consistent with a less conservative age-of-marriage norm. This may explain why effects observed in target households at endline are not significantly different across treatment arms.

7 Conclusion

Norms that prescribe behaviour of women and girls exist in many contexts. Even though private benefits of deviating from these norms may be largest for women, if concerns about social repercussions from deviating from these norms outweigh them, women may still be more reluctant to delay marriage. We investigate – in a context of age-of-marriage norms

[29]We do not find a consistent pattern of updating by fathers regarding the beliefs about the attitudes of other men and other women in the community in any treatment arm (Online Appendix Table O18). There also do not appear to be intra-household spillovers in updating of these beliefs between spouses.

[30]The pattern of updating of second-order beliefs is not driven by a mechanisms whereby our intervention corrects a misperceived social norm by facilitating a platform to share information about attitudes. We do not find a significant reduction in the difference between second-order beliefs of fathers and mothers, and the corresponding average first-order beliefs of men and women surveyed in their village in any treatment arm (Online Appendix Table O17). Instead, it seems likely that mothers and fathers update their second-order beliefs in line with real changes in behavior that they observe at the village level.

Table 6: Mothers' beliefs about attitudes of **other men and women** in the community towards child marriage for girls

	Best Age < 14		Best Age 14-15		Best Age 16-17		Accept 12-15		Accept 16-17	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Female	-0.255	-0.388	-0.613	-0.753	-0.247	-0.409	-0.646	-0.591	-0.102	-0.461
	(0.205)	(0.090)*	(0.005)***	(0.000)***	(0.253)	(0.053)*	(0.003)***	(0.010)***	(0.613)	(0.040)**
	[0.253]	[0.090]*	[0.016]**	[0.001]***	[0.253]	[0.080]*	[0.007]***	[0.020]**	[0.614]	[0.041]**
Male	-0.185	-0.220	-0.228	-0.046	-0.135	-0.074	-0.302	-0.279	-0.097	-0.072
	(0.283)	(0.262)	(0.323)	(0.839)	(0.531)	(0.739)	(0.157)	(0.206)	(0.656)	(0.740)
	[0.484]	[0.787]	[0.484]	[0.840]	[0.532]	[0.840]	[0.315]	[0.413]	[0.656]	[0.741]
Female+Male	-0.350	-0.408	-0.488	-0.376	-0.217	-0.192	-0.592	-0.478	-0.221	-0.162
	(0.039)**	(0.027)**	(0.031)**	(0.084)*	(0.294)	(0.392)	(0.005)***	(0.032)**	(0.273)	(0.471)
	[0.059]*	[0.083]*	[0.059]*	[0.127]	[0.295]	[0.392]	[0.011]**	[0.065]*	[0.274]	[0.471]
Observations	1649	1650	1649	1650	1649	1650	1649	1649	1648	1649
Control Mean	2.034	2.179	3.618	3.598	5.037	5.152	3.613	3.556	5.098	5.279
$M \neq F$	0.706	0.448	0.065	0.003	0.619	0.135	0.111	0.189	0.983	0.076
$M \neq FM$	0.275	0.285	0.237	0.189	0.710	0.621	0.171	0.394	0.561	0.684
$F \neq FM$	0.606	0.927	0.549	0.103	0.893	0.336	0.803	0.642	0.546	0.190
$M > F$	0.353	0.224	0.032	0.002	0.310	0.067	0.056	0.095	0.491	0.038
$M > FM$	0.138	0.143	0.119	0.094	0.355	0.31	0.086	0.197	0.281	0.342
$FM < F$	0.303	0.463	0.726	0.949	0.554	0.832	0.598	0.679	0.273	0.905

Notes: The table presents intent-to-treat effects from OLS regressions at midline. The dependent variable is the mother's belief about the number of other men out of 10 in their community and other women out of 10 in their community who find less than 14 the best age (Columns 1-2), 14-15 the best age (Columns 3-4), 16-17 the best age (Columns 5-6), 12-15 an acceptable age (Columns 7-8), and 16-17 an acceptable age (Columns 9 and 10) to marry off a girl. It takes a value from 0-10. Fixed effects for randomisation strata are included. P-values from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Q-values correcting for false discovery rate within each family using the Benjamini–Hochberg procedure are indicated in square brackets. The family over which we correct reflects the three categories of best age per respondent per treatment arm and the two categories of acceptability per respondent per treatment arm. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" multiplied by 10 indicates the average percentage of other men and women in the community that mothers in the control group believe would agree or strongly agree with the specific statement. P-values for comparison of treatment effects between experimental arms for various one-sided and two-sided alternative hypothesis are reported at the bottom of the table: Male arm (M), Female arm (F) and Female+Male arm (FM).

that promote early marriage, especially for girls – to what extent targeting men, women, or both with the same intervention in the same context affects outcomes for women and girls in target households and at the village level.

We show that targeting the intervention at men, either alone or jointly, reduces the probability of child marriage for girls in *target households*. Consistent with descriptive evidence, we rationalize these results by modelling, a stronger relative hesitancy of mothers to deviate from village age-of-marriage norms as a key driver of these results. When some mothers are targeted with new information that favours marriage delay, they persuade fathers to not delay marriage.

In contrast, targeting the intervention at women, either alone or jointly, leads to sustained reductions in the probability of child marriage for girls *at village level*. We rationalize these results by modelling gender-segregated information transmission from targeted spouses, where women are assumed to have a stronger incentive to communicate potential benefits of marriage delay in the community. We demonstrate that our results are consistent with an interpretation where a new equilibrium of delayed marriage is established at village level when women are targeted.

Our findings indicate that targeting women to change outcomes for women and girls may lead to seemingly counter-intuitive outcomes in their own households versus at village level. We show, however, that these results are generated by the same mechanism whereby women – in their own households – may be reluctant to change outcomes because of costs of social repercussions. That same costs may, however, lead them to experience incentives to communicate about benefits that may induce changes in outcomes at the village level. Thereby, to ultimately "push" for another equilibrium that also reduces their costs to change outcomes in their own households. A further key implication of our results is that it is important to measure impacts at both household and community levels, as measuring just one (typically the household level) may lead to an incomplete picture of effects, and sub-optimal policy design.

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A Appendix

Table A1: Target households: Child marriage outcomes for adolescent girls

	Annual Hazard Rate			
	Alternative 1		Alternative 2	
	Midline	Endline	Midline	Endline
	(1)	(2)	(3)	(4)
Female	0.021 (0.004)*** [0.003]***	-0.011 (0.238) [0.294]	0.004 (0.721) [0.767]	-0.013 (0.280) [0.341]
Male	-0.030 (0.000)*** [0.000]***	-0.019 (0.024)** [0.046]**	-0.018 (0.036)** [0.048]**	-0.017 (0.107) [0.150]
Female+Male	-0.011 (0.049)** [0.060]*	-0.024 (0.004)*** [0.010]**	-0.007 (0.440) [0.461]	-0.017 (0.105) [0.119]
Observations	2990	2843	1641	2159
Control Mean	0.044	0.053	0.029	0.042
p-val M $\neq$ F	0.000	0.314	0.032	0.691
p-val FM $\neq$ F	0.000	0.097	0.323	0.695
p-val FM $\neq$ M	0.000	0.465	0.187	0.996

Notes: The table presents treatment effects on the average hazard rate into child marriage for girl adolescents from our target households, using a discrete approximation of a censored duration model estimated from Equation 2 at midline and endline. Marriage outcomes are as reported by the adolescent themselves as pre-specified in the pre-analysis plan. Data is an adolescent-year panel, where each adolescent contributes at most five observations to the sample, one observation for each post-baseline at-risk year between 13 and 17 until she is either married or passes the 18-year threshold after which she exists the data. The dependent variable is coded as zero for the ages prior to her marriage, as unity for the age at which she marries. Columns 1-2 report the average hazard rate into child marriage, where right censored observations – that is, observations between the current age at the corresponding surveyround and age 18 for girls who are aged less than 18 and still unmarried by midline or endline – that is are still at risk of being child married are coded as the cohort-specific, age-specific, and treatment arm-specific probability of marriage. Columns 3-4 report the average hazard rate into child marriage, where right censored observations – that is, observations between the current age at the corresponding survey-round and age 18 for girls who are aged less than 18 and still unmarried by midline or endline – are coded as missing. Fixed effects for age cohort, current age and randomization strata are included. P-values for marginal treatment effects are based on standard errors clustered at village level (unit of randomisation), and are indicated in parentheses. Exact p-values for marginal treatment effects from randomization inference tests based on 1000 permutations are provided in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" indicates the average annual probability of child marriage over cohorts in the control group. P-values for all comparisons of treatment effects between each experimental arm are reported at the bottom of the table: Male arm (M), Female arm (F) and Female+Male arm (FM).

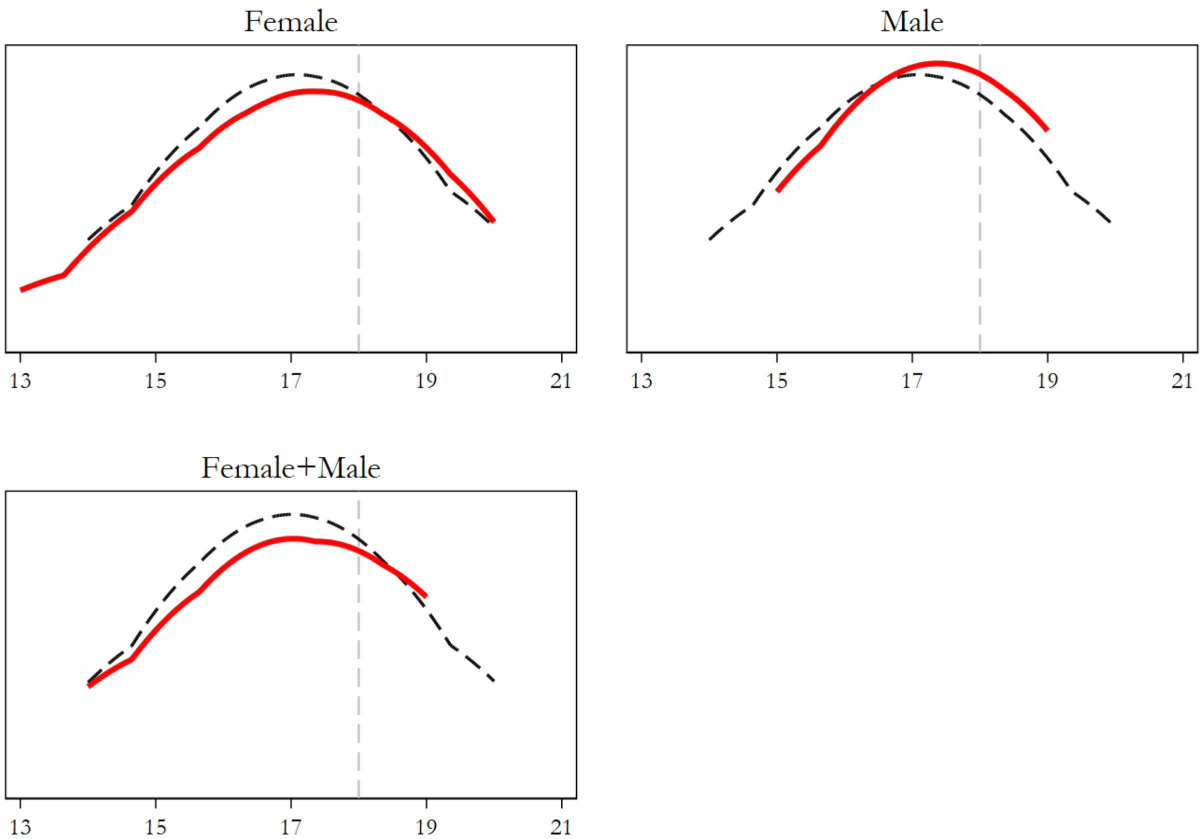
Table A2: Target households: Marriage & marriage age outcomes for adolescent girls

	Married		Marriage age	
	(1) Midline	(2) Endline	(3) Midline	(4) Endline
Female	-0.001	-0.064	-0.095	0.029
	(0.969)	(0.185)	(0.817)	(0.947)
	[0.970]	[0.258]	[0.840]	[0.952]
Male	-0.053	-0.096	0.254	0.374
	(0.039)**	(0.026)**	(0.562)	(0.313)
	[0.066]*	[0.049]**	[0.507]	[0.329]
Female+Male	-0.029	-0.083	-0.257	-0.199
	(0.285)	(0.051)*	(0.543)	(0.596)
	[0.267]	[0.050]*	[0.490]	[0.617]
Observations	828	798	66	131
Control Mean	0.100	0.222	16.857	17.089
p-val M $\neq$ F	0.101	0.443	0.506	0.507
p-val FM $\neq$ F	0.398	0.640	0.752	0.640
p-val FM $\neq$ M	0.258	0.719	0.339	0.191

Notes: The table presents marginal treatment effects on marriage outcomes for girl adolescents ($\eta + \rho$) from the pre-specified logit regression for marriage and OLS regression for marriage age in Equation 1. Marriage outcomes are as reported by the adolescent themselves as pre-specified in the pre-analysis plan. Reported is the estimation for midline and endline. In Column 1-2, the binary dependent variable takes on value one if the adolescent was married at midline and endline respectively. In Column 3-4, the dependent variable is the age of the girl at the time of marriage, conditional on being married at midline and endline. Fixed effects for randomisation strata are included at endline and not at midline due to perfect prediction. P-values for marginal treatment effects from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Exact p-values for marginal treatment effects from randomization inference tests based on 1000 permutations are provided in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" indicates the probability of marriage, and average age of marriage in the control group. P-values for all comparisons of treatment effects between each experimental arm are reported at the bottom of the table: Male arm (M), Female arm (F) and Female+Male arm (FM).

B Online Appendix

Figure O1: Target households: Kernel density plot of girls' marriage age



Notes: The figure presents kernel density plots of age at the time of marriage for all girl adolescents our from target households at endline. Age at the time of marriage is plotted on the x-axis. Black dashed line represents the variable's distribution in the control group. Red line represents the distribution of the variable in each treatment arm, i.e., Female arm (top-left), Male arm (top-right), Female+Male arm (bottom-left). Vertical grey line is the 18 years threshold, below which a marriage is considered a child marriage.

Table O1: Village-level descriptives and balance

	(1) C	(2) F	(3) M	(4) F+M	(5) F vs C	(6) M vs C	(7) F+M vs C	(8) F vs M	(9) F vs F+M	(10) M vs F+M
Boys primary school	0.227	0.311	0.364	0.364	0.084	0.136	0.136	-0.053	-0.053	0.000
	(0.424)	(0.468)	(0.487)	(0.487)	(0.372)	(0.157)	(0.157)	(0.601)	(0.601)	(1.000)
					[0.188]	[0.299]	[0.299]	[-0.110]	[-0.110]	[0.000]
Girls primary school	0.182	0.200	0.273	0.273	0.018	0.091	0.091	-0.073	-0.073	0.000
	(0.390)	(0.405)	(0.451)	(0.451)	(0.828)	(0.307)	(0.307)	(0.419)	(0.419)	(1.000)
					[0.046]	[0.216]	[0.216]	[-0.170]	[-0.170]	[0.000]
Mixed primary school	0.432	0.400	0.409	0.500	-0.032	-0.023	0.068	-0.009	-0.100	-0.091
	(0.501)	(0.495)	(0.497)	(0.506)	(0.761)	(0.829)	(0.522)	(0.931)	(0.342)	(0.391)
					[-0.064]	[-0.046]	[0.135]	[-0.018]	[-0.200]	[-0.180]
Girls can leave compound	0.636	0.733	0.750	0.773	0.097	0.114	0.136	-0.017	-0.039	-0.023
	(0.487)	(0.447)	(0.438)	(0.424)	(0.324)	(0.246)	(0.157)	(0.858)	(0.667)	(0.803)
					[0.207]	[0.245]	[0.299]	[-0.038]	[-0.090]	[-0.054]
Teashop in village	0.432	0.444	0.455	0.477	0.013	0.023	0.045	-0.010	-0.033	-0.023
	(0.501)	(0.503)	(0.504)	(0.505)	(0.905)	(0.831)	(0.669)	(0.924)	(0.757)	(0.831)
					[0.025]	[0.045]	[0.090]	[-0.020]	[-0.065]	[-0.045]
Female teachers in girls' school	0.636	0.711	0.727	0.750	0.075	0.091	0.114	-0.016	-0.039	-0.023
	(0.487)	(0.458)	(0.451)	(0.438)	(0.457)	(0.364)	(0.251)	(0.867)	(0.683)	(0.811)
					[0.158]	[0.194]	[0.245]	[-0.036]	[-0.087]	[-0.052]
Distance to nearest primary girls' school (km)	2.703	2.453	2.690	2.767	-0.250	-0.013	0.064	-0.237	-0.314	-0.078
	(1.486)	(1.499)	(1.520)	(1.634)	(0.504)	(0.972)	(0.873)	(0.542)	(0.437)	(0.852)
					[-0.168]	[-0.009]	[0.041]	[-0.157]	[-0.200]	[-0.047]
Distance to nearest primary girls' school (min)	14.741	13.964	17.038	15.704	-0.776	2.298	0.963	-3.074	-1.739	1.335
	(9.197)	(7.560)	(10.570)	(9.603)	(0.734)	(0.401)	(0.707)	(0.225)	(0.458)	(0.632)
					[-0.092]	[0.232]	[0.102]	[-0.335]	[-0.201]	[0.139]
Distance to nearest secondary girls' school (km)	8.128	6.993	6.695	7.219	-1.135	-1.433*	-0.909	0.298	-0.226	-0.524
	(3.901)	(3.524)	(3.043)	(3.711)	(0.157)	(0.062)	(0.273)	(0.676)	(0.773)	(0.482)
					[-0.305]	[-0.410]	[-0.239]	[0.091]	[-0.062]	[-0.141]
Distance to nearest secondary girls' school (min)	30.000	30.182	32.325	31.667	0.182	2.325	1.667	-2.143	-1.485	0.658
	(15.392)	(11.384)	(12.799)	(13.098)	(0.950)	(0.454)	(0.591)	(0.420)	(0.576)	(0.818)
					[0.013]	[0.164]	[0.117]	[-0.177]	[-0.121]	[0.050]
Distance to nearest town (min)	30.523	32.267	28.227	28.500	1.744	-2.295	-2.023	4.039	3.767	-0.273
	(14.788)	(13.223)	(12.115)	(11.744)	(0.559)	(0.427)	(0.478)	(0.135)	(0.157)	(0.915)
					[0.124]	[-0.170]	[-0.151]	[0.319]	[0.301]	[-0.023]
Number of households	172.000	198.689	220.909	204.500	26.689	48.909	32.500	-22.220	-5.811	16.409
	(214.764)	(369.649)	(340.191)	(187.771)	(0.677)	(0.421)	(0.451)	(0.768)	(0.925)	(0.780)
					[0.088]	[0.172]	[0.161]	[-0.063]	[-0.020]	[0.087]
Joint Significance(p-value)					0.855	0.180	0.312	0.541	0.826	0.983

Notes: Column 1-4 show the mean of the variable in each experimental arm – the Female arm (F), the Male arm (M), the Female+Male arm (F+M), and Control arm (C). Standard deviations are indicated in parentheses. Column 5-10 shows the difference in means for each combination of experimental arms. In Columns 5-10, p-values from robust standard errors clustered at the village level (unit of randomization) are indicated in parenthesis using a logit regression for binary variables, and an OLS regression for continuous variables. Normalized differences are reported in square brackets, calculated as the difference between the sample means of experimental arms divided by the square root of the sum of the sample variances. Row "Joint Significance (p-value)" reports the p-value on the chi-squared test that coefficients and p-values from all 12 regressions on balance variables are jointly unrelated to the treatment assignment. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance.

Table O2: Attrition by experimental treatment arms at midline

	(1) M	(2) F	(3) F+M	(4) C	(5) M vs C	(6) F vs C	(7) F+M vs C	(8) F vs M	(9) F+M vs M	(10) F+M vs F	(11) Observations
Father	0.061	0.062	0.073	0.053	0.008	0.009	0.020	0.002	0.012	0.010	1687
	25	*27*	*31*	*22*	(0.682)	(0.587)	(0.354)	(0.931)	(0.600)	(0.633)	
					[0.818]	[0.818]	[0.818]	[0.932]	[0.818]	[0.818]	
Mother	0.032	0.016	0.014	0.012	0.020	0.004	0.002	-0.015	-0.017	-0.002	1687
	13	*7*	*6*	*5*	(0.098)*	(0.616)	(0.799)	(0.217)	(0.158)	(0.818)	
					[0.435]	[0.818]	[0.818]	[0.435]	[0.435]	[0.818]	
Household	0.022	0.005	0.012	0.007	0.015	-0.003	0.005	-0.017	-0.010	0.007	756
	9	*2*	*5*	*3*	(0.107)	(0.616)	(0.530)	(0.048)**	(0.315)	(0.293)	
					[0.321]	[0.617]	[0.617]	[0.290]	[0.473]	[0.473]	

Notes: The table presents tests for differential attrition at midline. Panel consists of 1687 target households, with 756 households in Sindh province, and 931 households in Punjab province. In each household, three respondents were to be surveyed, i.e. father, mother and adolescent. In Column 1-4, the attrition rate for each individual respondent, and the household attrition rate (Sindh only) by experimental arm - the Female arm (F), the Male arm (M), the Female+Male arm (F+M), and Control arm (C), are presented. An individual respondent is considered an attritor if we were unable to survey him/her at midline. For Sindh province only, a household is considered an attritor if we were unable to survey all three respondents who were part of our baseline panel at midline. Attrition for adolescent respondent is the same as household attrition, that is, attrition rate for adolescents in non-attrited households is 0%. In italics, the raw number of individuals (or household) that attrited are reported. In Column 5-10, the difference in attrition rate between experimental arms from logit regressions are presented. Fixed effects for randomisation strata are not included, due to perfect prediction given our low attrition rate. *P*-values for marginal treatment effects from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. *Q*-values correcting for false discovery rate within each family using the Benjamini–Hochberg procedure are indicated in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance.

Table O3: Attrition by experimental treatment arms at endline

	(1) M	(2) F	(3) F+M	(4) C	(5) M vs C	(6) F vs C	(7) F+M vs C	(8) F vs M	(9) F+M vs M	(10) F+M vs F	(11) Observations
Father	0.143	0.122	0.155	0.130	0.013	-0.007	0.025	-0.021	0.012	0.033	1687
	59	*53*	*66*	*54*	(0.637)	(0.782)	(0.387)	(0.455)	(0.697)	(0.254)	
					[0.782]	[0.782]	[0.782]	[0.782]	[0.782]	[0.782]	
Mother	0.080	0.046	0.080	0.060	0.020	-0.014	0.020	-0.034	-0.000	0.034	1687
	33	*20*	*34*	*25*	(0.381)	(0.434)	(0.385)	(0.101)	(0.991)	(0.102)	
					[0.521]	[0.521]	[0.521]	[0.306]	[0.991]	[0.306]	
Household	0.063	0.035	0.061	0.046	0.017	-0.011	0.015	-0.028	-0.002	0.026	756
	26	*15*	*26*	*19*	(0.391)	(0.466)	(0.444)	(0.131)	(0.928)	(0.155)	
					[0.559]	[0.559]	[0.559]	[0.465]	[0.929]	[0.465]	

Notes: The table presents tests for differential attrition at endline. Panel consists of 1687 target households, with 756 households in Sindh province, and 931 households in Punjab province. In each household, three respondents were to be surveyed, i.e. father, mother and adolescent. In Column 1-4, the attrition rate for each individual respondent, and the household attrition rate (Sindh only) by experimental arm - the Female arm (F), the Male arm (M), the Female+Male arm (F+M), and Control arm (C), are presented. An individual respondent is considered an attritor if we were unable to survey him/her at endline. For Sindh province only, a household is considered an attritor if we were unable to survey all three respondents who were part of our baseline panel at endline. Attrition for adolescent respondent is the same as household attrition, that is, attrition rate for adolescents in non-attrited households is 0%. In italics, the raw number of individuals (or household) that attrited are reported. In Column 5-10, the difference in attrition rate between experimental arms from logit regressions are presented. Fixed effects for randomisation strata are not included, due to perfect prediction given our low attrition rate. P-values for marginal treatment effects from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Q-values correcting for false discovery rate within each family using the Benjamini–Hochberg procedure are indicated in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance.

Table O4: Participation in screening and group discussion by treatment arm

	Male attendees	Female attendees
Female		18.09
		(2.58)
Male	15.77	
	(2.38)	
Female+Male	14.94	16.15
	(2.71)	(3.75)

Notes: The table presents the average number of participants in each treatment arm, disaggregated by the gender of the attendees. Standard deviation are reported in parentheses. In the Female+Male intervention, two separate sessions were conducted - one for males and one for females from the same household. In this treatment arm participants were explicitly informed that the other gender was participating in the same intervention.

Table O5: Target households: Marriage for adolescent girls reported by father, mother, any household member

	Father's response		Mother's response		Any respondent	
	(1) Midline	(2) Endline	(3) Midline	(4) Endline	(5) Midline	(6) Endline
Female	0.005	−0.050	−0.006	−0.056	−0.006	−0.052
	(0.900)	(0.328)	(0.873)	(0.248)	(0.868)	(0.283)
Male	−0.047	−0.098	−0.054	−0.088	−0.057	−0.089
	(0.063)*	(0.034)**	(0.040)**	(0.047)**	(0.036)**	(0.042)**
Female+Male	−0.039	−0.106	−0.030	−0.099	−0.034	−0.086
	(0.148)	(0.019)**	(0.281)	(0.020)**	(0.257)	(0.054)*
Observations	775	722	820	784	828	793
Control Mean	0.096	0.220	0.101	0.216	0.114	0.228

Notes: The table presents marginal treatment effects on marriage outcomes for girl adolescents ($\eta+\rho$) from the pre-specified logit regression in Equation 1. Reported is the estimation for midline and endline. Marriage outcomes of the adolescent is reported separately by the father, mother or any respondent. That is, Column 1-2 if the father said the adolescent was married, Column 3-4 if the mother said the adolescent was married, and Column 5-6 if any respondent (father, mother or adolescent) said that the adolescent was married. Fixed effects for randomisation strata are included at endline and not at midline due to perfect prediction. P-values for marginal treatment effects from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. Row "Control Mean" indicates the marriage rate for girl adolescents in the control group.

Table O6: Target households: (Child) marriage and marriage age outcomes for adolescent boys

	Married		Marriage age		Child Marriage	
	(1) Midline	(2) Endline	(3) Midline	(4) Endline	(5) Midline	(6) Endline
Female	-0.002	-0.006	-1.000	-0.130	0.008	0.006
	(0.904)	(0.813)	(0.357)	(0.826)	(0.445)	(0.757)
	[0.808]	[0.824]	[0.482]	[0.860]	[0.650]	[0.794]
Male	0.009	0.012	0.000	0.456	0.014	0.009
	(0.636)	(0.637)	(1.000)	(0.387)	(0.254)	(0.668)
	[0.732]	[0.659]	[1.000]	[0.446]	[0.370]	[0.747]
Female+Male	0.009	-0.021	-0.250	0.177	0.019	-0.006
	(0.628)	(0.335)	(0.714)	(0.742)	(0.144)	(0.768)
	[0.705]	[0.359]	[0.771]	[0.757]	[0.226]	[0.765]
Observations	840	800	28	55	840	800
Control Mean	0.030	0.073	17.000	16.929	0.010	0.036

Notes: The table presents marginal treatment effects on marriage outcomes for boy adolescents (η) from the pre-specified logit regression for (child) marriage and OLS regression for marriage age in Equation 1. Marriage outcomes are as reported by the adolescent themselves as pre-specified in the pre-analysis plan. Reported is the estimation for midline and endline. In column 1-2, the binary dependent variable takes on value one if the adolescent was married at midline and endline respectively. In Column 3-4, the dependent variable is the age of the girl at the time of marriage, conditional on being married at midline and endline. In Column 5-6, the binary dependent variable takes on value one if the adolescent was less than 18 years old at the time of marriage for midline and endline. Fixed effects for randomisation strata are included at endline and not at midline due to perfect prediction. P-values for marginal treatment effects from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Exact p-values for marginal treatment effects from randomization inference tests based on 1000 permutations are provided in square brackets. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" indicates the probability of marriage, average age of marriage and probability of child marriage in the control group.

Table O7: Target households: Engagement outcomes for adolescent girls

	Engaged		Newly Engaged	
	(1) Midline	(2) Endline	(3) Midline	(4) Endline
Female	−0.020	−0.016	0.033	0.009
	(0.682)	(0.779)	(0.420)	(0.802)
Male	0.042	0.094	0.058	0.044
	(0.417)	(0.112)	(0.159)	(0.167)
Female+Male	−0.015	0.008	0.012	0.012
	(0.776)	(0.884)	(0.764)	(0.696)
Observations	746	665	736	665
Control Mean	0.283	0.293	0.177	0.076

Notes: The table presents marginal treatment effects on engagement outcomes for girl adolescents ($\eta + \rho$) from the pre-specified logit regression in Equation 1. Reported is the estimation for midline and endline. In Column 1-2, the dependent variable is a binary variable that takes on value one (zero otherwise) if the adolescent is engaged/promised. Column 3-4 presents effects on new engagements, that is, adolescents who were not engaged at baseline but engaged at midline (Column 3: midline) and those who were not engaged at midline but engaged at endline (Column 4). For engagement between baseline and midline, for Sindh province we use responses from the baseline survey. For Punjab where security concerns prevented us from having a baseline survey, we estimate newly engaged as those adolescents who are engaged at midline, and their age at engagement is one year less than or equal to their age at midline, as these adolescents are most likely to be engaged between our survey rounds. Fixed effects for randomisation strata are included. P-values for marginal treatment effects from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. Row “Control Mean” indicates the probability of being engaged and probability of being newly engaged in the control group.

Table O8: Village-marriage level: (Child) marriage outcomes for girls

	Child Marriage		Marriage age	
	(1) Midline	(2) Endline	(3) Midline	(4) Endline
Post × Female	−0.407	−0.206	1.293	0.676
	(0.131)∗∗∗	(0.072)∗∗∗	(0.579)∗∗	(0.343)∗
Post × Male	−0.337	−0.107	0.790	0.350
	(0.116)∗∗∗	(0.072)	(0.462)∗	(0.344)
Post × Female+Male	−0.262	−0.251	0.678	0.949
	(0.116)∗∗	(0.068)∗∗∗	(0.505)	(0.313)∗∗∗
Observations	697	1383	697	1383
Control Mean	0.614	0.348	17.386	18.429

Notes: The table presents estimates for girls of ψ from Equation 3 using village fixed effects regressions with data at the level of marriages. In Columns 1 and 2, the binary dependent variable takes value one if the marriage involved a bride below the age of 18. In Columns 3 and 4, the dependent variable is the age of marriage of the bride. "Midline" counts observations between the pre-treatment months and January 2020, and "Endline" counts observations between the pre-treatment months and March 2021. The variable "post" is a binary variable that takes on the value zero if the marriage lies in the period before (not including) July 2019, the period before or during the intervention; and takes on value one if the marriage lies in the period after the intervention was completed. Fixed effects for randomisation strata and their interaction with "post" are included. P-values from standard errors clustered at village level (unit of randomisation), are indicated in parentheses. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance.

Table O9: Village-month level: Number of marriages

	Any Marriage		Number of Marriages	
	(1) Midline	(2) Endline	(3) Midline	(4) Endline
Post × Female	−0.015	0.041	−0.020	0.001
	(0.727)	(0.379)	(0.624)	(0.969)
Post × Male	0.055	0.068	0.043	0.043
	(0.226)	(0.120)	(0.278)	(0.211)
Post × Female+Male	−0.006	0.025	−0.003	0.012
	(0.880)	(0.544)	(0.927)	(0.721)
Observations	2452	4746	2452	4746
Control Mean	0.176	0.229	0.168	0.175

Notes: The table presents estimates for girls of ψ from Equation 3using village fixed effects regressions with data at the level of marriages aggregated at the village-month level. In Column 1-2, the binary dependent variable takes value one if there was at least one marriage in the village-month. In Column 3-4, the dependent variable is a count variable of the number of marriages in the village-month. "Midline" counts observations between the pre-treatment months and January 2020, and "Endline" counts observations between the pre-treatment months and March 2021. The variable "post" is a binary variable that takes on the value zero if the village-month lies in the period before July (not including) 2019, the period before or during the intervention; and takes on value one if the observation month lies in the period after the intervention was completed. Fixed effects for randomisation strata and their interaction with "post" are included. P-values from standard errors clustered at village level (unit of randomisation), are indicated in parentheses. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row 'control mean' reports the specific variable in the control group.

Table O10: Village-month level: (Child) marriage outcomes for boys

	Child Marriage		Marriage age	
	(1) Midline	(2) Endline	(3) Midline	(4) Endline
Post × Female	−0.101	−0.063	2.617	1.547
	(0.246)	(0.198)	(0.038)**	(0.004)***
Post × Male	−0.147	−0.114	0.490	0.851
	(0.057)*	(0.032)**	(0.533)	(0.097)*
Post × Female+Male	−0.080	−0.035	1.198	0.810
	(0.383)	(0.485)	(0.119)	(0.069)*
Observations	673	1123	673	1123
Control Mean	0.163	0.118	19.826	21.171

Notes: The table presents estimates for boys of ψ from Equation 3using village fixed effects regressions with marriage data aggregated at the village-month level. In Columns 1-2, the binary dependent variable takes on value one if in the village-month at least one observed marriage involved a groom below the age of 18, and zero if all observed marriages involved a groom 18 and above. In Columns 3-4, the dependent variable is the average age of all groom who got married in the village-month. "Midline" counts observations between the pre-treatment months and January 2020 and "endline" counts observations between the pre-treatment months and March 2021. The variable "post" is a binary variable that takes on the value zero if the village-month lies in the period before (not including) July 2019, the period before or during the intervention; and takes on value one if the observation month lies in the period after the intervention was completed. Fixed effects for randomisation strata and their interaction with "post" are included. P-values from standard errors clustered at village level (unit of randomisation), are indicated in parentheses. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" reports the likelihood of child marriage and average marriage age of girls, aggregated to a village-month observation, during the pre-intervention period in the control group.

Table O11: Proposals coming in for girl adolescents in target households

	(1) All	(2) Age <18	(3) Age >=18
Female	-0.058	-0.127	0.131
	(0.283)	(0.026)**	(0.176)
Male	-0.077	-0.109	0.021
	(0.189)	(0.104)	(0.844)
Female+Male	-0.114	-0.141	-0.019
	(0.020)**	(0.010)**	(0.865)
Observations	722	548	174
Control Mean	0.324	0.336	0.289
p-val M $\neq$ F	0.729	0.774	0.267
p-val FM $\neq$ F	0.213	0.761	0.152
p-val FM $\neq$ M	0.464	0.590	0.725

Notes: The table presents marginal treatment effects ($\eta + \rho$) on marriage proposals coming in for girl adolescents from target households using the pre-specified logit regression in Equation 1 at endline. The dependent variable is a binary variable that takes on value one (zero otherwise) if the adolescent received a marriage proposal. Column 1 shows effects on proposals coming in for all girl adolescents. In Column 2, effects are estimated on the sub-sample of girl adolescents who are below 18 prior to the endline and in Column 3 for those who are 18 and over. Fixed effects for randomisation strata are not included due to perfect prediction. P-values for marginal treatment effects from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. Row "Control Mean" indicates the probability of marriage proposals coming in in the control group. P-values for all comparisons of treatment effects between each experimental arm are reported at the bottom of the table: Male arm (M), Female arm (F) and Female+Male arm (FM).

Table O12: Village-month level: (Child) marriage outcomes for girls by village-level agency of targeted women

	Leave compound		Education		Community meetings	
	(1)	(2)	(3)	(4)	(5)	(6)
	No	Yes	No	Yes	No	Yes
Post X Female	-0.019	-0.297	-0.022	-0.263	-0.219	-0.171
	(0.894)	(0.013)**	(0.914)	(0.012)**	(0.252)	(0.090)*
		[0.100]		[0.249]		[0.809]
Post X Male	-0.038	-0.151	0.094	-0.170	-0.021	-0.135
	(0.821)	(0.191)	(0.606)	(0.109)	(0.900)	(0.211)
		[0.538]		[0.164]		[0.520]
Post X Female+Male	-0.134	-0.322	-0.171	-0.287	-0.237	-0.237
	(0.202)	(0.004)***	(0.308)	(0.003)***	(0.080)*	(0.027)**
		[0.172]		[0.503]		[0.999]
Observations	311	812	296	827	429	694

Notes: The table presents estimates for girls of ψ from Equation 3using village fixed effects regressions with data at the level of marriages aggregated at the village-month level. The binary dependent variable takes on value one if in village-month at least one observed marriage involved a bride below the age of 18, and zero if all observed marriages involved a bride 18 and above. The variable "post" is a binary variable that takes on the value zero if the village-month lies in the period before (not including) July 2019, the period before or during the intervention; and takes on value one if the observation month lies in the period after the intervention was completed. Column 1-2 presents impacts on child marriage in the sample of villages where women *cannot* or *can* leave the compound of the household, respectively. Column 3-4, presents impacts on child marriage in the sample of villages where *at least one woman* or *none of the women* among our target households has any education, respectively. Column 5-6, presents impacts on child marriage in the sample of villages where *at least one woman* or *none of the women* among our target households attended a community meeting, respectively. Fixed effects for randomisation strata and their interaction with "post" are included. *P*-values from standard errors clustered at village level (unit of randomisation), are indicated in parentheses. In square brackets, the *p*-value of the *chi-squared* test, that estimated treatment effects from the two seemingly unrelated regressions (SUR) are significantly different from each other. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance.

Table O13: Fathers' beliefs about health risks to a girl in case of child marriage

	Mother			Child		
	(1) Depression	(2) Poor health	(3) Mortality	(4) Low birthweight	(5) Poor health	(6) Mortality
Female	−0.017	0.049	0.015	0.021	0.094	0.033
	(0.576)	(0.244)	(0.714)	(0.399)	(0.046)**	(0.247)
Male	−0.008	−0.002	−0.007	0.017	0.049	0.025
	(0.808)	(0.969)	(0.856)	(0.456)	(0.293)	(0.404)
Female+Male	0.007	0.038	−0.003	0.013	0.054	0.023
	(0.837)	(0.367)	(0.931)	(0.592)	(0.245)	(0.396)
Observations	1545	1545	1545	1545	1545	1545
Control Mean	0.207	0.590	0.308	0.112	0.355	0.112

Notes: The table presents intent-to-treat effects from Logit regressions at midline. The dependent variable takes on value one if fathers, mention that the expected risks to a girl (column 1-3) and the girl's resulting child (column 4-6) in case of early marriage or childbearing are: depression to mother (column 1), poor health of mother from early childbearing (column 2), mortality risk to mother from early child bearing (column 3), low birth weight of child from early childbearing (column 4), poor health of child from early childbearing (column 5) or mortality risk to child from early childbearing (column 6). Fixed effects for randomisation strata are included. P-values from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. Row "Control Mean" indicates the expectations of fathers in the control group.

Table O14: Mothers' beliefs about health risks to a girl in case of child marriage

	Mother			Child		
	(1) Depression	(2) Poor health	(3) Mortality	(4) Low birthweight	(5) Poor health	(6) Mortality
Female	0.015	0.051	0.014	−0.017	0.035	0.003
	(0.594)	(0.210)	(0.762)	(0.685)	(0.475)	(0.935)
Male	−0.044	0.033	0.023	−0.041	−0.021	−0.022
	(0.061)*	(0.468)	(0.610)	(0.286)	(0.609)	(0.495)
Female+Male	0.006	0.080	0.006	−0.063	−0.029	−0.055
	(0.814)	(0.042)**	(0.912)	(0.073)*	(0.502)	(0.118)
Observations	1650	1650	1650	1650	1650	1650
Control Mean	0.122	0.501	0.335	0.149	0.213	0.193

Notes: The table presents intent-to-treat effects from Logit regressions at midline. The dependent variable takes on value one if mothers, mention that the expected risks to a girl (column 1-3) and the girl's resulting child (column 4-6) in case of early marriage or childbearing are: depression to mother (column 1), poor health of mother from early childbearing (column 2), mortality risk to mother from early child bearing (column 3), low birth weight of child from early childbearing (column 4), poor health of child from early childbearing (column 5) or mortality risk to child from early childbearing (column 6). Fixed effects for randomisation strata are included. P-values from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. Row "Control Mean" indicates the expectations of mothers in the control group.

Table O15: Mothers' and fathers' beliefs about spousal quality benefits from marriage delay to 20

	Secondary School		High School	
	(1) Father	(2) Mother	(3) Father	(4) Mother
Female	0.031	0.118	0.105	0.121
	(0.435)	(0.030)**	(0.059)*	(0.029)**
	[0.580]	[0.061]*	[0.235]	[0.061]*
Male	0.056	0.160	0.121	0.150
	(0.181)	(0.003)***	(0.025)**	(0.009)***
	[0.363]	[0.012]**	[0.100]	[0.012]**
Female+Male	0.067	0.132	0.097	0.100
	(0.075)*	(0.011)**	(0.065)*	(0.075)*
	[0.100]	[0.036]**	[0.100]	[0.100]
Observations	769	815	769	815
Control Mean	0.765	0.668	0.480	0.473

Notes: The table presents marginal treatment effects for girl adolescents ($\eta + \rho$) from the pre-specified logit regression in Equation 1 at midline. The binary dependent variable takes on value one if the respondent - mother or father - states that they expect that the future spouse of their adolescent girl will have atleast completed secondary (Grade 10 and above) or high school (Grade 12 and above), if she is married at 20. Fixed effects for randomisation strata are included. P-values for marginal treatment effects from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Q-values correcting for false discovery rate within each family using the Benjamini–Hochberg procedure are indicated in square brackets. The family over which we correct reflects the the four schooling levels per respondent per treatment arm. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" indicates the percentage in the control group stating the above expectation at the given age.

Table O16: Mothers' and fathers' beliefs about spousal quality benefits from marriage delay to 16

	Secondary School		High School	
	(1) Father	(2) Mother	(3) Father	(4) Mother
Female	0.082	0.097	0.020	0.027
	(0.121)	(0.083)*	(0.468)	(0.392)
	[0.243]	[0.302]	[0.469]	[0.523]
Male	0.128	0.143	0.031	0.001
	(0.019)**	(0.010)**	(0.312)	(0.986)
	[0.038]**	[0.042]**	[0.313]	[0.987]
Female+Male	0.100	0.085	0.006	-0.006
	(0.048)**	(0.146)	(0.827)	(0.846)
	[0.096]*	[0.289]	[0.827]	[0.847]
Observations	769	814	769	814
Control Mean	0.383	0.361	0.066	0.073

Notes: The table presents marginal treatment effects for girl adolescents ($\eta + \rho$) from the pre-specified logit regression in Equation 1 at midline. The binary dependent variable takes on value one if the respondent - mother or father - states that they expect that the future spouse of their adolescent girl will have atleast completed secondary (Grade 10 and above) or high school (Grade 12 and above), if she is married at 16. Fixed effects for randomisation strata are included. P-values for marginal treatment effects from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Q-values correcting for false discovery rate within each family using the Benjamini–Hochberg procedure are indicated in square brackets. The family over which we correct reflects the the four schooling levels per respondent per treatment arm. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" indicates the percentage in the control group stating the above expectation at the given age.

Table O17: Over- and underestimation of other men's and women's attitudes towards acceptability of child marriage for girls

	Mother				Father			
	Accept 12-15		Accept 16-17		Accept 12-15		Accept 16-17	
	(1) Men	(2) Women	(3) Men	(4) Women	(5) Men	(6) Women	(7) Men	(8) Women
Female	−0.086	−0.011	0.030	0.014	−0.019	0.033	0.042	0.028
	(0.004)***	(0.689)	(0.410)	(0.684)	(0.474)	(0.292)	(0.236)	(0.509)
Male	−0.058	−0.010	0.054	0.045	−0.014	0.001	0.076	0.038
	(0.067)*	(0.741)	(0.157)	(0.229)	(0.619)	(0.975)	(0.020)**	(0.433)
Female+Male	−0.030	−0.021	0.053	−0.032	−0.011	0.006	0.041	−0.046
	(0.317)	(0.520)	(0.182)	(0.412)	(0.691)	(0.869)	(0.240)	(0.372)
Observations	1649	1649	1648	1649	1559	1558	1559	1558
Control Mean	0.219	0.129	-0.190	-0.068	0.162	0.098	-0.146	-0.031

Note: The table presents intent-to-treat effects from OLS regressions at midline. Responses of mothers are presented in Column 1-4 and fathers in column (5-8). The dependent variable is difference between the percentage of mothers (fathers) in the corresponding village in at midline who find that 14-15 (Columns 1-2 & Columns 5-6) or 16-17 (Columns 3-4 & Columns 7-8) an acceptable age to marry off a girl, and the mother's (father's) belief about how many other men (women) in the village agree with the respective statements. The dependent variable takes on a value from 0-1. Fixed effects for randomisation strata are included. P-values from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" multiplied by 100, indicates the average percentage point under- or over-estimation in the control group.

Table O18: Fathers' beliefs about attitudes of **other men and women** in the community towards child marriage for girls.

	Best Age < 14		Best Age 14-15		Best Age 16-17		Accept 12-15		Accept 16-17	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Female	-0.117	-0.085	0.265	0.021	-0.057	-0.159	0.033	-0.131	-0.019	-0.247
	(0.474)	(0.654)	(0.163)	(0.924)	(0.788)	(0.447)	(0.843)	(0.487)	(0.934)	(0.286)
	[0.712]	[0.925]	[0.490]	[0.925]	[0.789]	[0.925]	[0.935]	[0.488]	[0.935]	[0.488]
Male	-0.043	-0.179	0.345	0.203	0.311	0.275	0.157	-0.148	0.138	-0.094
	(0.788)	(0.362)	(0.094)*	(0.328)	(0.204)	(0.246)	(0.329)	(0.357)	(0.533)	(0.696)
	[0.789]	[0.363]	[0.283]	[0.363]	[0.307]	[0.363]	[0.534]	[0.697]	[0.534]	[0.697]
Female+Male	-0.227	-0.382	-0.026	-0.178	-0.377	-0.251	-0.349	-0.234	-0.349	-0.395
	(0.229)	(0.044)**	(0.880)	(0.380)	(0.070)*	(0.241)	(0.027)**	(0.201)	(0.137)	(0.072)*
	[0.344]	[0.133]	[0.881]	[0.380]	[0.212]	[0.361]	[0.054]*	[0.201]	[0.138]	[0.145]
Observations	1560	1558	1559	1558	1560	1558	1559	1558	1559	1558
Control Mean	1.811	2.256	2.925	3.297	5.488	5.742	3.018	3.248	5.525	5.646
M ≠ F	0.599	0.626	0.723	0.413	0.167	0.066	0.492	0.929	0.507	0.521
M ≠ FM	0.272	0.296	0.083	0.068	0.010	0.030	0.005	0.640	0.051	0.190
F ≠ FM	0.519	0.115	0.144	0.356	0.167	0.667	0.034	0.627	0.184	0.497
M > F	0.300	0.687	0.361	0.206	0.083	0.033	0.246	0.536	0.254	0.260
M > FM	0.136	0.148	0.042	0.034	0.005	0.015	0.002	0.320	0.026	0.095
FM < F	0.259	0.058	0.072	0.178	0.083	0.333	0.017	0.313	0.092	0.249

Notes: The table presents intent-to-treat effects from OLS regressions at midline. The dependent variable is the father's belief about the number of other men out of 10 in their community and other women out of 10 in their community who find less than 14 the best age (Columns 1-2), 14-15 the best age (Columns 3-4), 16-17 the best age (Columns 5-6), 12-15 an acceptable age (Columns 7-8), and 16-17 an acceptable age (Columns 9 and 10) to marry off a girl. It takes a value from 0-10. Fixed effects for randomisation strata are included. *P*-values from standard errors clustered at village level (unit of randomisation) are indicated in parentheses. *Q*-values correcting for false discovery rate within each family using the Benjamini–Hochberg procedure are indicated in square brackets. The family over which we correct reflects the three categories of best age per respondent per treatment arm and the two categories of acceptability per respondent per treatment arm. Stars indicate: *** 1 percent ** 5 percent * 10 percent level of significance. The row "Control Mean" multiplied by 10 indicates the average percentage of other men and women in the community that fathers in the control group believe would agree or strongly agree with the specific statement. *P*-values for comparison of treatment effects between experimental arms for various one-sided and two-sided alternative hypothesis are reported at the bottom of the table: Male arm (M), Female arm (F) and Female+Male arm (FM).

B.1 Model Appendix: Equilibrium probability of delay

We start by working out the probability of a household choosing to delay for each preference profile, $C_j \in \cup_{k=0}^{9} C^k$, after a mother has been informed that $s = H$ (See Table A1 in Anderberg et al. (2024) for characterization of possible preference profiles).

- **Profiles C^0 to C^1**: At C^0 neither parents wants to delay. At C^1, the mother adopts the uninformative strategy, so this means the father retains his prior at whichher also prefers early marriage. Thus, no marriage delay will occur at C^0 and C^1.

- **Profiles C^2**: At C^2 the mother will not support delay, but the father will do so if she indicates that the state is H. She does with probability ϕ_2^*. We can express the probability that $C_j = C^2$ in terms of the primitive components:

$$
\begin{aligned}
& \Pr\left(\underline{\sigma}\left(L\right) \leq \sigma_{1j} \leq \underline{\sigma}\left(P\right) \text{ and } \sigma_{2j} > \underline{\sigma}\left(H\right)\right) \\
= & \left[\Gamma\left(\underline{\sigma}\left(P\right)\right) - \Gamma\left(\underline{\sigma}\left(L\right)\right)\right]\left[1 - E_{\gamma_j}\left[\Lambda\left(\underline{\sigma}\left(H\right) - \gamma_j\right)|\underline{\sigma}\left(L\right) \leq \gamma_j \leq \underline{\sigma}\left(P\right)\right]\right]
\end{aligned}
$$

  In this case, delay will happen with the probability $\alpha\overline{\phi}_2^*$, that is, based on this bargaining weight and optimal communication strategy.

- **Profiles C^3**: At profile C^3 the mother and father will disagree irrespective of any information, with the father preferring delay and the mother preferring early marriage. We can express the probability that $C_j = C^3$ in terms of the primitive components:

$$
\begin{aligned}
& \Pr\left(\sigma_{1j} \leq \underline{\sigma}\left(L\right) \text{ and } \sigma_{2j} > \underline{\sigma}\left(H\right)\right) \\
= & \Gamma\left(\underline{\sigma}\left(L\right)\right)\left[1 - E_{\gamma_j}\left[\Lambda\left(\underline{\sigma}\left(H\right) - \gamma_j\right)|\gamma_j \leq \underline{\sigma}\left(L\right)\right]\right]
\end{aligned}
$$

  In this case delay will happen with the probability α, that is, based on this bargaining weight since spouses will disagree.

- **Profiles C^4 to C^9**: From Claim 1, at preference profiles $C^4, ..., C^9$ the mother communicates truthfully. Hence both spouses learn that the state is H. In these preference profiles the mother (who is fully informed that the state is H) will support delay. The father at these profiles will also support delay since from Assumption 3 we know that $\sigma_{1j} \leq \sigma_{2j}$ whereby also $\sigma_{1j} \leq \underline{\sigma}(H)$. We can express the probability that $C_j \in \cup_{k=4}^{9} C^k$ in terms of the primitive components:

$$
\Pr\left(\sigma_{2j} \leq \underline{\sigma}\left(H\right)\right) = E_{\lambda_j}\left[\Gamma\left(\underline{\sigma}\left(H\right) - \lambda_j\right)\right]
$$

In these 6 cases, delay will happen for certain since both mothers and fathers support delay as they learn at $s = H$.

The new equilibrium probability of a random household choosing delay, $\widehat{d}_{new}$, is the summation of the above cases:

$$\begin{aligned}\widehat{d}_{new} = \quad & E_{\lambda_j}\left[\Gamma\left(\underline{\sigma}\left(H\right)-\lambda_j\right)\right]+\alpha\Gamma\left(\underline{\sigma}\left(L\right)\right)\left[1-E_{\gamma_j}\left[\Lambda\left(\underline{\sigma}\left(H\right)-\gamma_j\right)|\gamma_j \leq \underline{\sigma}\left(L\right)\right]\right] \\ & +\alpha\overline{\phi}_2^*\left[\Gamma\left(\underline{\sigma}\left(P\right)\right)-\Gamma\left(\underline{\sigma}\left(L\right)\right)\right]\left[1-E_{\gamma_j}\left[\Lambda\left(\underline{\sigma}\left(H\right)-\gamma_j\right)|\underline{\sigma}\left(L\right)\leq \gamma_j \leq \underline{\sigma}\left(P\right)\right]\right]\end{aligned} \quad (4)$$

B.1.1 Equilibrium under the prior

The equilibrium probability of a random household choosing delay based on the prior was simply

$$\alpha \Pr\left(\sigma_{1j} \leq \underline{\sigma}\left(P\right)\right)+\left(1-\alpha\right)\Pr\left(\sigma_{2j} \leq \underline{\sigma}\left(P\right)\right)$$

that characterizes $\widehat{d}$ in the baseline no-information case.[31]

Writing this also in terms of primitives, this is equivalent to

$$\alpha\Gamma\left(\underline{\sigma}\left(P\right)\right)+\left(1-\alpha\right)E_{\gamma_j}\left[\Lambda\left(\underline{\sigma}\left(P\right)\right)-\gamma_j\right] \quad (5)$$

B.2 Comparing Equilibria

Comparing the the new equilibrium (Equation 4), after the mother has learned that $s = H$, to the prior (Equation 5) we now have that delay:

- Will occur for certain at $C_j = C^4$ whereas at the prior it would not occur.
- Will occur for certain at $C_j \in \left\{C^5, C^6\right\}$ whereas on the prior it only occurred with probability α.
- Will occur with probability $\alpha\overline{\phi}_2^*$ at $C_j = C^2$ whereas at the prior it would occur at α (note $\alpha\overline{\phi}_2^* \leq \alpha$).

The *opposing* effect at $C_j = C^2$ that is obtained as the mother is partially successful at dissuading the father, implies that the comparison of the equilibrium is, by nature, ambiguous. It is of course plausibly positive and consistent with the decreased frequency of early marriages in the local population in the long-run.

[31] Parents share the same prior belief. Thus, deriving the equilibrium on the prior does not depend on who is informed.