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Impact of the CARE Tipping Point Program in Nepal on adolescent girls' agency and risk of child, early, or forced marriage: Results from a cluster-randomized controlled trial

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ABSTRACT

Background: Girl child, early, and forced marriage (CEFM) persists in South Asia, with long-term effects on well-being. CARE's Tipping Point Initiative (TPI) sought to address the gender norms and inequalities underlying CEFM by engaging participant groups on programmatic topics and supporting community dialogue to build girls' agency, shift power relations, and change norms. We assessed impacts of the CARE TPI on girls' multifaceted agency and risk of CEFM in Nepal.

Methods: The quantitative evaluation was a three-arm, cluster-randomized controlled trial (control; Tipping Point Program [TPP]; Tipping Point Plus Program [TPP+] with emphasized social-norms change). Fifty-four clusters of ~200 households each were selected from two districts (27:27) with probability proportional to size and randomized evenly to study arms. A pre-baseline census identified unmarried girls 12–16 years (1,242) and adults 25 years or older (540). Questionnaires covered marriage; agency; social networks/norms; and discrimination/violence. Baseline participation was 1,140 girls and 540 adults. Retention was 1,124 girls and 531 adults. Regression-based difference-in-difference models assessed program effects on 15 agency-related secondary outcomes. Cox-proportional hazard models assessed program effects on time to marriage. Sensitivity analyses assessed the robustness of findings.

Results: At follow-up, marriage was rare for girls (<6.05%), and 10 secondary outcomes had increased. Except for sexual/reproductive health knowledge (coef.=.71, p=.036) and group membership (coef.=.48, p=.026) for TPP + versus control, adjusted difference-in-difference models showed no program effects on secondary outcomes. Results were mostly unmoderated by community mean: gender norms, household poverty, or women's schooling attainment. Cox proportional hazard models showed no program effect on time-to-marriage. Findings were robust.

Discussion: Null findings of the Nepal TPI may be attributable to low CEFM rates at follow-up, poor socio-economic conditions, COVID-19-related disruptions, and concurrent programming in control areas. As COVID-19 abates, impacts of TPP/TPP + on girls' agency and marriage, alone and with complementary programming, should be assessed.

Trial registration number: NCT04015856.

1. Introduction

Globally, the practice of child, early, or forced marriage (CEFM) disproportionately affects girl children (Gastón et al., 2019; Nour, 2009; Raj, 2010). An estimated 650 million women and girls who are alive today were married as children, and an estimated 12 million girls under

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age 18 years marry annually (United Nations International Children's Emergency Fund, March 2018); however, if current rates of CEFM were to continue, another 150 million girls would be expected to marry in childhood by 2030 (United Nations International Children's Emergency Fund, March 2018).

Some of the highest rates of CEFM are observed in South Asia, where about half of all child marriages occur (Pandey, 2017; Raj, 2010). In four high-prevalence South Asian countries, declines in girl-child marriage were observed from 1991 to 1994 to 2005–2007 (Raj et al., 2012); yet, declines were concentrated among marriages before age 14 years, with little or no change in marriage prevalence among 16-17 year-olds for any country except Bangladesh, where the prevalence of such marriages increased by 36% (Raj et al., 2012). Recent prevalence estimates among women 20–24 years range from 18% in Pakistan to 51% in Bangladesh (UNICEF, 2018–2021). Despite a 56% decline in CEFM in Nepal since 2000, 40% of women 20–24 years in 2016 were married before age 18 years (Ministry of Health et al., 2017), and the median age at first marriage varied from 17.4 to 19.7 years across provinces (Ministry of Health et al., 2017).

CEFM is associated with an array of adverse social and health outcomes. Compared to their counterparts, women and girls who experience CEFM also experience diminished long-term economic empowerment in marriage (Yount, Crandall, & Cheong, 2018) as well as heightened risks of intimate-partner and family violence (Raj, 2010)[3], depression and suicidality (Raj, 2010), and poor reproductive outcomes (Godha et al., 2013; Raj & Boehmer, 2013), including pregnancy-related complications that are leading causes of mortality among girls 15–19 years (Nour, 2009; Ganchimeg et al., 2014; Raj, 2010; World Health Organization, 2018). The children of adolescent mothers also face heightened risks of prematurity, low-birth-weight, and death during infancy (Nour, 2009; Raj et al., 2014).

CARE's Tipping Point Initiative (TPI) in Nepal and Bangladesh has documented systematic exclusion of girls' voices in marriage processes (Karim et al., 2016). When adolescent girls have tried to assert their opinions about whether, whom, and when to marry, families and communities often have criticized them for challenging the authority of male relatives (Karim et al., 2016). Instead, marriage decisions are made *for* adolescents, not *with* them (Karim et al., 2016). Only boys with more schooling, income, or experience working overseas may express opinions about a spouse (Karim et al., 2016). In Nepal, child marriage also is concentrated in certain castes–like Dalits, Madhesi, low-caste Hindu women, and other economically marginalized castes (Karim et al., 2016). The isolation of these groups limits their ability to change such practices, even when aggregate changes in child marriage are underway (Karim et al., 2016).

The present analysis assessed the impacts of the CARE Tipping Point Program (TPP) and Tipping Point Plus Program (TPP+), relative to a control condition, on one primary outcome—adolescent girls' hazard of child, early, or forced marriage (CEFM)—as well as 15 secondary outcomes capturing multiple dimensions of adolescent girls' agency, perceived social-network norms, and perceived discrimination in the family as part of a broader mixed-methods evaluation (Yount et al., 2021). These findings, and the companion qualitative findings (Clark et al., 2022), which we refer to in the discussion section, have implications for the feasibility of community-based social-norms-change and movement-building efforts to realize sustained impacts under chronic conditions of gender inequality and the COVID-19 pandemic.

2. Background

2.1. CAREs Tipping Point initiative

CARE's Tipping Point Initiative (TPI) focuses on addressing the underlying causes of CEFM. To do so, TPI aims to promote the rights of adolescent girls through community-level programming that involves the synchronized engagement of different participant groups to challenge social expectations and repressive gender norms and to promote girl-centric and girl-led activism (Fig. 1). CARE's TPI includes a 'core' program package, the Tipping Point Program (TPP), which includes components to enhance adolescent girls' personal assets and intrinsic agency (including their self-efficacy) as well as girls' instrumental agency (including their voice and negotiation skills). CARE's TPI also includes an 'enhanced' program package, TPP+, which includes all components in TPP as well as activities to enhance social-norms change by engaging community leaders and by facilitating girl-led community activities and social-norms-change events. Fig. 1 summarizes planned components of the CARE TPP and TPP + models, and details are available elsewhere (Yount et al., 2021).

Programmatic modifications resulting from the COVID-19-induced lockdown and associated disruptions are recorded in the trial registry. In brief, the TPP and TPP + packages were reduced in duration from 18 to 16 months (July 2019 to March 2021). A five-month hiatus in programming occurred from March 2020 to July 2020, and the number of weekly sessions for girls and boys were reduced from 45 to 38. To adhere maximally to the original programmatic content, some sessions were merged, and repetitive content was cut. The enhanced social-norms-change activities at the community level also were conducted in a condensed manner. Originally, to allow adequate time for a sufficient number of marriages to have occurred to detect program effects and to capture sustained changes in primary and secondary outcomes beyond the intensive period of program implementation, a 'freeze period' of 12 months from the end of program implementation to follow-up data collection was planned; however, due to COVID-19-related delays in the completion of program implementation, this period was reduced to eight months.

2.2. Theory of Change for the CARE Tipping Point program and Tipping Point plus program

Fig. 2 depicts the CARE Tipping Point Program Impact Evaluation Theory of Change (Yount et al., 2021). *Inputs* summarize the core CARE TPP package (Box 1) and additional components of the CARE TPP+ (Box 2). *Change processes or outcomes* clarify the mechanisms by which TPP and TPP + are expected to operate. *Impacts* (Box 3) clarifies the expected impacts of TPP and TPP + on girls' risks of CEFM. The mechanisms by which TPP/TPP + inputs are expected to operate warrant discussion. First, TPP + sessions with religious leaders, government officials, and school personnel, are expected to engage formal structures in the community to foster gender-equitable procedures and services and to facilitate shifts in gender norms among key reference groups (Box 4). Second, TPP and TPP + are expected to change interpersonal power relations by increasing girls' *instrumental and collective agency*, including their connectedness, trust, and capacity for negotiation with family members; solidarity and movement building among peers; and participation among community members to support norms change (Box 5). Third, TPP and TPP + are expected to strengthen each adolescent girl's *personal assets* by expanding her knowledge (e.g., of sexual and reproductive rights) and skills (e.g., with respect to leadership and activism) and to strengthen each girl's *intrinsic agency* by increasing her self-confidence in her capabilities, critical consciousness of her rights, and gender-equitable attitudes (Box 6). Fourth, TPP and TPP + are expected to support the diffusion of gender-equitable norms regarding what community members believe girls should do (injunctive norms) and actually do (descriptive norms) (Box 6). The facilitated diffusion of gender-equitable norms is emphasized in TPP+, through girl-centered movement building and its four related community-level activities, social-norms activities, engagement of key stakeholders, and intergroup dialogues. These intermediate normative and agency-related outcomes are expected to support a decline in CEFM, and intermediate outcomes and impacts are expected to be more pronounced in the group receiving TPP+, with its emphasized social-norms programming.

	Groups	Sessions	Core Trainings	Girl-led Activities (TPP+)	Joint Sessions
Core Participants	Girls	45 weekly	-**Social norms** (all) -**Access to alternatives** (G) -**ASRHR** (all core) -**Movement building** (G) -**Activist training** (G leaders) -**Activist training** (BFM)	**Girls groups** **6-community activities** Mobility Menstruation Gender-division labor Dowry Family honor/SH Girls' aspirations	**6 intergroup dialogues** Girl-Boy Girl-Mother Mother-Father G-B-M-F
	Boys	45 weekly			
	Mothers	18 monthly			
	Fathers	18 monthly			
Emphasized	Religious leaders	Intensive trainings Follow-up meetings		**Girl-elected leaders** **4 x-cluster activities**	**Duration 18-months** Diverse facilitations
	Local Govt				
	School Personnel				
	Project Staff Core Capacities	Gender-equity and diversity, facilitation techniques, participatory and reflective techniques, movement building, VLSA, social norms, social analysis and action			

Fig. 1. Care Tipping Point Program (TPP) and Tipping Point Program plus intervention packages.
Notes. ASRHR = Adolescent sexual and reproductive health and rights; G = Girl; BFM=Boy-Father-Mother; SH=Sexual Health; VSLA=Village Savings and Loan Association.

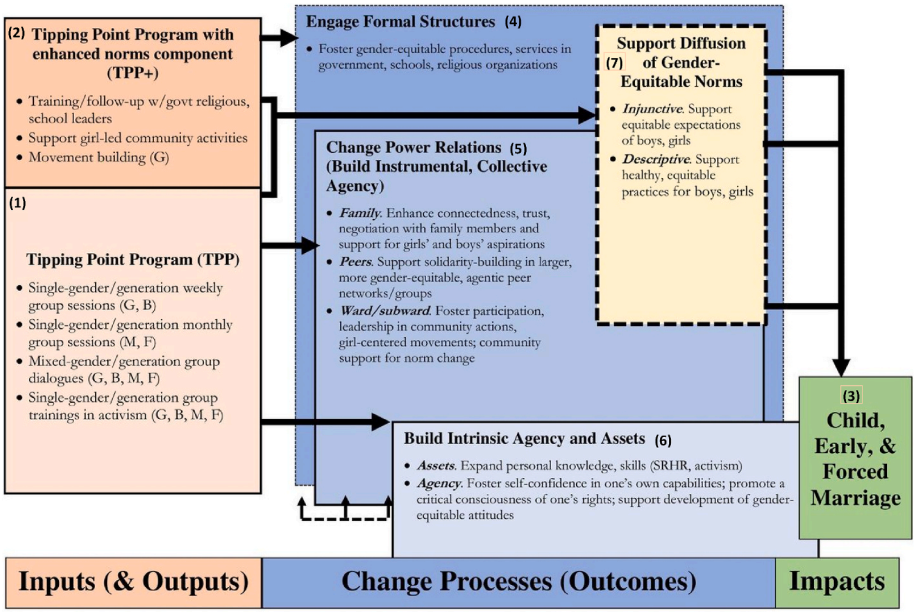

Fig. 2. Theory of Change for the Nepal Tipping Point Evaluation
Note. Fig. 2 is adapted with permission from the first author (Yount et al., 2021).

2.3. Objectives and hypotheses

In sum, this analysis aimed to assess the impacts of the TPP and TPP+, relative to no program, on the primary outcome of time to marriage and secondary outcomes related to personal assets/intrinsic agency, instrumental agency, and collective agency of adolescent girls as well as social and gender norms in the community. We expected that, relative to the control condition, the TPP and TPP + would reduce the risk of first marriage, increase all dimensions of agency for adolescent girls, and improve gender-related social norms. We also expected that TPP + would have incrementally more favorable effects on primary and secondary outcomes than TPP alone (Table 1).

3. Method

3.1. Study setting

The study sites were Kapilvastu and Rupandehi districts, where the Nepali Government has prioritized CARE programming and where no concurrent CARE or other NGO programming specifically related to CEFM was known to have been underway. Both districts are in Lumbini Province (formerly Province 5), in Western Nepal. Compared to the

Table 1
Primary and secondary outcomes of the Nepal Tipping Point Evaluation and associated hypotheses.

		C	TPP	TPP+
Primary Outcome				
CEFM	• Hazard of child, early, or forced marriage (CEFM) at follow-up (in months)	–	↓	↓↓
Secondary Outcomes				
Individual assets and Intrinsic agency	• Knowledge of sexual and reproductive health and rights • Attitudes about sexual and reproductive health • Aspirations about marriage and education • Self-efficacy • Attitudes about gender/ discrimination in the family/ menstruation/masculinity	–	↑	↑↑
Instrumental agency	• Communication and negotiation with parents • Leadership competence • Participation in decision-making • Participation in financial activities • Mobility and freedom of movement	–	↑	↑↑
Girl-centered movement building and collective agency	• Group membership • Collective efficacy: cohesion, solidarity, and mobilization skills • Collective action, participation in events	–	↑	↑↑
Changes in repressive social norms	• Norms in girls' social networks	–	↑	↑↑
Reductions in violence and harassment as barriers to change	• Public violence/harassment against girls	–	↑	↑↑

Notes. Control communities were expected to show little change over the study period due to the concentration of child marriage in these conservative communities and the period of observation. The symbol ↑ refers to an increase, and ↑↑ refers to a more substantial increase. The symbol ↓ refers to a decrease, and ↓↓ refers to a more substantial decrease.

national Human Development Index (HDI), the HDI in Lumbini Province has been lower since 1990 (Institute for Management Research, 2022). In 2019, Lumbini's slightly lower HDI (0.563 versus 0.587 nationally) was attributable to lower life expectancy at birth (68.8 versus 69.7), slightly lower mean grades of schooling for those 25 years or older (5.0 versus 5.2 years), and notably lower mean gross national income per capita (2086 versus 2748 in 2011 purchasing power parity [PPP] US dollars) (Government of Nepal & United Nations Development Program, 2020). Despite overall gains in schooling attainment in the province, gender gaps in schooling are expected to increase from 0.2 completed grades among adults (4.9 women; 5.1 men) to an expected gap of nearly 1.0 completed grades among current children (12.2 women; 13.1 men) due to faster than expected increases in schooling among boys than girls. Also, despite similar percentages of women and men 15 years or older participating in the labor force (70.0% versus 72.1%), the gender gap in per capita income is high (1488 for women; 2751 for men in 2011 PPP US$). The median age at first marriage in Lumbini Province is 17.7 years for women 25–49 years, the third lowest for women these ages across provinces (Ministry of Health et al., 2017).

According to the Nepal national census, Kaplivastu district has an estimated population of 686,739 in 2021, of whom 68% speak Awadhi, 17% speak Nepali, 11% speak Tharu, and the remainder speak other languages as their first language. Six of the district's ten municipalities are urban, and four are rural. Most of the district's population is dependent on agriculture, with paddy rice being a major crop and sugarcane being a major cash crop. Many young people rely on foreign employment. Rupandehi district has an estimated population of 1,118,975 in 2021, of which 37% speak Nepali, 37% speak Bhojpuri, 6% speak Awadhi, 6% speak Tharu, and the remainder speak other languages as their first language. Six of the district's 16 municipalities are urban, and 10 are rural. Rupandehi is nationally known for its educational infrastructure and has a literacy rate above the national average. Kapilvastu and Rupandehi districts border each other and India to the south.

3.2. Sample eligibility

Eligible girls for the Tipping Point intervention and data collection were unmarried, 12–16 years, and living in selected clusters with no plans to migrate in the subsequent 24 months. Eligible mothers and fathers for the intervention were parental figures of an adolescent girl who was recruited to participate in the intervention and data collection. Parents participating in the intervention were not assessed quantitatively, but a subsample was assessed in the qualitative process evaluation, described elsewhere (Clark et al., 2022). Eligible adult community members, for data collection on community social and gender norms in all study clusters, were men and women 25 years or older who were living in selected clusters. Sample eligibility for boys, who are not analyzed here, is described elsewhere (Yount et al., 2021).

3.3. Sampling and randomization of primary sampling units (wards)

Fig. 3 presents the flow diagram for the selection and retention of adolescent girls and community adults in the study sample (the flow diagram for boys is available upon request) (Yount et al., 2021). In Nepal, wards are the lowest governmental administrative unit and were the primary sampling units for this study. Using the size of the resident population from the 2011 Census of Nepal, 27 wards were selected with probability proportionate to size from each study district. Each selected ward within each district was assigned randomly to one of the three study arms, resulting in 18 wards per study arm. This randomization process allowed for balance in the sample across study districts to facilitate program implementation.

3.4. Cluster selection and pretrial household census

Enumerators mapped selected wards in the field to ensure an accurate count of households or to update the count based on information from ward authorities. Enumerators divided large wards into segments of about 200 households and selected one segment randomly. The selection of segments within wards also minimized the extent of physical adjacency of program and control segments and any spillover of program effects into control areas (Yount et al., 2021). In selected clusters (wards or ward segments), enumerators conducted a household census. Census forms were administered to the most knowledgeable woman member, or to any knowledgeable adult member (Yount et al., 2021). Enumerators collected contact information and data on the household's caste, religion, and language(s) spoken. Marital status, age at marriage, and years married were recorded for members above age eight years. These data generated our sampling frame.

3.5. Sample recruitment, participation, and retention

In TPP and TPP + assigned clusters, the names and contact information for eligible adolescent girls, as identified in the household census, were randomly ordered and provided to CARE to form the program groups that were to receive the TPP or TPP+. Following these lists, CARE Tipping Point project staff recruited and enrolled consenting adolescents to participate in the programming. The local research partner followed up with consenting intervention participants to administer the survey informed consent form and survey until the target number of participants was reached per cluster (23 girls). Thus, the

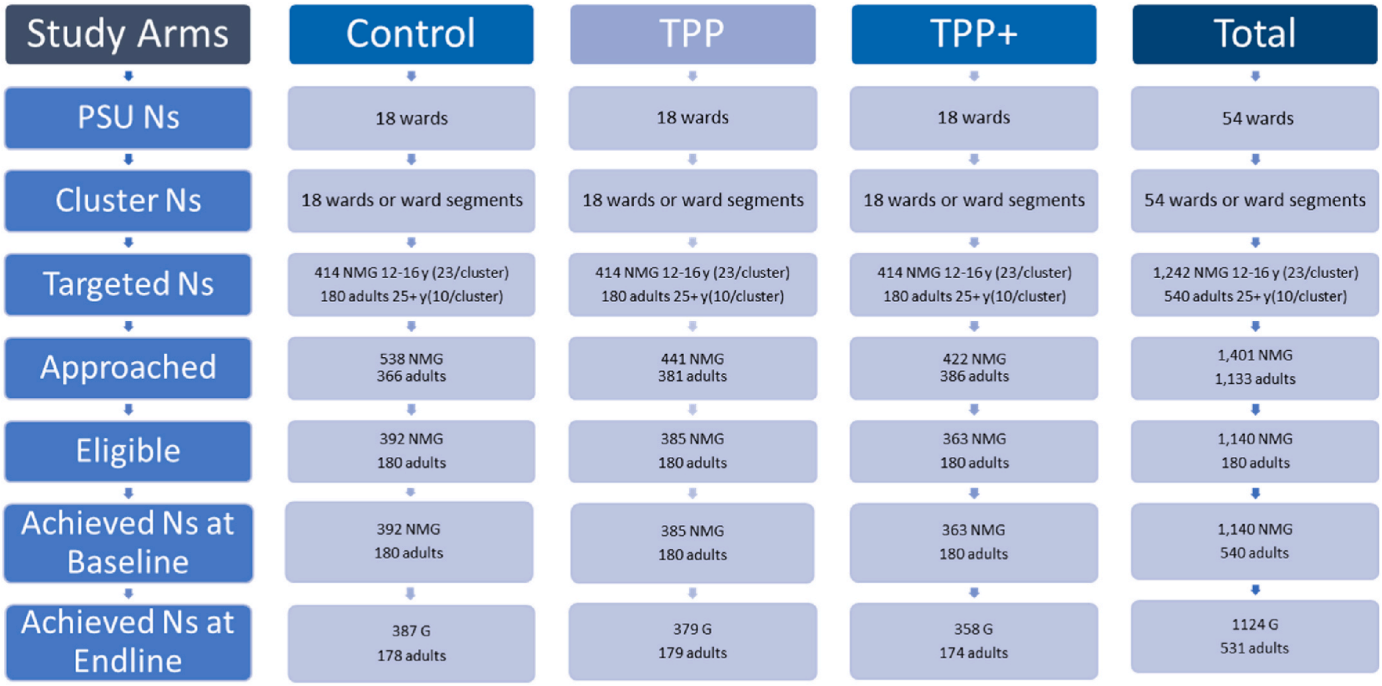

Fig. 3. Flow diagram for selection and retention of adolescent girls and adult community members in the Nepal Tipping Point Cluster-Randomized Controlled Trial Notes. NMG = all non-married adolescent girls at baseline; G = all adolescent girls at endline (or follow-up).

survey sample in these clusters represents those who agreed to participate in TPP or TPP+, not the population of unmarried girls 12–16 years. In control assigned clusters, and for the adult community samples in all clusters, the research team randomly selected eligible participants from cluster-specific lists generated from the household census, invited them to participate in the study, administered the informed consent, and administered the survey to consenting individuals.

Achieved baseline survey sample sizes were 1,140 unmarried adolescent girls and 540 adult community members. The follow-up survey was administered 8-months after CARE USA and CARE Nepal completed the TPP and TPP + program implementation period. To minimize attrition, the follow-up survey was timed to coincide with key agricultural seasons, when community residents who migrate cyclically for work were expected to return to assist their families with harvesting. Of baseline participants, 99% of adolescent girls (N = 1,124) and 98% of community adults (N = 531) were retained through a combination of face-to-face follow-up interviews or phone-tracing interviews for participants who were not found in the household in which they were living at baseline. Baseline data collection took place from June 10 to July 19, 2019, and follow-up data collection took place during December 2021 and January 2022.

3.6. Data

The baseline survey included modules that measured personal assets/intrinsic agency, instrumental agency, collective agency, social networks and norms, and discrimination and violence as barriers to change (Table 2). Nineteen modules were administered to girls, and five modules were administered to adult community members (Table 2). Questionnaires were customized for each sample but maintained high comparability across samples and survey waves. Modules administered to boys are described elsewhere (Yount et al., 2021).

3.7. Primary outcome: time to first marriage

The primary outcome for this analysis was time to first marriage in months, from baseline to follow-up. This period included 20-months of

Table 2
Questionnaire modules administered to adolescent girls and community adult women and men in the CARE Tipping Point impact evaluation in Nepal.

Questionnaire module (source)	Construct Measured	Samples Receiving	
		Girls	Adults
1. Self-efficacy	Individual Assets and Intrinsic agency	X	
2. Aspiration about marriage and education (Khan et al., 2018)		X	
3. Attitudes about gender (Khan et al., 2018)		X	X
4. Menstruation knowledge, attitudes, practices		X	
5. Knowledge/attitudes about sexual/reproductive health		X	X
6. Mobility or freedom of movement (Khan et al., 2018)	Instrumental agency	X	
7. Negotiation on education, marriage, mobility		X	
8. Communication and negotiation with parents		X	
9. Participation in financial activities		X	
10. Leadership competence (Khan et al., 2018)		X	
11. Group membership (Khan et al., 2018)	Collective agency	X	
12. Cohesion, solidarity, and mobilization skills		X	
13. Participation in events		X	
14. Connectedness	Social networks and norms	X	
15. Social networks (Khan et al., 2018)		X	
16. Social norms		X	X
17. Differential treatment of sister	Discrimination and violence as barriers to change	X	
18. Sexual abuse		X	X
19. Peer violence (Khan et al., 2018)		X	X

programming and the eight-month freeze period after programming and before follow-up. In sensitivity analyses, this outcome was revised to capture time to first marriage in days and weeks (results were analogous to those for time to first marriage in months and are available upon request).

3.8. Secondary outcomes

The secondary outcomes were 15 summative scales capturing dimensions of adolescent girls' agency, social networks and norms, and perceived discrimination in the family measured at baseline and follow-up. Table 3 presents the name of each scale, number of items, example item, response option range, possible range for the summative score, and alpha reliabilities at each data-collection wave.

Individual assets and intrinsic agency were captured using five summative scales. *Sexual and reproductive health (SRH) knowledge* was captured with six items, each scored 0 (incorrect) or 1 (correct) and summed to have a possible range of 0–6, with higher scores denoting more SRH knowledge. Alpha reliabilities were 0.65 at baseline and 0.61 at follow-up. *SRH attitudes* was captured with four items, each scored 0 (fully agree), 1 (partly agree), 2 (partly disagree), 3 (fully disagree) and reverse-coded, as needed, to have a more agentic valence. The summative scale had a possible range of 0–12, with higher scores denoting more agreement with discussion of certain SRH topics. Alpha reliabilities were 0.55 at baseline and 0.63 at follow-up. *Attitudes about gender* was captured with nine items, each scored 0 (fully agree) to 3 (fully disagree) and reverse coded, if needed, so each item had a more agentic valence. The summative scale had a possible range of 0–27, with higher scores denoting more gender-equitable attitudes. Alpha reliabilities were 0.75 at baseline and 0.74 at follow-up. *Aspirations about marriage and education* were measured with seven items. Four items were scored 0 (at puberty, after completing his/her study, after she/he started to earn money, when parents decide) or 1 (after she/he is 20 years of age). Two items were scored 0 (no) or 1 (yes), and one item (desired educational level) was scored 1 (grade 10 or lower), 2 (grade 11 or 12), 3 (college), and 4 (masters degree or higher). The summative scale had a possible range of 1–10, with higher scores denoting greater aspirational goals towards later marriage and higher educational attainment. Alpha reliabilities were 0.72 at baseline and 0.69 at follow-up. *Self-efficacy* was captured with 11 items scored 0 (not at all confident), 1 (somewhat confident), and 2 (very confident). The summative scale had a possible range of 0–22. Alpha reliabilities were 0.79 at baseline and 0.86 at follow-up.

Instrumental agency was measured with five summative scales. *Communication and negotiation with parents* was measured with six items, scored 0 (fully disagree) to 3 (fully agree) and summed to have a possible range of 0–16. Alpha reliabilities were 0.86 at baseline and 0.91 at follow-up. *Leadership competence* was measured with nine items, scored 0 (fully disagree) to 3 (fully agree) and summed to have a possible range of 0–27. Alpha reliabilities were 0.92 at baseline and 0.93 at follow-up. *Participation in decision-making* was measured with three items scored 0 (no), 1 (yes and no), and 2 (yes and yes) and summed to have a possible range of 0–6. Alpha reliabilities were 0.48 at baseline and 0.56 at follow-up. *Participation in financial activities* was measured with three items scored 0 (no) or 1 (yes) and summed for a possible range of 0–3. Alpha reliabilities were low (<0.30) at baseline and follow-up. *Mobility* was measured with nine items scored 0 (no) to 2 (yes) and summed to have a possible range of 0–18. Alpha reliabilities were 0.82 at baseline and 0.83 at follow-up.

Collective agency was captured with three summative scales. *Group membership* was captured with nine items scored 0 (not involved), 1 (member), or 2 (leader). The summative scale had a possible range of 0–18. Alpha reliabilities were 0.70 at baseline and 0.62 at follow-up. *Cohesion, solidarity, and mobilization skills* were captured with five items, scored 0 (fully disagree) to 3 (fully agree). The summative scale had a possible range of 0–15. Alpha reliabilities were 0.77 at baseline and 0.91 at follow-up. *Participation in events* was captured with four items scored 0 (no) or 1 (yes) and summed to have a possible range of 0–4. Alpha reliabilities were 0.69 at baseline and 0.80 at follow-up.

Repressive social norms were measured with three items scored 0 (fully agree) to 3 (fully disagree) and summed for a possible range of 0–9. Alpha reliabilities were 0.94 at baseline and 0.97 at follow-up. Finally, ***violence and harassment as barriers to social change*** were measured with five items scored 0 (fully disagree) to 3 (fully agree) and

Table 3
Secondary outcomes for unmarried adolescent girls ages 12–16 years at baseline and participating in the Nepal Tipping Point evaluation, by construct.

Scale Name	# of Items	Example Item	Response Options	Score Range	α Baseline	α Follow-up
Individual Assets and Intrinsic Agency						
SRH knowledge	6	A woman can get pregnant the first time she has sexual intercourse	0–1	0–6	0.65	0.61
SRH attitudes	4	A mother can discuss menstruation with her daughter	0–3	0–12	0.55	0.63
Attitudes about gender	9	A woman is a 'real woman' only after she has a child	0–3	0–27	0.75	0.74
Aspirations about marriage and education	7	When do you think is the best time to have guana? … Do you want to continue your education after marriage?	6: 0-1 1: 1-4	1–10	0.72	0.69
Self-efficacy	11	You can refuse marriage if you do not desire it	0–2	0–22	0.79	0.86
Instrumental Agency						
Communication, negotiation with parents	6	I am willing to listen to my parent/guardian's opinions	0–3	0–18	0.86	0.91
Leadership competence	9	I prefer to be a leader rather than a follower	0–3	0–27	0.92	0.93
Participation in decision-making	3	Did you ever express your choice about how much education you wanted?	0–2	0–6	0.48	0.56
Participation in financial activities	3	Do you have any savings of your own?	0–1	0–3	0.27	0.20
Mobility	9	Generally, which of the following places are you able to visit?	0–2	0–18	0.82	0.83
Collective Agency						
Group membership	9	Social or cultural organization club or association	0–2	0–18	0.70	0.62
Cohesion, solidarity, and mobilization skills	5	Girls and others in your community could prevent child marriage	0–3	0–15	0.77	0.91
Participation in events	4	In the past 12 months, have you spoken out in public about a problem that affects someone else?	0–1	0–4	0.69	0.80
Repressive social norms	3	Peer believes that men and women should share the housework, such as doing dishes, cleaning and cooking	0–3	0–9	0.94	0.97
Violence and harassment as barriers to change	5	Your parents/guardian listen to your opinion as much as they listen to a brother's opinion	0–3	0–15	0.80	0.87

Notes. SRH = sexual and reproductive health. Sample sizes for each α are available upon request.

summed for a possible range of 0–15. Alpha reliabilities were 0.80 at baseline and 0.87 at follow-up.

3.9. Covariates

Individual-level covariates, selected from empirical research, included the adolescent girls' baseline age in completed years (Espinoza Revollo & Portela, 2019), grades of schooling, literacy (read and/or write, neither [reference]), vocational training (yes, no [reference]), religion (Hinduism, Muslim and other [reference]), caste (advantaged, disadvantaged [reference]), household poverty (Espinoza Revollo & Portela, 2019), main occupation of the household head (longterm employee, no job/doesn't work [reference]), and participation of the girl or family member in another empowerment program in the prior two years (yes, no [reference]). Household poverty was measured using eight items from the Nepal 2010 Poverty Probability Index (PPI). These items had varying scores that were summed to have a possible range of 0–61. Questions included the male head's/spouse's job type worked the most hours in the past seven days, number of bedrooms in the residence, main construction material of outside walls and roof, in-home amenities (type of stove mainly used for cooking; type of toilet used; number of telephone sets/cordless/mobile owned), household ownership of agricultural land (own, sharecrop-in, mortgage-in) and, if yes, whether irrigated. This scale was inversely proportional, such that a higher score represented a lower poverty likelihood and a score of twenty-five or below indicated a high poverty likelihood.

Community-level covariates included the baseline cluster-level proportion of households from a disadvantaged caste, proportion of households being Muslim, average household PPI score, mean grades of schooling completed for women 25 years or older, and the gender gap in mean grades completed for adults 25 years or older (men's mean grades – women's mean grades). These measures were computed using data from the pre-baseline household census in each study cluster, so measures reflected the average for the population of households or adults 25 years or older in the cluster. A final cluster-level control measure was gender norms (hereafter "norms" for parsimony). Norms were measured by computing the cluster-level mean summative score for responses to 16 items among women and men 25 years or older who participated in the survey in each cluster. Each item was coded 0 (fully agree) to 3 (fully disagree), or reverse coded to ensure a more gender-equitable valence. An example item was "Most people in my village will approve if a married woman goes out of house to work." Alpha reliabilities at the individual-level were 0.92 for women, 0.86 for men, and 0.91 for all adults. Items were summed for each adult, and summative scores were averaged in each cluster to capture the cluster (community-level) mean gender norm, with higher means denoting more equitable gender norms among adults in the cluster.

3.10. Statistical analyses

Descriptive analyses. As a first step in the descriptive analysis, we constructed secondary-outcome scales and performed a reliability assessment for each scale at baseline and follow-up (Table 3). Individual survey questions (items) for adolescent girls were organized into item sets capturing secondary outcomes. Items were recoded to be anchored at zero and to have a positive valence. Missing responses were coded as missing for univariate analyses of items and as 0 for summative scoring. Pearson pairwise correlations were estimated to ensure that items within sets were mutually correlated and that summative scales were reasonable reflections of intended secondary outcomes (results available on request). An item was considered for deletion if the magnitude of its pairwise correlation with others in the same item set was close to zero and not significant. Scale reliabilities were assessed for all secondary outcomes using Cronbach's alpha for each item set or subset after item deletion (Table 3). As a second step in the descriptive analysis, we estimated univariate distributions for all primary and secondary outcomes, individual-level covariates, and community-level covariates, for the total sample of girls and for girls in each study arm separately.

Assessment of program impact. As a first step in the impact assessment, we estimated the average treatment effect on secondary outcomes by computing the differences between the means of the secondary outcomes for participants assigned to TPP or TPP + versus non-participants, or the control group. We used the difference-in-difference (DID) regression approach with cluster-robust variance estimators, which aims to eliminate the confounding effects of unobserved study-arm and time characteristics (Lechner, 2011; Liang & Zeger, 1986). We first ran DID models without covariates. Then, we re-estimated all DID models, adjusting for individual- and community-level covariates, described above. We assessed the impacts of assignment to the TPP and TPP + treatment groups, separately and combined, relative to the control group.

As a second step in the impact assessment, we assessed the impact of assignment to the TPP and TPP + treatment groups on the hazard of marriage in months using Cox proportional odds models with and without regression adjustment. We assessed the impacts of assignment to the TPP group or TPP + group, separately and combined, relative to the control group (Austin & Stuart, 2015). To assess the robustness of the findings with additional control for observed sources of confounding, we employed propensity score methods using inverse-probability-weighted regression adjustment with all individual covariates as listed in Sections 3.9a except household religion (Austin & Stuart, 2015). Finally, we estimated models for the hazard of marriage measured in days and weeks, instead of months, as a robustness check of the findings (available upon request).

As a final step in the impact assessment, we estimated linear mixed-models to assess whether the adjusted effects of assignment to the TPP group or TPP + group were moderated by three community-level characteristics: mean gender norms, mean household poverty index, and mean grades of schooling for women 25 years or older (West et al., 2006). For these analyses, all three community characteristics were grand-mean centered, and we probed significant interactions ($p < 0.05$), using Preacher, Curran, and Bauer's (2006) (Preacher et al., 2006) procedure to detect the regions of the specific values of the community covariates in which the program effect was significant.

Correlates of program participation and dose-response analyses. As a final phase in the analysis, we examined correlates of participation in TPP or TPP + program activities, and then, dose-response associations of program participation with primary and secondary outcomes for adolescent girls. First, we estimated proportional odds models to assess the associations of individual-level covariates, such as caste, religion, education, and participation in other empowerment programs, with the frequency of TPP and TPP + session attendance (never, rarely, sometimes, often, always), measured separately for adolescent girls' mothers, and girls' fathers. Second, we used the same modeling strategy to assess associations of the same covariates with the number of community events in which girls, girls' mothers, and girls' fathers took part (none, one, two, three or more). Session and community-event participation for girls and their parents were based on girls' reports. Third, we used Cox proportional hazard models to assess the unadjusted and adjusted associations of TPP and TPP + session attendance and community-event attendance for girls, mothers, and fathers with girls' hazard of marriage in months. Finally, we used linear regression models to assess the unadjusted and adjusted associations of TPP and TPP + session attendance and community-event attendance for girls, mothers, and fathers with all secondary outcomes for girls. These results are summarized in Appendix Tables 1–5.

4. Results

Sample Characteristics. Table 4 presents the baseline characteristics of adolescent girls in the sample, overall and by study arm. On average, girls in the study districts were 14 years old and could read or write

Table 4
Characteristics of girls 12–16 Years surveyed at baseline, Kapilvastu and Rupandehi districts, Nepal, 2019–2022, overall and by study arm (N = 1,124).

	Control (n = 387)	TPP (n = 379)	TPP+ (n = 358)	Total (n = 1,124)
Age in years, M (SE)	13.91 (0.07)	13.95 (0.07)	13.97 (0.07)	13.95 (0.04)
Can read or write, %				
Neither[b]	3.10	8.18	4.19	5.16
Read and/or write	94.58	86.28	94.14	91.64
Missing[b]	2.33	5.54	1.68	3.20
Ever attended school, %				
Yes	95.61	92.08	94.97	94.22
No	4.39	7.92	5.03	5.78
Missing	0.00	0.00	0.00	0.00
School type attended, %				
Government	72.61	70.98	73.74	72.42
Private	21.96	17.68	19.83	19.84
Community	0.52	2.90	1.12	1.51
Other	0.52	0.53	0.28	0.44
Never attended	4.39	7.92	5.03	5.78
Missing	0.00	0.00	0.00	0.00
Grades completed, M (SE)[a]	6.32 (0.13)	5.57 (0.14)	6.07 (0.13)	5.98 (0.08)
Still attending school, %				
Yes	82.17	77.31	80.45	79.98
No	13.44	14.78	14.53	14.23
Never attended[b]	4.39	7.92	5.03	5.78
Missing[b]	0.00	0.00	0.00	0.00
Ever received vocational training, %				
Yes	5.43	5.80	6.70	5.96
No[b]	94.06	94.20	93.02	93.77
Missing[b]	0.52	0.00	0.28	0.27
Religion, %				
Hinduism[b]	90.96	88.39	90.22	89.86
Buddhism	1.03	0.00	0.84	0.62
Islam	5.94	10.82	8.10	8.27
Kirat	0.00	0.00	0.00	0.00
Christianity	1.03	0.53	0.56	0.71
Other	0.00	0.00	0.00	0.00
Don't know	1.03	0.00	0.00	0.36
Missing	0.00	0.26	0.28	0.18
Caste, %				
Upper caste groups[b]	40.83	58.31	41.90	46.06
Relatively advantaged indigenous People[b]	34.88	17.41	34.36	28.83
Disadvantaged Terai and religious minority groups	6.46	10.29	7.82	8.19
Disadvantaged indigenous groups	0.26	0.26	0.28	0.27
Dalit groups	17.05	13.46	14.80	15.12
Other	0.26	0.26	0.84	0.44
Missing[b]	0.26	0.00	0.00	0.09
Household PPI, M (SE) [Theoretical 0–61]	40.76 (0.50)	40.46 (0.54)	39.81 (0.53)	40.36 (0.30)
Male Head/Spouse Primary Occupation Past Seven Days, %				
No male[b]	11.37	9.50	9.50	10.14
Does not work[b]	8.01	8.44	6.42	7.65
Paid daily in agriculture	19.38	18.73	25.42	21.09
Paid daily in non-agriculture	16.80	12.40	13.97	14.41
Self-employed in agriculture	16.54	16.62	17.88	16.99
Self-employed in non-agriculture	21.71	23.75	19.83	21.80
Paid wages on a long-term basis (agriculture or non-agriculture)	6.20	10.55	6.98	7.92
Missing[b]	0.00	0.00	0.00	0.00
Participation in non-TPI empowerment organizations, %				
Yes, me and my family	0.78	2.37	3.91	2.31
Yes, me only	1.29	0.79	0.84	0.98
Yes, family only	0.26	1.06	1.96	1.07
No	65.37	74.14	76.82	71.98
Don't know	19.12	9.76	4.19	11.21
Missing	13.18	11.87	12.29	12.46

[a] # observations on grades of schooling are missing.
[b] Combined to form reference group.

(91%). Almost all girls (94%) attended school, and most (72%) attended a government school. On average, girls had completed six grades of schooling, and most (80%) were still attending school. Vocational training was uncommon for girls in these districts (6%). Most girls lived in Hindu (90%) households and were from upper-caste (47%) or relatively advantaged indigenous (29%) groups; however, 15% of the sample were members of the disadvantaged (Dalit) caste group. Three-fourths (74%) of male heads of household (or their spouse) worked in daily wage labor or self-employment as their main occupation in the seven days before baseline. Most adolescents (71%) reported that neither they nor their family members were participating in another empowerment program; however, a substantial percentage of adolescents did not know their or their family's participation status (11%).

Distributions of and changes in primary and secondary outcomes. Table 5 presents means for primary and secondary outcomes for adolescent girls, overall and by study arm. Asterisks next to scale names denote significant changes from baseline to follow-up for the total sample. At follow-up, very few girls were married, overall and by study arm (Table 5). Also, from baseline to follow-up, significant changes were observed in most of the 15 secondary outcomes. For measures of individual assets and intrinsic agency, significant increases were observed in mean scores for girls' SRH knowledge, SRH attitudes, gender attitudes, and self-efficacy; however, mean scores for aspirations about marriage and education did not change. For measures of instrumental agency, significant increases were observed in mean scores for girls' mobility and freedom of movement, communication and negotiation with parents, and participation in decision-making; otherwise, leadership competence and participation in financial activity did not change over the study period. For measures of collective agency, mean scores for group membership and participation in events increased significantly over the study period; however, mean scores for cohesion, solidarity, and mobilization skills did not change. Finally, reported gender norms among peer networks did not change, but perceptions of discrimination in the family increased over the study period.

Results of difference-in-difference analysis of secondary outcomes. Table 6 reports the results for the difference-in-difference (DID) analyses (with covariate adjustments) of secondary outcomes related to girls' intrinsic, instrumental, and collective agency; network social norms, and perceptions about gender-discrimination in the family. Except for models of SRH knowledge (coef = .71, p=.036) for TPP + versus the control group, and group membership (coef=.48, p=.024) for TPP + versus the control group, regression-based DID models showed no significant program effects on the other 13 outcomes.

Results of Cox-proportional hazard models of time to marriage. Table 7 presents the results for the Cox proportional hazard models for the effects of assignment to TPP or TPP + on time to marriage in months. No significant program effect on the time to marriage in months was observed. Propensity score models with single covariates yielded the same results, and robustness checks using recalibrated time in weeks and days showed that the results did not change (available on request).

Results of mixed-model moderation analyses. Table 8 presents mixed-model results for the moderation analyses, which investigated whether the grand-mean-centered community-level means for gender norms, household poverty, and women's completed grades of schooling moderated the impact of the Tipping Point Program (TPP) and/or the Tipping Point Plus Program (TPP+). No significant moderation effects were observed for community mean gender norms, meaning the non-significant main effects of TPP and TPP+ were consistent across communities, regardless of their mean gender norm. Otherwise, community-level household poverty moderated the program effects on girls' aspirations for education and marriage, mobility and freedom of movement, and gender discrimination in the family. The simple slope analysis showed significant *positive* effects of TPP + versus Control on a) a girl's aspirations for education and marriage in communities less than or equal to −5.70/5.28 = −1.08SD below the community average household poverty level and b) a girl's reported gender discrimination in the

Table 5
Means (SE) for secondary (agency) outcomes, adolescent girls 12–16 years surveyed at baseline and follow-up, overall and by study arm, Kapilvastu and Rupandehi districts, Nepal, 2019–2022.

Secondary Agency Outcomes	Baseline				Follow-up			
	Control N = 387	TPP N = 379	TPP+ N = 358	Total N = 1,124	Control N = 387	TPP N = 379	TPP+ N = 358	Total N = 1,124
Married, %					5.94	6.33	5.87	6.05
Individual Assets and Intrinsic Agency	M (SE)	M (SE)	M (SE)	M (SE)	M (SE)	M (SE)	M (SE)	M (SE)
SRH knowledge [0–6]***	3.12 (0.17)	2.76 (0.13)	2.94 (0.16)	2.94 (0.09)	3.71 (0.22)	3.76 (0.18)	4.27 (0.13)	3.91 (0.12)
SRH attitudes [0–12]***	7.88 (0.25)	7.59 (0.22)	7.60 (0.25)	7.69 (0.14)	8.61 (0.40)	8.30 (0.35)	9.27 (0.26)	8.71 (0.20)
Attitudes about gender [0–27]***	14.10 (0.63)	12.71 (0.47)	14.03 (0.49)	13.61 (0.32)	17.05 (0.99)	16.88 (0.72)	17.61 (0.71)	17.17 (0.46)
Aspirations about marriage and education [1–10]	5.82 (0.19)	5.70 (0.21)	5.63 (0.20)	5.72 (0.12)	5.80 (0.20)	5.58 (0.20)	5.87 (0.21)	5.75 (0.12)
Self-efficacy [0–22]***	13.29 (0.60)	12.58 (0.52)	12.95 (0.47)	12.94 (0.30)	14.24 (0.83)	12.73 (0.62)	13.73 (0.65)	13.56 (0.41)
Instrumental Agency								
Mobility and freedom of movement [0–18]***	7.49 (0.44)	7.10 (0.34)	7.19 (0.24)	7.26 (0.20)	8.33 (0.28)	8.01 (0.26)	8.47 (0.30)	8.27 (0.16)
Communication and negotiation with parents [0–18]***	15.56 (0.27)	15.39 (0.22)	15.60 (0.29)	15.52 (0.15)	16.15 (0.35)	15.59 (0.32)	16.04 (0.33)	15.93 (0.19)
Leadership competence [0–27]	15.66 (0.60)	15.68 (0.50)	16.16 (0.53)	15.83 (0.32)	15.77 (0.91)	14.75 (0.85)	17.21 (0.81)	15.89 (0.50)
Participation in financial activities [0–4]	0.56 (0.06)	0.51 (0.07)	0.53 (0.07)	0.54 (0.04)	0.47 (0.05)	0.56 (0.07)	0.55 (0.08)	0.53 (0.04)
Participation in decision making [0–6]***	1.89 (0.12)	1.82 (0.14)	1.84 (0.15)	1.85 (0.08)	2.46 (0.26)	2.37 (0.19)	3.00 (0.26)	2.60 (0.14)
Collective Agency								
Group membership [0–18]***	0.47 (0.06)	0.51 (0.09)	0.33 (0.06)	0.44 (0.04)	0.67 (0.07)	0.86 (0.10)	0.97 (0.17)	0.83 (0.07)
Cohesion, solidarity, mobilization skills [0–15]	10.96 (0.34)	11.08 (0.29)	11.03 (0.32)	11.02 (0.18)	11.27 (0.45)	10.56 (0.40)	11.42 (0.48)	11.08 (0.26)
Participation in events [0–4]***	0.06 (0.02)	0.07 (0.02)	0.03 (0.01)	0.06 (0.01)	0.21 (0.05)	0.16 (0.06)	0.23 (0.53)	0.20 (0.03)
Peer Social Networks [0–9]	0.91 (0.11)	0.80 (0.11)	0.76 (0.10)	0.82 (0.06)	0.63 (0.16)	0.80 (0.16)	0.95 (0.18)	0.79 (0.10)
Gender discrimination in the family [0–15]***	11.34 (0.40)	10.52 (0.49)	11.05 (0.34)	10.93 (0.25)	12.42 (0.48)	11.35 (0.50)	12.18 (0.43)	11.93 (0.27)

***$p < 0.001$ for paired *t*-test of mean score at baseline versus follow-up in the total sample of girls.

family in communities less than 0.32/5.28 = 0.06SD above the community average household poverty level. The TPP also had a significant *negative* effect (versus Control) on a girl's mobility in communities less than or equal to 8.67/5.28 = 1.64SD above the average mean household poverty level. Also, the community-level mean of women's schooling attainment moderated the program impact on a girl's attitudes about gender and perceived gender discrimination in family. The simple slope analysis indicated, for example, a significant positive effect of TPP versus Control on a girl's attitudes about gender in communities not more than 1.73/1.28 = 1.35SD above the community average schooling attainment for women. There also was a significant positive effect of TPP + vs Control on girls' perceived gender discrimination in the family in communities with not more than 0.14/1.28 = 0.11SD above the community average schooling attainment for women.

5. Discussion

5.1. Summary of findings and interpretations

This analysis has focused on evaluating the impact of Tipping Point and Tipping Point Plus programming on the multidimensional agency and risk of child marriage in a cohort of unmarried girls 12–16 years in two Nepali districts. Notably, evaluation of the impacts of TPP and TPP + on adults in the community and on adolescent boys are not presented. These analyses are forthcoming, and results from the qualitative process evaluation are presented elsewhere (Clark et al., 2022).

In Kapilvastu and Rupandehi districts, from baseline to follow-up, marriage remained rare for adolescent girls in this sample, overall (6.05%) and in all study arms (<6.33%). In tandem, significant increases were observed from baseline to follow-up for 10 of 15 secondary outcomes that were designed to capture distinct but correlated aspects of girls' intrinsic, instrumental, and collective agency, network social norms, and perceptions of discrimination in the family. Qualitative findings from participants, parents and community members in TPP and TPP + sites suggested that changes in norms and practices toward later ages at marriage were already well underway at baseline, and like the quantitative results, very few girls were married over the course of the study (Clark et al., 2022). At baseline, parents and community members indicated that norms in their communities had shifted in recent years toward later marriage for girls (typically 18–25), often citing better maternal health outcomes and a greater recognition of the importance of girls' education as justification for daughters to delay marriage (Clark et al., 2022). Baseline interview and focus group participants generally perceived that earlier marriage was limited to specific socially and economically disadvantaged populations, aligning with what is known about risk factors for CEFM in Nepal.

These overall changes in secondary outcomes—and specifically increases in adolescent girls' agency—may have been due partly to normal developmental processes during adolescence (Hansen & Jessop, 2017), to contextual changes occurring similarly across the districts, and/or to Tipping Point programmatic inputs. However, except for models of SRH knowledge and group membership, regression-based DID models for the effects of assignment to TPP + or to TPP versus to the control group, showed no significant program effects. According to qualitative findings from the trial, many program participants did perceive increased knowledge to be attributable to participation in TPI; however, increases in agency and behavioral change were rare and limited primarily to older adolescents, who at baseline, already had aspirations for later ages at marriage and for education and work before marriage, which their parents supported, suggesting relatively low a priori risks of marriage among those reporting the strongest program benefit (Clark et al., 2022).

The general absence of programmatic effects on secondary, agency-related outcomes was surprising, given baseline evidence of a significant direct association of community-level gender norms with several agency-related outcomes, and of significant moderating effects of community-level gender norms on gender-gaps in agency outcomes (Yount et al., 2022). While based on cross-sectional data, these findings suggested that programmatic efforts to change community-level gender norms in these districts could increase multiple dimensions of adolescent girls' agency, reduce gender gaps in adolescent agency, and ultimately, reduce their risks of CEFM. Notably, these associations were observed

Table 6
Results from difference-in-differences models for the effects of assignment to the CARE tipping point program (TPP) or CARE tipping point plus program (TPP+) on secondary agency-related outcomes, unmarried adolescent girls 12–16 Years old at baseline, Kapilvastu and Rupandehi Districts, Nepal, 2019 July 2019–March 2021.

Girls' Individual Assets and Intrinsic Agency Secondary Outcomes					
	SRH Knowledge (N = 1,057)	SRH Attitudes (N = 1,050)	Gender Roles (N = 1,104)	Aspirations about Marriage, Educ. (N = 1,058)	Self-Efficacy (N = 1,104)
	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)	Est. (95% CI)
Panel A: Adjusted Effects of Separate Study Arms vs Control[a]					
TPP	.40 (−.26, 1.06)	−.28 (−2.15, 1.58)	1.21 (−.73, 3.15)	−.10 (−.75 .56)	−.85 (−2.72, 1.03)
TPP+	**.71 (.05, 1.37)***	1.31 (−.41, 3.04)	.59 (−1.13, 2.31)	.21 (−.52, .94)	−.20 (−2.09, 1.69)
Panel B: Adjusted Effects of Combined Study Arms vs Control[a]					
TPP or TPP+	.55 (−.05, 1.14) †	.49 (−1.11, 2.09)	.91 (−.69, 2.51)	.05 (−.55, .66)	−.54 (−2.19, 1.11)
Girls' Instrumental Agency Secondary Outcomes					
	Freedom of Movement (N = 1,106)	**Communication with Parents** (N = 1,058)	**Leadership Competence** (N = 1,099)	**Participation in Financial Activities** (N = 1.054)	**Participation in Decision Making** (N = 1,058)
	Est. 95% CI	Est. 95% CI	Est. 95% CI	Est. 95% CI	Est. 95% CI
Panel A: Adjusted Effects of Separate Study Arms vs Control[a]					
TPP	.07 (−.95, 1.09)	−.44 (−1.52, .64)	−1.13 (−4.68, 2.41)	.15 (−.07, .37)	−.01 (−.63, .60)
TPP+	.42 (−.56, 1.39)	−.19 (−1.34, .95)	.85 (−2.88, 4.57)	.11 (−.10, .32)	.57 (−.13, 1.27)
Panel B: Adjusted Effects of Combined Study Arms vs Control[a]					
TPP or TPP+	.24 (−.67, 1.14)	−.32 (−1.32, .68)	−.17 (−3.35, 3.06)	.13 (−.05, .31)	.27 (−.32, .86)
Girls' Collective Agency, Network Social Norms, Perceptions of Gender-Discrimination in the Family Secondary Outcomes					
	Group Membership (N = 1,106)	**Collective Efficacy** (N = 1,102)	**Participation in Events** (N = (1,104)	**Network Social Norms** (N = 837)	**Gender Discrimin-ation in Family** (N = 475)
	Est. 95% CI	Est. 95% CI	Est. 95% CI	Est. 95% CI	Est. 95% CI
Panel A: Adjusted Effects of Separate Study Arms vs Control[a]					
TPP	.18 (−.18, .54)	−1.27 (−3.35, .83)	−.06 (−.22, .09)	.26 (−.25, .76)	−.12 (−1.75, 1.52)
TPP+	**.48 (.06, .89)***	.22 (−2.13, 2.57)	.04 (−.12, .20)	.44 (−.19, 1.06)	−.25 (−1.59, 1.10)
Panel B: Adjusted Effects of Combined Study Arms vs Control[a]					
TPP or TPP+	.32 (−.01,.66)†	−.54 (−2.47, 1.38)	−.01 (−.15, .12)	.35 (−.15, .85)	−.18 (−1.51, 1.15)

† $p < 0.1$; *$p < 0.05$; **$p < 0.01$.

[a] Controlling for age in years, read and/or write, grades completed, still attending school, received vocational training, household religion, caste, Household PPI, male head primary occupation, other (non-TPI) empowerment organizations attended, proportion of households from an advantaged caste, proportion of households being Muslim, average household PPI score, mean grades of schooling completed for women 25 years or older, and the gender gap in mean grades completed for adults 25 years or older (men's mean grades – women's mean grades).

Table 7
Results of cox proportional hazard models for the effects of assignment to the CARE tipping point program (TPP) or CARE tipping point plus program (TPP+) on time to first marriage in months, unmarried adolescent girls 12–16 Years at baseline, Kapilvastu and Rupandehi districts, Nepal, July 2019–March 2021 (N = 1,078).

	UHR[a] (95% CI)		RAHR[b] (95% CI)	
Panel A: Separate Study Arms				
TPP	1.06	(.60, 1.88)	.97	(.53, 1.79)
TPP+	.98	(.54, 1.78)	1.14	(.58, 2.26)
Panel B: Combined Study Arms				
TPP or TPP+	1.02	(.62, 1.69)	1.43	(.83, 2.48)

[a] Unadjusted Hazard Ratio.

[b] Regression Adjusted Hazard Ratio controlling for age in years, read and/or write, grades completed, still attending school, received vocational training, religion, caste, Household PPI, male head primary occupation, other empowerment organizations attended† $p < 0.1$; *$p < 0.05$; **$p < 0.01$.

using baseline data from 2019, before the onset of the COVID-19 pandemic. Thus, the dramatic and pervasive pandemic-related disruptions that began in the second quarter of 2020 and that continued for much of the program period could partly explain these disparate findings between study baseline and follow-up. This interpretation fits with the mostly null program effects being unmoderated by community-level mean gender norms, mean household poverty, and mean grades of schooling among adult women.

Moreover, Cox proportional hazard models showed no significant program effect on time to marriage in months. These findings with respect to program impacts were robust to variations in model specification, alternative measurement of the outcome in days and weeks, and the measurement of exposure to treatment as dichotomous (control; TPP or TPP+) or trichotomous (control; TPP; TPP+). The general absence of programmatic effects on the hazard of marriage among girls most likely was due to the overall low rate of marriage in the cohort. This low rate of child marriage was surprising, given high estimated rates of child marriage in the study districts, based on the household census conducted shortly before the baseline survey (Yount et al., 2021). In that census, the rate of first marriage among women 15–19 years was 26.0% in Kapilvastu district and 37.1% in Rupandehi district (Yount et al., 2021). One reason for the lower rate of marriage may have been the high percentage of girls in the study cohort coming from upper-caste (47%) or more advantaged indigenous (29%) groups, and the low percentage coming from disadvantaged (Dalit) groups (15%). Other scholars have shown at the national level in Nepal that, compared to high-caste Hindu girls, low-caste Hindu girls have about 1.8 times higher adjusted odds of marriage before age 16 and before the legal age of 20 (Pandey, 2017). So, the large percentage of girls coming from groups with a lower risk of child marriage may have contributed to the lower observed marriage rate during the study period. Indeed, among the girls who married during the study period, 21% were Dalit overall, and qualitatively, a higher percentage of married girls were Dalit in the control group (30%) than in the TPP groups (13%) or the TPP + group (19%). Another reason for the lower rate of child marriage in the study cohort may have been the inclusion of unmarried adolescent girls 15–16 years at baseline, who

Table 8
Mixed-model results for moderation analyses: Region of significance for interactions of mean community gender norms, mean community-level household poverty, and mean community-level completed grades of schooling for women ages 25 Years or older, unmarried adolescent girls 12–16 Years at baseline, kapilvastu and rupandehi districts, Nepal, July 2019–March 2021 (N = 982).

	TPP			TPP Plus			TPP/TPP Plus Combined		
Secondary Agency Outcomes	Gender Norms	Household PPI	Grades Completed, Women 25+	Gender Norms	Household PPI	Grades Completed, Women 25+	Gender Norms	Household PPI	Grades Completed, Women 25+
Individual Assets and Intrinsic Agency									
SRH Knowledge [0–6]									
SRH Attitudes [0–12]									
Attitudes About Gender [0–27]			+(**1.73**, **3.42**)-						+(**-2.78**, 6.49)-
Aspirations about marriage, education [1–10]					+(-**5.70**, 38.5)-			+(-25.65 31.82)-	
Self-efficacy [0–22]									
Instrumental Agency									
Mobility and freedom of movement [0–18]		-(**8.67**, 30.75)+							
Communication, negotiation with parents [0–18]									
Leadership competence [0–27]									
Participation in Financial Activities [0–4]									
Participation in Decision Making [0–6]									
Collective Agency									
Group Membership [0–18]									
Cohesion, solidarity, mobilization skills [0–15]									
Participation in events [0–4]									
Peer Social Networks [0–9]									
Gender discrimination in the family [0–15]					+(**0.32**, 488.76)-	+(**0.14**, 5.05)-			

Moderators, Mean Community-Level.
•Gender Norms (M = 0, SD = 6.09).
•Household Poverty Index (M = 0, SD = 5.28).
•Completed Grades, Women 25+ (M = 0, SD = 1.28).
Notes. The ranges shown denote the region of significance, which includes the lower and upper bounds to the region within which the program effect was not significant. The + and – signs show the direction of the program impact at the region boundaries. Empty cells indicate no significant moderation effect. A boundary that lies within four standard deviations below and above the mean is bold-faced. According to Chebyshev's Theorem, at least 94% of the observations fall inside four standard deviations, and no more than 6% fall outside. Thus, we consider this range within which most observations fall to be relevant when interpreting the interactions. For instance, for the aspirations about marriage and education outcome, in the TPP Plus group vs. control, communities with household poverty index with 5.70 (5.70/5.28 = 1.08 SD) below the mean experienced enhanced program effects, while communities with PPI 38.5 (7.29 SD) above the mean experienced attenuated effects. However, the upper bound is not within 4 SD of the mean and therefore there is likely only a very small percent of observations at or above it.

already had 'survived' the risk of very early child marriage and who may have been a selective group of girls, who were much less likely to marry during the study period. Another reason for the lower rate of child marriage in the study cohort may have been the inclusion of early-adolescent girls (12–13 years), whose observed risk period for child marriage was substantially truncated. These limitations suggest the need for intervention studies of child marriage that include early adolescent girls and longer periods of follow-up. A final possible explanation for the low marriage rate among adolescent girls is the Marriage Registration Act, which established the legal age of marriage at 20 (Marriage Registration Act, 2028 (1971), second amendment (2006), Section 4(3) which established the legal age of marriage at 20 (The Births, Deaths and Other Personal Events (Registration) Act, 2033, (1976), 2019). Baseline qualitative data signaled awareness of the legal marriage age and some evidence of enforcement by local police, especially in cases of elopement.

Qualitative findings from the trial indicated that girls with more favorable socio-economic circumstances at baseline tended to stay in the program and participate more; whereas, girls who were more economically vulnerable at baseline may not have been able to participate due to competing demands on their time (Clark et al., 2022). This finding suggests that the Tipping Point programming may not have reached girls most vulnerable to CEFM in program communities.

5.2. Limitations and strengths of analysis

This study and analysis had some limitations, which we addressed in various ways that warrant discussion. First, despite the randomization of wards to study arms, the samples of adolescent girls in the TPP and TPP + study arms may have differed from girls in their communities because of the voluntariness of their participation in these programs. The Nepal program implementation teams faced some challenges recruiting adolescent participants in both program study arms, so the team sought informed consent from and surveyed only those who agreed to participate in TPP and TPP+. These conditions may have resulted in potentially non-representative samples of adolescents in treatment arms, the inability to construct sampling weights, and observed and unobserved differences between adolescents in treatment and control clusters.

Despite this caveat, following a random probability sample of adolescents in the control clusters to understand their trajectories in primary and secondary outcomes in the absence of TPP/TPP+ was important. Also, we assessed the extent of balance across study arms using baseline characteristics, and few differences were observed (Table 4) (Yount et al., 2021). Still, we recommend making inferences to adolescent girls with characteristics similar to the study sample rather than to the districts from which adolescent girls were recruited, and we have interpreted these findings with caution considering the full set of findings.

Second, field staff reported challenges collecting accurate data on age to determine eligibility, which the team addressed with repeated verification. Data on age were first gathered during the household census by trained staff and data collectors. This information was verified, and inconsistencies were resolved, while implementing staff were forming groups of eligible program participants to ensure that the criteria for inclusion in the intervention were met. As with age, accurate estimates of age at marriage required repeated verification and triangulation during data cleaning and analysis. Triangulation of age and age of marriage during data cleaning and analysis was achieved by including questions in the census enumeration form (current age, age at marriage, years married) that allowed for consistency checks in age reporting and by assessing concordance in years married with husband–wife dyads.

Third, differential attrition across study arms could have arisen at follow-up for a variety of reasons: the intended different intensities of the TPP and TPP+; the unintended 21-month period of programming, which included five months of suspended activities during the COVID-19 lockdown; an 8-month freeze-period from the end of program activities to the follow-up assessment; and a 36-month period after baseline of no-contact with participants in the control arm. To guard against differential attrition across study arms, the team implemented a phone-interview tracing protocol for all baseline participants who were not found at home at the time of the follow-up face-to-face interview. To ensure the collection of information on primary and secondary outcomes, the team prioritized tracing adolescent girls. These efforts resulted in high retention rates of adolescent girls at follow-up across all study arms (Control: 99%; TPP: 98%; TPP+: 99%).

Fourth, Tipping Point programming was well underway when the COVID-19 pandemic disrupted the study districts, Nepal, and the world. CARE USA and CARE Nepal followed institutional and national guidelines with respect to COVID-19 risk mitigation strategies and paused program implementation for five months, from March through July of 2020. This hiatus, and unplanned program modifications after implementation had resumed, including the truncation of large community gatherings critical to TPP+, likely reduced the extent of program participation and the chances of retained learning and behaviors that may have been underway among participants before the pandemic. The truncation of large community gatherings critical to TPP + also means that the effects observed in this analysis are likely to be lower than the effects that would have been observed if large gatherings had been possible. Future programmatic efforts that involve social movement building might consider other, technology-based ways of mobilizing large groups of people at the community level. Despite these disruptions to programming, the evaluation experienced relatively little disruption because baseline data collection was completed in 2019, and follow-up data collection was completed in December 2021–January 2022. The in-country research team achieved high retention rates of adolescent girls across all study arms (see above), reducing concerns about the effects of differential attrition on the findings. The research team also employed state-of-the-art methods to ensure the robustness of the findings across different measurement scales of the primary outcome, different categorizations of exposure to the Tipping Point Program treatment(s), and different estimation strategies to control for potential sources of confounding.

A fifth limitation, however, was that marriage rates were unexpectedly low, given higher estimated marriage rates based on census data from the two study districts. Low marriage rates across all study arms during the study period—a favorable outcome for all girls—challenged our ability to detect program effects. Sixth, about 61% (n = 689) of girls in the cohort were 12–14 years, and 39% (n = 435) were 15–16 years. The study team did not develop age-specific measures of agency to capture more developmentally specific expressions of agency for girls 12–14 years versus those 15–16 years in the cohort. Developmental heterogeneity within the 12–16-year cohort also may have explained the low alpha reliabilities for SRH attitudes, participation in decision-making, and participation in financial activities (Table 3). That said, the advantage of having a common set of measures for agency across age groups was precisely to capture changes in agency as girls develop, and the randomized design should have allowed us to identify impacts of the program that were independent of age-related developmental change. A related limitation was that, while Tipping Point content and activities were tailored to these age groups, program staff were unable to organize group sessions by age. The challenges of delivering age-specific content and activities to mixed age groups should be balanced by the potential benefits of having older girls serve as mentors and role models for younger girls in the group.

Finally, a post-endline validation workshop involving two focus group discussions (FGDs) with community stakeholders in August 2023 revealed other field-related conditions that may have affected overall changes in the study districts and cross-arm comparisons. At this time, the team learned that federal policy, such as increases in access to quality education, and local government policy were addressing girls' issues through programming in the control areas. *Sukanya dhani yojana* and *Mayor kanya vivah yojana* were two local policy initiatives the Municipalities introduced after local-level elections in 2017. These initiatives involved financial incentives that the girls or their parents would receive in the future, and so were least affected by COVID-19. *Sukanya dhani yojana* is a government-backed small savings scheme, which allows parents to open savings accounts for girls below the age of 10. The account comes with a higher interest rate and several tax benefits and has a tenure of 21 years or until the girl child marries after the age of 18. *Mayor kanya vivah yojana* offers grants to low-income families for the marriages of daughters who are at least 20 years old. Other municipalities have programs that attempt to provide free education to girls up to the 10 plus two levels to motivate parents and adolescent girls not to leave studies for financial reasons. Finally, some municipalities are designated as child-friendly municipalities. In sum, INGOs and local governmental supported programs to empower adolescent girls in Tipping Point designated 'control' areas could partly explain the overall positive changes underway in all study arms and the limited differences across treatment and control arms.

5.3. Implications for research, programming, and policy

The findings presented here have important implications for research, programming, and policy. First, in general, better and more timely data on child marriage rates are needed to enable assessments of the magnitude of the issue and whether it is changing over time. Second, the hiatus in and deviations from planned programming due to the COVID-19 pandemic suggest that the TPP and TPP + may warrant testing again, if or when pandemic conditions abate and programming can be implemented, as originally planned. Third, future research could assess the potential modifying effect of membership in a low-caste (Dalit) household or of residence in a predominantly low-caste (Dalit) community on the effects of TPP and TPP+. Testing the modification effects of caste at the household level would require a larger percentage of girls in the cohort coming from disadvantaged households and communities. A mixed-model analysis indicated no significant moderation effects were observed for the community mean proportion of disadvantaged caste (results available upon request). On a related point, researchers also might assess whether there is any modification by age group of the effects of TPP or TPP + for girls who started the program at a younger age compared to girls who were older when they entered the

program. Tests of age-modification of program impacts may require following a cohort of girls 12–16 years for a longer period of time.

Fourth, future impact assessments of Tipping Point may consider more generally a longer timeframe for following the cohort of participants to detect measurable changes in rates of child marriage. This change in study design would overcome the prohibitively large sample size that may be needed to show measurable changes in rates of child marriage in a planned 18-month programmatic intervention with a cohort from demographic backgrounds that may have lower rates of child marriage. Future impact studies of Tipping Point may instead focus on measures more directly affected by the program components, and set more realistic expectations for the impact evaluation if the primary outcome is child marriage.

Fifth, the developmental differences across these age groups may warrant impact assessment of different programmatic approaches with respect to not only content and activities but also group size, frequency of sessions, total number of sessions, and mode of delivery. Such adaptations may encourage more meaningful participation within each age group and a stronger dose-response effect.

Relatedly, accumulating evidence suggests that programs focusing on changing social norms through educational activities and dialogue may not have significant, favorable, or sustained impacts on knowledge, attitudes, or behavior in communities where women experience multifaceted forms of gender inequality (Yount et al., 2017). While we observed substantial variation across study communities in gender norms, household poverty, and women's schooling, the districts in Nepal in which the TPI was undertaken were disadvantaged on several indicators relative to the national average (Government of Nepal & United Nations Development Program, 2020). With economic and social disadvantage increasing girls' risk of CEFM, broader efforts to address socioeconomic inequality and to lift communities out of poverty may be needed to affect lasting change among the most vulnerable groups (Bajracharya & Amin, 2010; Mahato, 2016). Moreover, Nepal ranks 147th out of 189 countries and territories on the Human Development Index and 115th out of 162 countries and territories on the Gender-Inequality Index (UN Women, 2021). In such settings, social-norms programming to accelerate increases in the age at first marriage for girls may require concurrent efforts to empower women and girls economically while working to change gender norms in community stakeholder groups (Levy et al., 2020; Malhotra & Elnakib, 2021). Furthermore, the more favorable outcomes observed in girls who reported greater participation in program activities by fathers (Appendix), as well as qualitative findings of the continued primacy of fathers in marriage decisions, underscores the importance of engaging men and boys in programming that seeks to facilitate broad changes in social norms (Flood, 2018). Although a few of these multifaceted programs have been implemented (Yount et al., 2017), study designs are needed that allow researchers to disentangle the effects of program components on the risk of child marriage (Yount et al., 2017). Attention also should be paid to avoid the tradeoff of attempting to implement complex, multi-component interventions, which may be difficult to deliver or to sustain (Yount et al., 2017; Malhotra & Elnakib, 2021).

Despite weak evidence of programmatic impacts of the TPI in Nepal, quantitative and qualitative findings from this study corroborate the conclusion that substantial changes among adolescent girls were underway in these districts during the study period. Girls in the cohort exhibited favorable increases in 10 of the 15 measures for intrinsic, instrumental, and collectively agency; perceived norms in social networks; and perceptions of discrimination in the family. Some of this change may have resulted from normal developmental changes during adolescence (Lerner et al., 2018, pp. 109–121) or from various programmatic efforts that were underway concurrently in all study communities. Prospective observational research could assess how changes in specific, theoretically relevant community characteristics may be associated with changes in girls' agency, net of normal increases in agency over adolescence. The findings of such research would help to refine multifaceted, multilevel programs that aim to alter the socio-ecological conditions in communities associated with agency-related outcomes in girls, and in turn, their risk of CEFM.

5.4. Conclusion

The CARE Nepal TPI, designed to change community gender norms and to support anti-CEFM movement-building among adolescent girls, did not have significant impacts either on the risk of girl-child marriage or on most agency-related mediators. Null findings may have resulted from the broadly disruptive impacts of the COVID-19 pandemic on programming, unfavorable gender-related policy, normative, or structural conditions in Nepal, concurrent programming for adolescent girls in control areas, or a need for concurrent multilevel, multisectoral programming within communities to address household poverty, women's low social and economic empowerment, and inequitable gender-norms in stakeholder groups. Future intervention studies should be attentive to the multilevel investments that may be needed in communities to accelerate reductions in CEFM and to the broader socio-ecological conditions that may affect sustained community-level change. Programs also may need to be tailored a priori to accommodate on-going uncertainties related to the COVID-19 pandemic. Finally, while integrating younger and older adolescents in a program may foster relationships and role-models, developmental differences between younger and older adolescents may require tailored, age-specific programmatic approaches that change over time as adolescents age.

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Author contributions (CREDIT guidelines)

KMY: conceptualization, data curation, funding acquisition, investigation, methodology, project administration, resources, software, supervision, data visualization, writing-original draft, writing-review and editing. RD: methodology, data visualization, writing-original draft; IB: data curation, project administration, writing-original draft, writing-review and editing. YFC: conceptualization, methodology, supervision, data visualization, writing-original draft, writing-review and editing. CC: conceptualization, data curation, funding acquisition, investigation, writing-review and editing. SK: conceptualization, funding acquisition, project administration, writing-review and editing. AL: methodology, project administration, supervision, writing-review and editing. SS: methodology, validation, investigation, resources, data curation, supervision, writing-original draft. AS: methodology, project administration, supervision, writing-review and editing All authors have read and approved the manuscript.

Declaration of competing interest

None.

Data availability

Data will be made available on request.

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Appendix

1. Results of Participation and Dose-Response Analyses

Appendix Tables 1–3 provide the results for analyses of Tipping Point Program participation of adolescent girls, their mothers, and their fathers, as reported by adolescent girls. Except for adolescents' reports of their participation in weekly sessions and their mothers' participation in monthly sessions (Appendix Table 1), the frequency of participation across study arms did not differ for adolescents, mothers, or fathers. A large majority of adolescent girls reported participating "always" or "most of the time" in weekly Tipping Point sessions (TPP 68%; TPP+ 76%). About 40%–50% of mothers reportedly participated "always" or "most of the time" in monthly sessions, but only about 17%–21% of fathers reportedly participated "always" or "most of the time" in monthly events. More than half of adolescent girls reported to have participated in at least two community events (TPP 56%; TPP+ 53%). More than 40% of mothers reportedly participated in at least two community events; however, about 60% of fathers reportedly participated in *no* community events (Appendix Table 1).

Few characteristics were associated with the frequency of participation in either Tipping Point sessions or Tipping Point community events for adolescent girls, mothers, or fathers (Appendix Tables 2 and 3). In adjusted ordinal logistic regression models, only the adolescents' completed grades of schooling were marginally positively associated with the frequency of their participation in weekly Tipping Point sessions. For mothers, exposure to TPP+, adolescent's grades completed (marginally), coming from a disadvantaged caste, and a family member's participation in a concurrent empowerment program were positively associated with the frequency of participation in monthly sessions. For fathers, living in a household whose head was a daily-wage or self-employed worker and the participation of a family member in another empowerment program were positively associated with the frequency of participation in monthly sessions. For adolescent girls, mothers, and fathers, only a family member's participation in another empowerment program was associated with the number of community events attended. In the case of fathers, the main occupation of the household head (daily wage laborer and self-employed) also was positively associated with attending community events.

Appendix Table 4 presents the results of dose-response analyses assessing the relationship of girls', mothers', and fathers' participation in Tipping Point with girls' hazard of marriage in months. In most fully adjusted models, none of the participation variables were associated with the primary outcome, except for girls' participation in weekly Tipping Point sessions. In this case, girls who reported 'sometimes' participating in weekly TPP sessions had a significantly lower hazard of marriage than girls who never participated (hazard ratio 0.12 [95% CI 0.02, 0.72], $p < 0.05$). No other frequency of girls' participation was associated with the primary outcome.

Appendix Table 5 presents results of dose-response analyses assessing the relationships of girls', mothers' and fathers' participation in Tipping Point sessions and events with girls' secondary (agency-related) outcomes. Regarding girls' participation in weekly TP sessions, participants (compared to non-participants) tended to have lower (less favorable) scores for gender attitudes, self-efficacy, participation in events, and awareness of gender discrimination in the family and but higher (more favorable) scores for participation in financial activities and group membership. Regarding girls' participation in community events, participants (compared to non-participants) tended to have lower (less favorable) scores for aspirations about marriage and education but higher (more favorable) scores for SRH attitudes, gender attitudes, self-efficacy, leadership competence, and awareness of gender discrimination in the family. Regarding maternal participation in monthly TP sessions, the girls of participants (compared to those of non-participants) tended to have lower (less favorable) scores for communication/negotiation with parents, participation in decision-making, social network norms, and awareness of discrimination in the family but higher (more favorable) scores for SRH knowledge and aspirations about marriage/education. Regarding maternal participation in community events, the girls of participants (compared to those of non-participants) tended to have higher (more favorable) scores for leadership competence and group membership. Regarding paternal participation in monthly TP sessions, the girls of participants (compared to those of non-participants) tended to have lower (less favorable) scores for gender attitudes, aspirations about marriage/education and higher (more favorable) scores for SRH knowledge, SRH attitudes, mobility/freedom of movement, communication/negotiation with parents, leadership competence, collective efficacy, and participation in events. Regarding paternal participation in community events, the girls of participants (compared to those of non-participants) tended to have lower (less favorable) scores for SRH knowledge, SRH attitudes, mobility/freedom of movement, communication/negotiation with parents, and collective efficacy but higher (more favorable) scores for aspirations about marriage and education and group membership.

2. Summary of Findings and Interpretations

In supplemental analyses of program participation, girls' schooling attainment tended to be positively associated with their program participation, and paternal extent of participation in Tipping Point programming tended to be positively associated with girls' knowledge and attitudes about SRH, self-efficacy, mobility and freedom of movement, and group membership. Findings from the qualitative longitudinal study in this trial corroborated the higher participation of girls with more schooling. [32] Qualitative findings qualitative longitudinal study in this trial corroborated the higher participation of girls with more schooling. [32] More favorable secondary outcomes observed for girls who reported greater participation by their fathers is also in line with qualitative data from baseline. Although many noted a trend toward more equitable family decision-making, participants almost universally identified fathers as the primary household decision-makers, especially regarding girls' marriage, mobility, and education.

Appendix Table 1
Distribution of Reported Participation in Tipping Point Sessions and Tipping Point Community Events of Adolescent Girls 12–16 Years, Girl's Mothers, and Girl's Fathers, Kapilvastu and Rupandehi Districts, Nepal, July 2019–March 2021, N = 737

Self-Reported Weekly Participation in Tipping Point	TPP (n = 379), %	TPP+ (n = 358), %	p-value[1]
Never	6.33	5.31	0.04*

(*continued on next page*)

Appendix Table 1 (*continued*)

Self-Reported Weekly Participation in Tipping Point	TPP (n = 379), %	TPP+ (n = 358), %	p-value[1]
Rarely	3.17	1.68	
Sometimes	19.26	12.01	
Most of the Time	18.21	18.99	
Always	49.34	56.70	
Missing	3.69	5.31	
Adolescent Reported Monthly Maternal Participation in Tipping Point			
Never	30.87	21.51	0.01*
Rarely	3.69	1.96	
Sometimes	20.58	19.83	
Most of the Time	16.89	18.72	
Always	22.96	31.56	
Missing	5.01	6.42	
Adolescent Reported Monthly Paternal Participation in Tipping Point			
Never	53.30	53.63	0.49
Rarely	6.60	4.19	
Sometimes	17.41	14.80	
Most of the Time	8.97	10.34	
Always	8.44	10.61	
Missing	5.28	6.42	
Self-Reported Tipping Point Community Events			
No Events	14.25	15.64	0.80
One Event	26.39	25.70	
Two Events	14.78	13.41	
Three or More Events	40.90	39.94	
Missing	3.69	5.31	
Reported Maternal Tipping Point Community Events			
No Events	34.83	25.98	0.07†
One Event	18.73	21.79	
Two Events	15.04	13.41	
Three or More Events	26.39	32.68	
Missing	5.01	6.15	
Reported Paternal Tipping Point Community Events			
No Events	60.69	59.78	0.07†
One Event	10.29	10.34	
Two Events	14.25	8.66	
Three or More Events	10.29	14.80	
Missing	4.49	6.42	

† $p < 0.1$; *$p < 0.05$; **$p < 0.01$.
[1]Derived from chi-square.

Appendix Table 2
Ordinal Logistic Regression of Participation in Tipping Point Sessions of Adolescent Girls 12–16 Years, Girl's Mothers, and Girl's Fathers, Kapilvastu and Rupandehi Districts, Nepal, July 2019–March 2021 (N = 737)

	Adolescent Girl				Adolescent Mother				Adolescent Father			
	UOR[2] 95%CI		AOR[3] 95%CI		UOR[2] 95%CI		AOR[3] 95%CI		UOR[2] 95%CI		AOR[3] 95%CI	
TPP+ [ref: TPP]	1.48	0.90, 2.42	1.42	0.85, 2.36	1.62*	1.06, 2.49	1.54*	1.02, 2.33	1.05	0.71, 1.56	0.94	0.63, 1.40
Age in years	1.00	0.90, 1.10	1.03	0.90, 1.17	1.06	0.93, 1.20	1.06	0.93, 1.21	1.08	0.98, 1.19	1.06	0.90, 1.25
Can read and/or write [ref. Neither/ Missing]	1.82*	1.09, 3.04	1.59	0.90, 2.81	1.31	0.79, 2.16	1.01	0.57, 1.79	1.10	0.57, 2.12	1.08	0.54, 2.16
Grades completed, M (SE)	1.06*	1.00, 1.13	1.08 †	1.00, 1.17	1.08**	1.03, 1.15	1.08 †	0.99, 1.17	1.05	0.98, 1.12	1.06	0.95, 1.19
Still attending school [ref. Never attended/Missing]												
No Longer Attending	0.78	0.37, 1.66	0.49	0.18, 1.31	0.92	0.49, 1.73	0.59	0.26, 1.32	0.79	0.38, 1.63	0.59	0.21, 1.68
Still Attending	1.48	0.82, 2.67	0.90	0.39, 2.06	1.41	0.77, 2.56	1.02	0.48, 2.17	0.98	0.48, 1.97	0.74	0.22, 2.53
Ever received vocational training [ref: No/Missing]	0.92	0.50, 1.70	0.93	0.49, 1.77	0.82	0.48, 1.41	0.75	0.43, 1.33	1.64	0.89, 3.00	1.67	0.88, 3.16
Religion [ref. Hinduism]												
All Others/Missing	1.22	0.73, 2.04	1.14	0.53, 2.46	0.68 †	0.45, 1.03	0.64 †	0.40, 1.04	0.62 †	0.37, 1.05	0.62	0.32, 1.17
Caste [ref. Advantaged/Non-Marginalized/Missing]												
Disadvantaged/Marginalized	1.24	0.84, 1.85	1.49	0.86, 2.58	1.06	0.73, 1.54	1.52*	1.01, 2.29	0.85	0.54, 1.35	1.09	0.63, 1.88
Household PPI	1.00	0.99, 1.01	0.99	0.98, 1.01	1.00	0.99, 1.01	0.99	0.98, 1.01	1.01	0.99, 1.03	1.00	0.98, 1.02
Male Head Primary Occupation [ref. No Job/Does not work/Missing][1]												
Daily Worker	0.81	0.48, 1.37	0.82	0.48, 1.41	0.92	0.63, 1.35	0.94	0.61, 1.44	2.00**	1.46, 2.72	2.17**	1.69, 3.28

(*continued on next page*)

Appendix Table 2 (*continued*)

	Adolescent Girl				Adolescent Mother				Adolescent Father			
	UOR[2] 95%CI		AOR[3] 95%CI		UOR[2] 95%CI		AOR[3] 95%CI		UOR[2] 95%CI		AOR[3] 95%CI	
TPP+ [ref: TPP]	1.48	0.90, 2.42	1.42	0.85, 2.36	1.62*	1.06, 2.49	1.54*	1.02, 2.33	1.05	0.71, 1.56	0.94	0.63, 1.40
Self-employed	1.04	0.68, 1.58	1.18	0.74, 1.89	0.84	0.58, 1.22	0.88	0.57, 1.35	2.10**	1.44, 3.05	2.19**	1.60, 3.35
Permanent/Long-Term worker	0.77	0.43, 1.40	0.81	0.44, 1.50	1.03	0.51, 2.08	1.10	0.52, 2.34	0.91	0.45, 1.83	0.90	0.44, 1.84
Other Empowerment Organizations [ref. No/Don't know][2]												
Yes, me only/me and family/family only	1.60	0.83, 3.10	1.37	0.64, 2.93	1.95*	1.08, 3.50	1.79*	1.06, 3.02	3.23**	1.88, 5.55	3.20**	1.86, 5.51
Missing	0.66	0.35, 1.26	0.74	0.38, 1.45	1.95*	1.14,3.35	2.09**	1.22, 3.58	1.14	0.77, 1.68	1.07	0.72, 1.60
Intercept [ref. Never]												
Rarely			1.93*				−0.14				−1.83	
Sometimes			1.55 †				−0.29				−2.08	
Most of the Time			0.26				−1.24				−2.98*	
Always			−0.66				−2.09*				−3.83*	

† $p < 0.1$; *$p < 0.05$; **$p < 0.01$.

[1]0 = No Job/Does not work; 1 = Paid daily agriculture or non-agriculture; 2 = Self-employed agriculture or non-agriculture; 3 = Paid long-term basis in agriculture or non-agriculture.

[2]UOR – Unadjusted Odds Ratio.

[3]AOR – Adjusted Odds Ratio.

Appendix Table 3

Ordinal Logistic Regression of Participation in Tipping Point Community Events of Adolescent Girls 12–16 Years, Girl's Mothers, and Girl's Fathers, Kapilvastu and Rupandehi Districts, Nepal, July 2019–March 2021 (N = 737)

	Adolescent Girl				Adolescent Mother				Adolescen1t Father			
	UOR[2] 95%CI		AOR[3] 95%CI		UOR[2] 95%CI		AOR[3] 95%CI		UOR[2] 95%CI		AOR[3] 95%CI	
Arm 3 [ref: Arm 2]	0.95	0.53, 1.71	0.86	0.48, 1.52	1.39	0.93, 2.08	1.29	0.84, 1.98	1.04	0.67, 1.60	0.90	0.57, 1.44
Age in years	1.04	0.95, 1.14	1.04	0.91, 1.17	1.08	0.94, 1.24	1.11	0.94, 1.31	1.08	0.96, 1.22	1.05	0.88, 1.25
Can read and/or write [ref. Neither/ Missing]	1.36	0.78, 2.36	1.29	0.69, 2.40	1.16	0.71, 1.89	1.05	0.64, 1.73	1.29	0.78, 2.11	1.24	0.74, 2.10
Grades completed, M (SE)	1.05	0.99, 1.13	1.03	0.92, 1.15	1.04	0.98, 1.11	1.00	0.91, 1.10	1.08*	1.01, 1.15	1.11 †	0.99, 1.25
Still attending school [ref. Never attended/Missing]												
No Longer Attending	1.38	0.66, 2.92	1.19	0.45, 3.15	0.99	0.43, 2.24	0.91	0.40, 2.07	0.64	0.29, 1.40	0.35 †	0.12, 1.05
Still Attending	1.49	0.85, 2.61	1.34	0.51, 3.53	1.28	0.67, 2.45	1.58	0.76, 3.27	0.99	0.50, 1.94	0.50	0.14, 1.74
Ever received vocational training [ref: No/Missing]	1.32	0.76, 2.29	1.24	0.69, 2.25	1.39	0.71, 2.73	1.31	0.65, 2.62	1.20	0.69, 2.06	1.15	0.63, 2.10
Religion [ref. Hinduism]												
All Others/Missing	0.71	0.41, 1.26	0.63	0.33, 1.22	0.89	0.55, 1.45	0.70	0.40, 1.20	0.60	0.30, 1.18	0.74	0.36, 1.53
Caste [ref. Advantaged/Non-Marginalized/Missing]												
Disadvantaged/Marginalized	1.00	0.67, 1.50	1.33	0.82, 2.15	1.25	0.84, 1.87	1.62 †	0.97, 2.72	0.78	0.48, 1.27	1.00	0.58, 1.74
Household PPI	1.00	0.98, 1.02	0.99	0.98, 1.01	1.00	0.98, 1.01	0.99	0.97, 1.01	1.01	0.99, 1.03	1.00	0.99, 1.02
Male Head Primary Occupation [ref. No Job/Does not work/Missing][1]												
Daily Worker	1.19	0.76, 1.86	1.23	0.77, 1.97	1.07	0.67, 1.71	1.05	0.64, 1.75	2.12**	1.45, 3.11	2.48**	1.66, 3.71
Self-employed	1.28	0.84, 1.97	1.35	0.82, 2.23	1.17	0.77, 1.79	1.29	0.80, 2.09	2.01**	1.42, 2.85	2.16**	1.49, 3.13
Permanent/Long-Term worker	0.96	0.59, 1.58	0.95	0.54, 1.69	1.07	0.64, 1.80	1.20	0.68, 2.14	1.12	0.56, 2.28	1.18	0.57, 2.46
Other Empowerment Organizations [ref. No/Don't know][2]												
Yes, me only/me and family/family only	3.62**	1.51, 8.68	3.75**	1.60, 8.80	5.43**	2.09, 14.14	5.45**	2.13, 13.99	3.75**	1.87, 7.53	3.64**	1.85, 7.15
Missing	1.35	0.65, 2.78	1.36	0.66, 2.78	2.50**	1.33, 4.72	2.72**	1.52, 4.86	1.37	0.89, 2.13	1.36	0.86, 2.15
Intercept [ref. No Events]												
One Event			0.60				−1.20				−2.09	
Two Events			−0.83				−2.14				−2.64 †	
Three or More Events			−1.45				−2.83*				−3.49*	

† $p < 0.1$; *$p < 0.05$; **$p < 0.01$.

[1]0 = No Job/Does not work; 1 = Paid daily agriculture or non-agriculture; 2 = Self-employed agriculture or non-agriculture; 3 = Paid long-term basis in agriculture or non-agriculture.

[2]UOR – Unadjusted Odds Ratio.
[3]AOR – Adjusted Odds Ratio.

Appendix Table 4
Hazard of Marriage in Months for Participation in Tipping Point Sessions Adolescent Girls 12–16 Years, Girl's Mother, and Girl's Father, Kapilvastu and Rupandehi Districts, Nepal, July 2019–March 2021 (N = 737)

	UHR[1] 95%CI		PAHR[2] 95%CI		FAHR[3] 95%CI	
Weekly Participation in TPP Adolescent [ref. Never]						
Rarely	1.65	0.35, 7.67	0.40	0.05, 3.06	0.38	0.02, 5.77
Sometimes	0.37	0.07, 2.02	0.24†	0.04, 1.32	0.12*	0.02, 0.72
Most of the Time	1.97	0.56, 6.81	0.55	0.14, 2.21	0.54	0.13, 2.34
Always	0.70	0.19, 2.63	0.53	0.16, 1.78	0.46	0.12, 1.80
Community Events for Adolescents [ref. No Events]						
One Event	1.77	0.44, 7.14	0.76	0.18, 3.20	0.88	0.11, 6.97
Two Events	1.07	0.27, 4.33	1.31	0.35, 4.92	2.35	0.44, 12.58
Three or more Events	1.51	0.48, 4.75	0.87	0.26, 2.89	1.57	0.46, 5.36
Monthly Participation in TPP Mother [ref. Never]						
Rarely	1.04	0.10, 10.57	1.77	0.20, 16.05	1.41	0.12, 16.75
Sometimes	0.87	0.26, 2.87	0.82	0.22, 3.05	0.45	0.06, 3.45
Most of the Time	2.54*	1.05, 6.12	0.81	0.26, 2.57	0.41	0.05, 3.26
Always	1.40	0.44, 4.43	0.99	0.33, 2.98	0.62	0.08, 4.87
Community Events attended by Mother [ref. No Events]						
One Event	1.84	0.73, 4.66	0.91	0.35, 2.34	1.54	0.31, 7.68
Two Events	1.29	0.58, 2.86	1.89 †	0.88, 4.06	3.40	0.73, 15.86
Three or more Events	1.77	0.81, 3.86	0.69	0.22, 2.11	1.52	0.23, 10.31
Monthly Participation in TPP Father [ref. Never]						
Rarely	0.80	0.24, 2.68	0.47	0.09, 2.53	0.97	0.15, 6.27
Sometimes	0.66	0.26, 1.66	0.68	0.24, 1.93	1.16	0.18, 7.49
Most of the Time	2.62*	1.20, 5.75	1.61	0.76, 3.45	3.14	0.73, 13.41
Always	0.45	0.09, 2.15	0.70	0.13, 3.73	1.27	0.17, 9.67
Community Events attended by Father [ref. No Events]						
One Event	1.72	0.87, 3.39	1.48	0.79, 2.78	0.77	0.17, 2.98
Two Events	0.75	0.25, 2.15	0.45 †	0.18, 1.14	0.30	0.05, 1.73
Three or more Events	0.88	0.36, 2.16	0.88	0.34, 2.26	0.34	0.10, 1.26

† $p < 0.1$; *$p < 0.05$; **$p < 0.01$.
[1]UHR–Unadjusted Hazard Ratio.
[2]PAHR–Partially Adjusted Hazard Ratio; Controlled for study arm, age in years, read and/or write, grades completed, still attending school, received vocational training, religion, caste, Household PPI, Male Head Primary Occupation, Other Empowerment Organizations attended.
[3]FAHR–Fully Adjusted Hazard Ratio; Controlling for all other participation variables, study arm, age in years, read and/or write, grades completed, still attending school, received vocational training, religion, caste, Household PPI, Male Head Primary Occupation, Other Empowerment Organizations attended.

Appendix Table 5
Linear Regression of Secondary Outcomes for Adolescent Girls 12–16 Years Enrolled in Tipping Point, Kapilvastu and Rupandehi Districts, Nepal, July 2019–March 2021 (N = 737)

	Intrinsic Agency Outcomes									
	Sexual and Reproductive Health Knowledge		Sexual and Reproductive Health Attitudes		Gender Roles		Aspirations about Marriage and Education		Self-Efficacy	
	Est. 95% CI		Est. 95% CI		Est. 95% CI		Est. 95% CI		Est. 95% CI	
Panel A: Unadjusted Association of Participation Variables[1]										
Intercept										
Weekly Participation Adolescent [ref. Never]										
Rarely	0.16	−0.99, 1.32	−0.76	−1.98, 0.45	−2.68*	−5.23, −0.13	−0.43	−1.98, 1.12	−2.36*	−4.31, −0.40
Sometimes	−0.11	−0.72, 0.50	−0.61	−1.71, 0.49	−1.96*	−3.52, −0.40	−0.54 †	−1.17, 0.09	−0.23	−1.54, 1.07
Most of the Time	0.11	−0.58, 0.80	−0.17	−1.10, 0.75	−0.74	−2.32, 0.84	0.43	−0.36, 1.24	−0.43	−2.13, 1.26
Always	0.36	−0.17, 0.89	−0.06	−0.90, 0.78	0.55	−1.04, 2.13	0.05	−0.57, 0.67	0.93	−0.76, 2.57
Community Events for Adolescents [ref. No Events]										
One Event	0.04	−0.34, 0.42	0.77*	0.15, 1.38	2.50**	1.14, 3.86	−0.64*	−1.16, −0.12	3.04**	1.63, 4.46
Two Events	−0.21	−0.71, 0.28	0.37	−0.41, 1.14	0.27	−1.19, 1.74	−0.95*	−1.68, −0.21	1.81*	0.45, 3.17
Three or More Events	−0.39	−0.86, 0.08	0.23	−0.37, 0.83	0.69	−0.48, 1.86	−0.02	−0.65, 0.62	2.62**	1.27, 3.98
Monthly Participation in TPP Mother [ref. Never]										
Rarely	0.34	−0.62, 1.30	−0.08	−0.80, 0.64	−0.98	−3.64, 1.68	−0.00	−0.97, 0.96	−1.33	−3.23, 0.56
Sometimes	0.30	−0.13, 0.73	−0.24	−0.80, 0.32	−0.16	−1.68, 1.36	0.27	−0.22, 0.76	−0.59	−2.08, 0.89
Most of the Time	0.45	−0.09, 0.99	0.49†	−0.04, 1.02	0.53	−0.67, 1.72	0.27	−0.34, 0.87	−0.04	−1.28, 1.20
Always	0.44*	0.05, 0.84	0.43	−0.21, 1.06	1.10†	−0.09, 2.29	0.28	−0.13, 0.69	0.89 †	−0.18, 1.95
Community Events attended by Mother [ref. No Events]										
One Event	0.46**	0.12, 0.79	0.64*	0.10, 1.18	1.81**	0.70, 2.93	−0.35	−0.96, 0.25	1.31 †	−0.21, 2.83
Two Events	−0.09	−0.56, 0.39	0.12	−0.47, 0.72	0.16	−1.05, 1.37	−0.07	−0.75, 0.60	0.92	−0.56, 2.40
Three or More Events	−0.11	−0.55, 0.33	−0.05	−0.62, 0.52	−0.04	−1.12, 1.04	0.29	−0.20, 0.77	1.01 †	−0.21, 2.24
Monthly Participation in TPP Father [ref. Never]										
Rarely	0.48 †	−0.03, 1.01	0.22	−0.63, 1.06	−0.78	−2.61, 1.06	−0.70 †	−1.48, 0.07	−0.31	−2.02, 1.41
Sometimes	0.26	−0.08, 0.61	−0.14	−0.76, 0.47	−0.25	−1.39, 0.88	−0.09	−0.67, 0.48	0.09	−1.00, 1.17
Most of the Time	0.02	−0.74, 0.80	0.45	−0.42, 1.32	−0.69	−2.06, 0.68	−0.32	−1.12, 0.49	0.13	−1.32, 1.58
Always	0.53*	0.07, 0.99	0.38	−0.27, 1.04	0.11	−1.37, 1.58	0.15	−0.49, 0.78	1.35**	0.38, 2.32

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Appendix Table 5 (*continued*)

	Intrinsic Agency Outcomes									
	Sexual and Reproductive Health Knowledge		Sexual and Reproductive Health Attitudes		Gender Roles		Aspirations about Marriage and Education		Self-Efficacy	
	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI
Community Events attended by Father [ref. No Events]										
One Event	0.10	−0.23, 0.43	0.38	−0.14, 0.90	0.66	−0.32, 1.64	−0.85*	−1.58, −0.12	0.33	−0.93, 1.58
Two Events	0.06	−0.35, 0.48	0.02	−0.64, 0.68	0.08	−1.09, 1.25	0.22	−0.39, 0.84	0.84	−0.35, 2.03
Three or More Events	−0.15	−0.80, 0.49	−0.53	−1.23, 0.16	−0.75	−1.91, 0.41	0.48 †	−0.00, 0.97	0.43	−0.79, 1.66
Panel B: Adjusted Association of Participation Variables[2]										
Intercept	0.86	−1.07, 2.80	9.94**	7.09, 12.79	20.43**	13.07, 27.79	6.89**	4.25, 9.53	13.99**	8.80, 19.17
Weekly Participation Adolescent [ref. Never]										
Rarely	0.03	−0.90, 0.98	−0.88	−2.33, 0.58	−2.98**	−5.09, −0.87	−0.12	−1.90, 1.66	−3.37**	−5.42, −1.31
Sometimes	0.02	−0.57, 0.61	−1.06	−2.37, 0.25	−3.07**	−4.53, −1.60	0.14	−0.76, 1.04	−2.48*	−4.43, −0.54
Most of the Time	0.15	−0.54, 0.84	−0.54	−1.70, 0.62	−1.82*	−3.53, −0.12	0.96 †	−0.11, 2.04	−2.49*	−4.84, −0.15
Always	0.29	−0.39, 0.98	−0.73	−1.86, 0.41	−0.79	−2.47, 0.89	0.55	−0.34, 1.45	−1.59	−4.06, 0.87
Community Events for Adolescents [ref. No Events]										
One Event	−0.22	−0.64, 0.21	0.93*	−0.01, 1.88	2.57**	1.27, 3.87	−0.76*	−1.46, −0.06	3.40**	1.63, 5.17
Two Events	−0.33	−0.86, 0.21	0.60	−0.35, 1.55	0.98	−0.56, 2.54	−0.99*	−1.86, −0.12	2.18*	0.54, 3.81
Three or More Events	−0.47 †	−1.02, 0.07	0.54	−0.34, 1.43	1.07	−0.35, 2.50	−0.33	−1.14, 0.47	2.78**	1.03, 4.55
Monthly Participation in TPP Mother [ref. Never]										
Rarely	0.44	−0.45, 1.32	0.15	−0.87, 1.18	−0.75	−4.07, 2.58	0.11	−0.82, 1.04	−1.02	−3.13, 1.09
Sometimes	0.53*	0.08, 0.99	−0.30	−0.88, 0.28	−0.65	−2.83, 1.53	0.64*	0.09, 1.20	−1.94*	−3.38, −0.49
Most of the Time	0.76*	0.19, 1.34	0.49	−0.12, 1.11	0.47	−1.34, 2.27	0.37	−0.32, 1.05	−0.94 †	−2.05, 0.17
Always	0.54*	0.05, 1.05	0.34	−0.55, 1.24	0.17	−1.63, 1.98	0.65*	0.09, 1.21	−1.03	−2.30, 0.27
Community Events attended by Mother [ref. No Events]										
One Event	−0.08	−0.56, 0.40	0.07	−0.68, 0.83	0.55	−0.93, 2.02	−0.56†	−1.22, 0.11	1.16	−0.61, 2.93
Two Events	−0.47†	−1.04, 0.09	0.04	−0.65, 0.72	−0.07	−1.84, 1.70	−0.49	−1.24, 0.26	1.36 †	−0.26, 2.99
Three or More Events	−0.45	−1.00, 0.10	−0.30	−1.15, 0.56	−0.55	−1.97, 0.87	−0.45	−1.12, 0.22	0.99	−0.30, 2.29
Monthly Participation in TPP Father [ref. Never]										
Rarely	0.45*	0.04, 0.85	0.39	−0.47, 1.26	−1.10	−2.92, 0.71	−0.97*	−1.76, −0.19	0.27	−1.27, 1.81
Sometimes	0.74**	0.30, 1.18	0.54	−0.16, 1.23	−0.50	−2.19, 1.19	−0.18	−0.76, 0.39	−0.08	−1.27, 1.10
Most of the Time	0.48	−0.29, 1.26	1.08*	0.20, 1.95	−1.74*	−3.46, −0.01	−0.53*	−1.06, −0.00	−0.15	−1.78, 1.47
Always	1.13**	0.58, 1.68	1.14**	0.35, 1.93	−1.08	−3.09, 0.92	−0.02	−0.64, 0.60	0.54	−1.05, 2.14
Community Events attended by Father [ref. No Events]										
One Event	−0.64**	−0.98, −0.31	−0.43	−0.98, 0.12	0.86	−0.74, 2.46	−0.42	−1.28, 0.44	−0.10	−1.51, 1.29
Two Events	−0.40	−0.94, 0.13	−0.52	−1.30, 0.26	1.02	−0.57, 2.61	0.37	−0.40, 1.14	0.58	−0.87, 2.04
Three or More Events	−0.69 †	−1.41, 0.04	−1.39**	−2.22, −0.56	0.43	−1.12, 1.97	0.49*	−0.04, 1.03	−0.04	−1.61, 1.53

	Instrumental Agency Outcomes									
	Mobility and Freedom of Movement		Communication and Negotiation with Parents		Leadership Competence		Participation in Financial Activities		Participation in Decision Making	
	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI
Panel A: Unadjusted Association of Participation Variables[1]										
Intercept										
Weekly Participation Adolescent [ref. Never]										
Rarely	1.37	−0.68, 3.41	−1.11	−3.03, 0.82	−0.55	−4.49, 3.38	0.21	−0.12, 0.55	0.36	−0.72, 1.43
Sometimes	−0.13	−1.44, 1.18	−0.49	−1.38, 0.41	0.61	−2.39, 3.62	0.16	−0.10, 0.42	−0.11	−0.73, 0.51
Most of the Time	0.93	−0.57, 2.43	−0.52	−1.57, 0.52	1.45	−2.07, 4.98	0.24 †	−0.03, 0.51	0.89*	0.23, 1.56
Always	0.81	−0.61, 2.23	−0.14	−1.26, 0.97	2.23	−1.06, 5.52	0.21	−0.08, 0.49	0.56 †	−0.03, 1.15
Community Events for Adolescents [ref. No Events]										
One Event	0.10	−0.65, 0.85	0.81 †	−0.01, 1.63	3.91**	1.57, 6.25	0.11	−0.04, 0.26	0.10	−0.44, 0.64
Two Events	0.50	−0.23, 1.24	0.01	−0.95, 0.94	4.77**	1.81, 7.74	0.15 †	−0.02, 0.32	−0.02	−0.66, 0.62
Three or More Events	−0.00	−0.62, 0.61	0.02	−0.78, 0.82	2.71*	0.56, 4.87	0.16	−0.04, 0.35	0.34	−0.10, 0.78
Monthly Participation in TPP Mother [ref. Never]										
Rarely	1.61	−0.37, 3.58	−0.40	−1.32, 0.51	0.70	−2.14, 3.55	0.00	−0.40, 0.41	−0.45 †	−0.91, 0.02
Sometimes	0.04	−0.66, 0.74	−0.72 †	−1.50, 0.05	1.26	−1.75, 4.26	0.19*	0.01, 0.37	0.22	−0.30, 0.75
Most of the Time	0.65 †	−0.06, 1.36	−0.08	−0.98, 0.81	1.75	−0.72, 4.21	0.01	−0.11, 0.14	0.50*	0.05, 0.94
Always	0.67*	0.08, 1.26	0.26	−0.62, 1.14	3.15*	0.65, 5.66	0.12	−0.05, 0.29	0.40	−0.09, 0.89
Community Events attended by Mother [ref. No Events]										
One Event	0.45	−0.18, 1.07	0.55	−0.14, 1.24	4.03**	1.85, 6.21	0.10	−0.05, 0.25	0.21	−0.31, 0.72
Two Events	0.04	−0.58, 0.65	0.20	−0.53, 0.92	3.96**	1.40, 6.52	0.12	0.05, 0.29	0.09	−0.37, 0.55
Three or More Events	−0.12	−0.71, 0.46	−0.45	−1.29, 0.38	2.70*	0.20, 5.20	0.20**	0.05, 0.34	0.48*	0.02, 0.93
Monthly Participation in TPP Father [ref. Never]										
Rarely	1.71**	0.77, 2.66	−0.10	−1.43, 1.23	1.50	−0.60, 3.63	0.01	−0.26, 0.28	0.26	−0.28, 0.81
Sometimes	0.71*	0.14, 1.29	−0.36	−1.08, 0.36	1.55 †	−0.08, 3.18	−0.08	−0.25, 0.10	0.08	−0.39, 0.55
Most of the Time	0.87*	0.16, 1.57	0.04	−0.83, 0.91	1.11	−1.75, 3.99	−0.15 †	−0.33, 0.02	0.58 †	−0.09, 1.25
Always	0.97*	0.24, 1.70	0.19	−0.74, 1.11	3.50**	1.44, 5.58	0.03	−0.17, 0.22	0.28	−0.29, 0.85
Community Events attended by Father [ref. No Events]										
One Event	1.05**	0.28, 1.83	−0.21	−1.02, 0.60	0.54	−0.86, 1.95	−0.06	−0.21, 0.09	−0.11	−0.48, 0.26
Two Events	0.80**	0.24, 1.36	−0.90 †	−1.87, 0.07	1.66 †	−0.29, 3.61	−0.04	−0.23, 0.14	0.32	−0.18, 0.81
Three or More Events	−0.05	−0.62, 0.52	−0.37	−1.41, 0.68	2.21	−0.56, 4.99	0.05	−0.14, 0.25	0.72*	0.17, 1.26
Panel B: Adjusted Association of Participation Variables[2]										
Intercept	4.13**	1.62, 7.10	16.59**	14.07, 19.11	6.73	−2.69, 16.15	−0.38	−1.19, 0.43	0.90	−1.17, 2.97
Weekly Participation Adolescent [ref. Never]										
Rarely	0.87	−1.58, 3.33	−1.03	−2.74, 0.67	−2.13	−6.78, 2.51	0.25	−0.06, 0.55	0.59	−0.76, 1.94

(*continued on next page*)

Appendix Table 5 (*continued*)

	Instrumental Agency Outcomes									
	Mobility and Freedom of Movement		Communication and Negotiation with Parents		Leadership Competence		Participation in Financial Activities		Participation in Decision Making	
	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI
Sometimes	−0.60	−2.28, 1.07	−0.73	−1.91, 0.44	−2.65	−7.02, 1.72	0.16	−0.11, 0.42	−0.10	−0.91, 0.71
Most of the Time	0.59	−1.33, 2.52	−0.68	−2.04, 0.68	−1.39	−6.34, 3.56	0.31*	0.03, 0.59	0.92 †	−0.02, 1.86
Always	0.26	−1.66, 2.19	−0.63	−1.91, 0.66	−1.35	5.91, 3.21	0.24	−0.04, 0.51	0.47	−0.44, 1.38
Community Events for Adolescents [ref. No Events]										
One Event	0.04	−0.92, 0.99	1.00 †	−0.16, 2.17	3.44*	0.02, 6.87	0.02	−0.17, 0.21	−0.02	−0.58, 0.54
Two Events	0.72	−0.21, 1.65	0.12	−1.16, 1.41	4.31*	1.04, 7.58	0.13	−0.09, 0.35	−0.02	−0.77, 0.72
Three or More Events	0.19	−0.58, 0.97	0.52	−0.45, 1.50	1.57	−1.13, 4.27	0.02	−0.18, 0.22	0.02	−0.66, 0.70
Monthly Participation in TPP Mother [ref. Never]										
Rarely	1.43	−0.77, 3.63	−0.51	−1.82, 0.81	−0.70	−4.28, 2.87	−0.07	−0.45, 0.32	−0.82*	−1.42, −0.21
Sometimes	0.15	−0.97, 1.22	−1.06*	−2.08, −0.05	−2.19	−5.52, 1.14	0.11	−0.09, 0.31	0.09	−0.62, 0.80
Most of the Time	0.58	−0.42, 1.62	−0.13	−1.16, 0.89	−1.08	−3.55, 1.38	−0.17	−0.41, 0.07	−0.05	−0.75, 0.65
Always	0.85	−0.23, 1.85	−0.07	−1.15, 1.01	−1.09	−4.04, 1.85	0.04	−0.32, 0.23	0.16	−0.64, 0.96
Community Events attended by Mother [ref. No Events]										
One Event	−0.49	−1.54, 0.56	0.40	−0.82, 1.61	4.01**	1.21, 6.89	0.10	−0.11, 0.32	0.05	−0.65, 0.75
Two Events	−0.67	−1,70, 0.37	0.74	−0.44, 1.91	4.49**	1.93, 7.05	0.08	−0.17, 0.33	−0.05	−0.65, 0.56
Three or More Events	−0.84†	−1.82, 0.14	−0.30	−1.47, 0.86	3.42**	0.93, 5.90	0.22†	−0.03, 0.47	0.08	−0.58, 0.74
Monthly Participation in TPP Father [ref. Never]										
Rarely	1.51**	0.46, 2.56	0.62	−0.75, 2.00	2.91*	0.23, 5.60	0.02	−0.31, 0.35	0.19	−0.50, 0.88
Sometimes	1.15*	0.25, 2.05	0.91*	0.13, 1.69	1.59	−0.62, 3.80	−0.22 †	−0.46, 0.01	−0.15	−0.75, 0.44
Most of the Time	1.14*	0.15, 2.13	1.04 †	−0.03, 2.12	0.59	−2.18, 3.37	−0.27 †	−0.55, 0.01	0.09	−0.56, 0.75
Always	1.54**	0.48, 2.61	1.08 †	−0.02, 2.17	2.99	−0.91, 6.88	−0.12	−0.42, 0.19	−0.19	−1.06, 0.67
Community Events attended by Father [ref. No Events]										
One Event	−0.09	−1.06, 0.88	−1.20*	−2.19, −0.20	−2.05 †	−4.20, 0.10	0.08	−0.17, 0.33	−0.05	−0.63, 0.52
Two Events	−0.09	−0.89, 0.72	−1.49*	−2.70, −0.27	−0.63	−3.08, 1.82	0.02	−0.26, 0.31	0.32	−0.22, 0.86
Three or More Events	−1.24*	−2.30, −0.18	−1.14	−2.61, 0.33	0.37	−3.31, 4.05	0.15	−0.13, 0.43	0.62 †	−0.12, 1.36

	Collective Agency Outcomes									
	Group Membership		Collective Efficacy		Participation in Events		Social Networks		Gender Discrimination in the Family	
	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI
Panel A: Unadjusted Association of Participation Variables[1]										
Intercept										
Weekly Participation Adolescent [ref. Never]										
Rarely	−0.19	−0.59, 0.21	1.08	−1.15, 3.31	−0.13	−0.42, 0.16	−0.26	−1.04, 0.52	−2.66**	−4.35, −0.97
Sometimes	0.18	−0.04, 0.41	−0.34	−2.23, 1.55	0.09	−0.23, 0.42	−0.46	−0.96, 0.04	−1.99**	−3.32, −0.67
Most of the Time	0.29*	0.03, 0.55	1.10	−0.87, 3.08	−0.19 †	−0.40, 0.01	0.27	−0.46, 1.00	−0.98	−2.46, 0.50
Always	0.70**	0.36, 1.04	0.70	−1.31, 2.70	−0.02	−0.22, 0.19	−0.38	−0.86, 0.11	−1.67*	−3.06, −0.28
Community Events for Adolescents [ref. No Events]										
One Event	0.51**	0.26, 0.76	0.62	−0.78, 2.03	−0.02	−0.12, 0.08	−0.45	−1.07, 0.16	0.65	−0.78, 2.07
Two Events	0.61**	0.16, 1.05	0.50	−0.52, 1.52	0.30*	0.06, 0.55	−0.66	−1.26, −0.07	0.38	−1.12, 1.88
Three or More Events	0.35*	0.05, 0.66	0.16	−0.62, 0.94	0.13*	0.03, 0.24	−0.11	−0.68, 0.46	0.86	−0.54, 2.25
Monthly Participation in TPP Mother [ref. Never]										
Rarely	0.32	−0.33, 0.96	2.03**	0.78, 3.27	−0.08	−0.24, 0.08	−0.62*	−1.16, −0.07	−0.45	−3.14, 2.24
Sometimes	0.30 †	−0.06, 0.66	0.28	−0.85, 1.41	0.13	−0.05, 0.31	−0.18	−0.65, 0.28	−1.29*	−2.51, −0.07
Most of the Time	0.14	−0.21, 0.50	1.17*	0.27, 2.07.	−0.06	−0.19, 0.07	0.32	−0.24, 0.87	−0.36	−1.68, 0.96
Always	0.50**	0.24, 0.76	1.13*	0.11, 2.16	0.09	−0.05, 0.23	−0.46 †	−0.92, 0.00	−0.19	−1.17, 0.79
Community Events attended by Mother [ref. No Events]										
One Event	0.67**	0.38, 0.96	1.46**	0.55, 2.37	−0.02	−0.15, 0.11	−0.21	−0.58, 0.16	0.26	−0.82, 1.33
Two Events	0.42**	0.16, 0.69	0.80	−0.29, 1.89	0.28**	0.08, 0.48	−0.25	−0.75, 0.25	0.21	−1.09, 1.51
Three or More Events	0.28†	−0.05, 0.61	0.45	−0.64, 1.54	0.13 †	−0.01, 0.27	0.10	−0.28, 0.49	−0.17	−1.17, 0.82
Monthly Participation in TPP Father [ref. Never]										
Rarely	−0.16	−0.48, 0.14	1.63**	0.72, 2.55	−0.05	−0.15, 0.06	−0.31	−0.82, 0.21	−2.39**	−3.90, −0.89
Sometimes	0.34*	0.00, 0.70	0.02	−1.11, 1.14	0.23*	0.06, 0.41	−0.54**	−0.90, −0.19	−1.30*	−2.47, −0.13
Most of the Time	0.38	−0.01, 0.76	0.86	−0.25, 1.97	−0.02	−0.22, 0.19	0.25	−0.57, 1.07	0.49	−0.85, 1.83
Always	0.66**	0.23, 1.10	0.86 †	−0.02, 1.73	0.43*	0.11, 0.75	−0.38 †	−0.78, 0.01	−0.28	−1.41, 0.86
Community Events attended by Father [ref. No Events]										
One Event	0.32*	0.07, 0.58	0.22	−0.52, 0.97	−0.06	−0.19, 0.07	−0.08	−0.49, 0.32	−1.39 †	−2.85, 0.07
Two Events	0.30†	−0.02, 0.63	−0.33	−1.58, 0.92	0.19 †	−0.03, 0.42	−0.30*	−0.57, −0.03	−1.15*	−2.22, −0.10
Three or More Events	0.62*	0.14, 1.09	0.54	−0.63, 1.70	0.32 †	−0.02, 0.66	0.05	−0.65, 0.75	0.02	−1.15, 1.19
Panel B: Adjusted Association of Participation Variables[2]										
Intercept	0.72	−0.50, 1.94	9.27**	5.54, 13.00	−0.21	−0.81,0.40	1.90*	0.37, 3.44	12.81**	7.92, 17.70
Weekly Participation Adolescent [ref. Never]										
Rarely	−0.35 †	−0.81, 0.10	0.60	−2.31, 3.51	−0.25 †	−0.53, 0.04	0.03	−0.97, 1.03	−3.07**	−5.03, −1.11
Sometimes	−0.17	−0.51, 0.17	−0.65	−3.47, 2.17	−0.09	−0.36, 0.18	−0.12	−0.93, 0.68	−2.75**	−4.61, −0.89
Most of the Time	−0.03	−0.42, 0.37	0.55	−2.40, 3.50	−0.35**	−0.59, −0.11	0.33	−0.76, 1.43	−1.61	−3.70, 0.48
Always	0.35*	0.01, 0.69	0.01	−2.92, 2.94	−0.22*	−0.42, −0.02	−0.03	−0.82, 0.76	−2.66**	−4.42, −0.90
Community Events for Adolescents [ref. No Events]										
One Event	0.14	−0.21, 0.48	0.38	−1.58, 2.33	0.01	−0.10, 0.11	−0.52	−1.22, 0.18	1.42 †	−0.12, 2.97
Two Events	0.38	−0.04, 0.81	0.57	−0.98, 2.12	0.23*	0.06, 0.40	−0.62 †	−1.34, 0.10	1.28	−0.32, 2.88
Three or More Events	−0.01	−0.35, 0.33	0.08	−1.01, 1.17	0.10 †	−0.02, −.22	−0.18	−0.95, 0.59	1.73*	0.31, 3.14
Monthly Participation in TPP Mother [ref. Never]										
Rarely	0.27	−0.33, 0.88	1.26	−0.16, 2.69	0.01	−0.23, 0.26	−0.80*	−1.50, −0.09	−0.54	−3.40, 2.32

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Appendix Table 5 (*continued*)

	Collective Agency Outcomes									
	Group Membership		Collective Efficacy		Participation in Events		Social Networks		Gender Discrimination in the Family	
	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI	Est.	95% CI
Sometimes	0.03	−0.43, 0.51	−0.26	−1.53, 1.01	0.08	−0.17, 0.27	−0.16	−0.84, 0.51	−1.55*	−3.08, −0.02
Most of the Time	−0.07	−0.63, 0.50	0.36	−0.69, 1.41	0.04	−0.18, 0.27	−0.04	−0.99, 0.91	−0.88	−2.52, 0.75
Always	0.01	−0.43, 0.46	0.42	−0.75, 1.59	0.00	−0.25, 0.25	−0.46	−1.17, 0.26	−0.62	−1.98, 0.74
Community Events attended by Mother [ref. No Events]										
One Event	0.50*	0.04, 0.95	1.00	−0.05, 2.06	0.04	−0.13, 0.22	0.21	−0.31, 0.73	0.99	−0.71, 2.69
Two Events	0.17	−0.24, 0.58	0.86	−0.37, 2.10	0.19	−0.08, 0.45	0.23	−0.27, 0.72	1.14	−0.53, 2.81
Three or More Events	0.15	−0.40, 0.69	0.22	−0.79, 1.23	0.07	−0.16, 0.31	0.34	−0.36, 1.05	−0.02	−1.61, 1.56
Monthly Participation in TPP Father [ref. Never]										
Rarely	−0.29	−0.67, 0.08	2.04**	1.06, 3.01	0.06	−0.16, 0.28	−0.41	−0.94, 0.12	−1.07	−2.63, 0.49
Sometimes	0.08	−0.38, 0.54	0.62	−0.43, 1.66	0.21	−0.13, 0.55	−0.69**	−1.17, −0.22	0.09	−1.34, 1.52
Most of the Time	0.01	−0.43, 0.44	0.91	−0.50, 2.32	0.07	−0.27, 0.41	−0.14	−0.76, 0.48	1.22	−0.78, 3.22
Always	0.14	−0.48, 0.77	1.24	−0.28, 2.75	0.45**	0.14, 0.76	−0.51	−1.12, 0.11	0.66	−1.19, 2.52
Community Events attended by Father [ref. No Events]										
One Event	0.11	−0.27, 0.49	−0.97*	−1.95, −0.00	−0.22 †	−0.47, 0.02	0.36	−0.17, 0.88	−1.57	−3.57, 0.43
Two Events	0.16	−0.27, 0.59	−0.96†	−1.96, 0.44	−0.07	−0.46, 0.32	0.17	−0.21, 0.56	−1.36 †	−2.91, 0.18
Three or More Events	0.54*	0.00, 1.09	−0.28	−1.85, 1.28	0.06	−0.38, 0.50	0.29	−0.49, 1.06	−0.98	−2.85, 0.88

† $p < 0.1$; *$p < 0.05$; **$p < 0.01$.

[1]Controlling for study arm, age in years, read and/or write, grades completed, still attending school, received vocational training, religion, caste, Household PPI, Male Head Primary Occupation, Other Empowerment Organizations attended.

[2]Controlling for all other participation variables, study arm, age in years, read and/or write, grades completed, still attending school, received vocational training, religion, caste, Household PPI, Male Head Primary Occupation, Other Empowerment Organizations attended.

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Glossary

TPI: Tipping Point Initiative
CEFM: Child, early, or forced marriage
TPP: Tipping Point Program
TPP+: Tipping Point Program Plus