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Compendium | December 2020

# FOUR AREAS OF INFLUENCE DRIVING CHILD MARRIAGE:


What the Data Tells us  
and how it can Inform  
Programming

A 2020 compendium of findings and recommendations to strengthen the evidence base and impact of social and behaviour change interventions to end child marriage.

## OVERVIEW

It is globally recognized that child marriage constitutes a human rights violation. Even in the face of overwhelming evidence about the negative health and social consequences of the practice, an estimated one in five girls around the world experience child marriage. In this context, there has been limited evidence on the role that social and behavioural drivers are playing in perpetuating this harmful practice.

To help address this gap, the United Nations Children's Fund (UNICEF) partnered with the University of California San Diego (UCSD) to explore some of the key areas that influence child marriage. This work consisted of secondary analysis of nationally-representative and population specific data from **India, Vietnam, Peru, Niger** and **Ethiopia**, with a focus on:

 **The child marriage decision-making process;**

 **Parent-child relationship;**

 **Community level social norms;**

 **Geography.**

This executive summary presents some of the most critical findings and programmatic implications from this research, and the larger body of engagement forged by this partnership. The remainder of this compendium provides the individual briefs and manuscripts produced by the research.

## BACKGROUND

Today, child marriage – marriage before the age of 18 – is stealing childhoods and leading to lifelong consequences for girls around the world, with those living in poverty at greatest risk. Worldwide, 650 million women and girls alive today were married as minors.<sup>1</sup> And, while the United Nations Sustainable Development Goals calls for the end of child marriage by 2030, it has become clear that the goal will not be attainable without significant improvements in interventions. If efforts are not accelerated, an estimated 150 million more girls will marry as minors within the decade.



As global efforts to end child marriage continue to shift from vertical, sector driven approaches (e.g. provision of education) to include more holistic, effective community engagement and gender empowerment strategies, there has been a growing need for more empirical evidence concerning the social and behavioural drivers of child marriage. This includes new research that directly interrogates the intersection between gender inequitable norms, practices and girl child marriage.

To address this need, UNICEF entered a partnership with UCSD to build a strong, and global evidence base on the root drivers of child marriage to inform Communication for Development (C4D), Social Behaviour Change Communication (SBCC), and cross-sectoral interventions aimed at reducing child marriage. The research focused on **Ethiopia, Peru, India, Vietnam**, and **Niger** – where existing population-level data was strongest – exploring the areas of decision making, parent-child relationship, community-level social norms, and geography.

The findings are intended for UNICEF and United Nations Population Fund (UNFPA) offices working on the Global Programme to Accelerate Action to End Child Marriage, as well as other programmers, researchers, and organizations interested in better understanding and eliminating today's drivers of child marriage around the world.





<sup>1</sup> <https://data.unicef.org/topic/child-protection/child-marriage/>

Specifically, this body of evidence can:

- Reinforce understanding of what influences child marriage at different levels and among different social groups, including girls, women, men and communities;
- Inform the expansion of indicators associated with child marriage beyond the individual and household-level indicators related to poverty, **development and education**, to highlight the roles of gender norms, parent-child relationships, and geographies;
- Offer **useful methodologies** for capturing social drivers and influencers related to child marriage that can be adapted for examination in other national contexts;
- Advocate for a deeper analysis of the role of influencers and marriage decision-making;
- Highlight the need for exploring how **gender socialization can be better institutionalized in positive parenting**, particularly on positive masculinities that can delay child marriage and other forms of gender-based violence.

## RESEARCH OUTPUTS & SECTIONS OF COMPENDIUM

The outputs from this partnership with UCSD include three peer-reviewed academic manuscripts and four research briefs directed at programmes. Each of these briefs are also available separately through the links provided below.

AREA OF FOCUS	MANUSCRIPT	BRIEF
 <b>Child marriage decision-making process</b>	No manuscript available.	Early Marriage Decision-Making: Pathways of Prevention — <a href="#">page 8</a>
 <b>Parent-child relationships</b>	'Effects of Parent-Child Relationships on Child Marriage of Girls in Ethiopia, India, Peru, and Vietnam: Evidence from a Prospective Cohort'. (published in the <i>Journal of Adolescent Health</i> ) — <a href="#">page 25</a>	The role of parent-child communication in delaying child and the early marriage of girls — <a href="#">page 12</a>
 <b>Community-level social norms</b>	'Associations between village-level norms on marital age and marital choice outcomes among adolescent wives in rural Niger'. (published in <i>Social Science &amp; Medicine: Population Health</i> ) — <a href="#">page 34</a>	The Role of Social Norms in Early Marriage in Niger: A Look at Adolescent Wives and their Communities — <a href="#">page 16</a>
 <b>Geography</b>	'Mapping the patchwork: Exploring the subnational heterogeneity of child marriage in India'. (published in <i>Social Science &amp; Medicine: Population Health</i> ) — <a href="#">page 44</a>	District-level variation in child marriage in India: A geospatial analysis — <a href="#">page 20</a>

Programmers interested in more specific recommendations are encouraged to review the briefs. Researchers and any other actor interested in more elaboration and scholarly exploration should consider the manuscripts.



## KEY FINDINGS

This section summarizes the findings from each of the four research areas covered by the partnership between UNICEF and USCD.



### CHILD MARRIAGE DECISION-MAKING PROCESS (with special focus on Ethiopia and India):

This study analysed available, population-level qualitative data from Oromia in Ethiopia, and Jharkhand in India. The data analysed was generated from semi-structured, in-depth interviews with girls and women aged 13-23 years (n=91), and up to three key marital decision makers per girl/women (n=114). Analysis of the data revealed that:

- There are **three phases** to the early marriage decision making process: initiation, negotiation and final decision-making.
- **Different influencers** affect different phases of the early marriage process:
  - In the **initiation phase**, marriage discussion tends to be led by elders and non-nuclear family members, with girls largely being excluded. This phase is deeply rooted in cultural traditions.
  - The **negotiation phase** is characterized by family discussions, and here too, girls have limited voice. This phase involves the greatest variety of actors compared to other phases and it is the most open to external influences. It represents a touchpoint to steer the negotiations outcome away from early marriage. External advocates outside of the traditional family and cultural circle, such as early marriage prevention counsellors and teachers, help girls voice their resistance to early marriage. They also have the ability to deter adverse social repercussions for the family, thanks to the knowledge and position associated with their role.
  - In the **final decision-making phase** of the early marriage process, parents, particularly the father, tend to be the ultimate decision makers. Once the early marriage process reaches the final decision-making stage, girls mostly acquiesce to their parents' decision. Early marriage was justified by the desire to find a 'good match' and by fear of limited future marital prospects.
- Along these pathways to marriage, there is little to **no opportunity for the girls to exercise choice** or agency, without the social support from family members or external influences.
- In a **minority of cases**, early marriage discussions were initiated, negotiated and decided by the young couples themselves. In these cases, girls were seen to maintain their voice and agency, exhibiting self-efficacy to move ahead with their decision despite potential parental disapproval. These couple-led early marriage decision processes were mostly influenced by peers rather than parents.

### PARENT-CHILD RELATIONSHIPS (with a special focus on Ethiopia, India, Vietnam and Peru):

This paper analysed data from the Young Lives Study (n=1,648), which follows girls between the ages of 8 and 19 years in Ethiopia, India, Vietnam and Peru. Examining two aspects of positive parenting (parent-child communication and parent-child relationship quality) in early adolescence (at age 12) within the Young Lives Study, the analysis revealed that:

- **Nearly 1 in 5 girls (18 per cent) reported marrying prior to 18 years of age.** Child marriage prevalence was high in both India and Ethiopia, with the latter reporting very early marriages (married before age 16).
- Higher parent-child relationship quality at age 12 was **protective against very early marriages.**
- Quality **parent-child communication** was protective against child and early marriage; however, it **increased the likelihood of marriage** after it became legally permissible (age 18 years in all four countries).
- **School dropout** and early menarche put girls at greater risk of child and very early marriages.

### COMMUNITY-LEVEL SOCIAL NORMS (with a special focus on Niger)

This study analysed data from a sample of adolescent wives and their husbands (N=581) that were included in the evaluation of a family planning intervention in the Dossa Region of Niger. The analysis explored two aspects. Firstly, the age of marriage and girls' marital choice by looking at both descriptive norms (the age at which people got married and whether the girl was involved in her marital choice). And, secondly, injunctive norms (perception of community expectations of age of marriage and of girls' involvement in marital choice). It revealed that:

- **Women marry younger** (at age 14 on average) than men, who were on average nine years older than their wives.
- **Adolescent girls** married at older ages in those villages where a larger proportion of girls reported being involved in the decision to marry (a descriptive social norm). And, where a larger proportion of husbands believed that their communities were supportive of girls' involvement in marital choice (an injunctive social norm).
- **Adolescent wives were more likely to report that they had marital choice in communities** where more

wives believed the community was supportive of older ages at marriage and where more husbands believed that the community supported girls' involvement in marital choice (injunctive social norms).

- **More women reported having been engaged in the decision to marry than men reported that their wife had been engaged in the decision to marry.** This suggests divergent views on what it means to have marital choice in these communities.

### GEOGRAPHY (with a special focus on India)

This study analysed district-level data from the National Family Health Survey-4 and the 2011 India Census, exploring sub-national variations in the prevalence of child marriage among 20 to 24 year old girls, and the social and connectivity factors within those locations that may influence child marriage. The analysis revealed that:

- The prevalence of **child marriage varies** significantly not only between states, but also between different districts within a state.
- Some **factors influencing** the prevalence of child marriage have a spillover effect, explaining levels of child marriage not only in a given community, but also in neighbouring communities.
- Such influencing factors with spillover effect on neighbouring districts include population density and proximity to the district border area (both associated with higher prevalence of child marriage), **education levels and presence of marginalized groups** (both associated with lower levels of child marriage).
- Communities whose neighbouring communities were **near state borders** also tended to have **higher levels of child marriage.**
- On average, districts with **higher levels of newspaper consumption** among females and where females had mobile phone access also had lower levels of child marriage; but these relationships varied across states and districts.

## PROGRAMME RECOMMENDATIONS

These studies confirm that child marriage is influenced by multi-faceted factors, occurs in diverse contexts, is not always coerced and is responsive to multiple pathways. A nuanced approach to understanding gender-based community norms is central to designing behaviour and social norms change interventions. Context matters and risk reduction and mitigation interventions should be informed by sub-national geographies, including at district levels, and guided by data. Early positive parenting and socialization can influence decision-making around marriage as well as values around gender equality. This compendium of research findings reinforces the importance of evidence for guiding interventions, while recognizing the growing body of measures, methodologies and need for deeper research and analysis.

Specific programmatic recommendations arising from these studies can be categorized in four domains: interpersonal relationships; community and environmental influences; geographical environment and evidence generation.



### INTERPERSONAL RELATIONSHIPS

The studies note the role that different interpersonal relationships, in particular fathers, peers and parents, can play in influencing child marriage.

- In **some communities**, fathers are central to the child marriage decision-making process. Their beliefs about an acceptable age of marriage and girls' marital choice are important in shaping social norms around child marriage. Interventions should engage fathers, as well as mothers, in discussions around child marriage, including marital age and girls' agency and choice.
- **Peers play an influential role** in supporting young couples to make their own choice about early marriage. Interventions addressing youth-led marriages should also target peer groups with education on early marriage and viable alternatives such as education or vocational channels.
- **Quality parent-child relationship** and parent-child communication in young adolescence can have a protective effect against child marriage. Child marriage prevention programmes should include gender transformative, positive parenting aspects at early ages as these can influence intra-familial decision-making on marriage and life choices for girls.

### COMMUNITY INFLUENCES

- In the **child-marriage decision making process**, there are opportunities, especially during the negotiation phase, for external agents to influence marriage outcomes. Interventions should identify influencers, such as teachers, early marriage prevention counsellors, or other parents and leaders. Influencers need to be supported to engage with families who are negotiating child marriage. Their involvement can play a role in deterring social repercussions and can therefore help shift norms about early marriage.
- **Community beliefs and expectations** (real or perceived) about age of marriage and about girls' involvement in marital choice can affect norms around child marriage. Interventions should aim to engage communities with activities addressing marital age and choice, to help shift community-level norms.
- **Understanding the nuances** of how girl marital choice is viewed by men and women is important, and interventions should aim to build a common understanding in this regard.

### GEOGRAPHICAL ENVIRONMENT

- **Geographical influences** such as population density, area and location, affect child marriage. This means that interventions must be adapted to local contexts, taking into account norms and behaviours in neighbouring locations as these spill over into bordering communities.
- **Traditional administrative boundaries** may be inadequate, and even counter-productive, in identifying which communities and localities most influence social norms around child marriage in a given community. Participatory approaches that engage communities in identifying and drawing their own boundaries of their community and social networks may be more informative in defining programming areas.

### EVIDENCE GENERATION

- **Analysis is needed** to better measure parenting styles and aspects of positive parenting that can protect against child marriage and increase girls' agency.
- **A deeper understanding** of parental and household determinants, seen through a gender lens, including support, neglect, and even violence, is needed to understand the changing relationship between parents and girls during adolescence.
- **Communities are dynamic**, and people regularly cross community borders, for work, school, to visit families, etc. Understanding how social and normative factors differ according to location and the movement of people may contribute to improved targeting of social and behaviour change efforts.
- **There is a need to further investigate** the role of adolescent and parental influencers outside the home in the context of child marriage.



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## EARLY MARRIAGE DECISION-MAKING: PATHWAYS OF PREVENTION

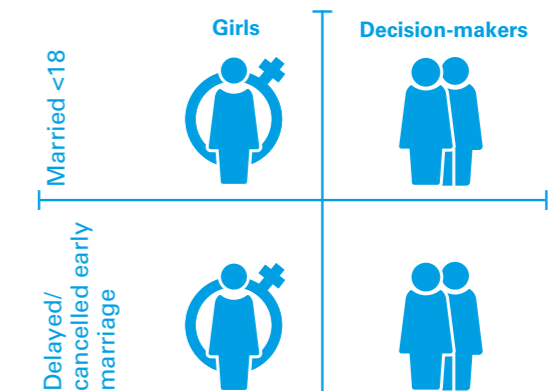
Based on qualitative data from semi-structured, in-depth interviews, this research reveals how participants in Ethiopia and India view the decision-making process around early marriage. It details the diverse influencers and processes within phases of initiation, negotiation and final decision-making. A series of interventions and recommendations are offered for how programmers can better understand the decision-making pathways and processes of child marriage, and how they can better support the choice, voice and agency of girls.

## BACKGROUND

Between 2018 and 2030, 150 million girls will be married before reaching age 18<sup>1</sup>. Research on early marriage has largely focused on sociodemographic risks<sup>2</sup>, rather than girls' potential power in deciding whether or not to marry. This brief summarizes results of a study on how girls and their marital decision-makers initiate, negotiate and finalize decisions on early marriage.

Qualitative data from semi-structured, in-depth interviews in Oromia, Ethiopia and Jharkhand, India was used to explore the process of early marriage decision-making. Interviews were conducted with girls and women between 13-23 years of age who participated in early marriage prevention programmes, and either married before reaching age 18, or cancelled/postponed proposed early marriages (n=91). Up to three key marital decision-makers per girl/woman were also interviewed (n=114). Responses were analyzed using latent content analysis.

Figure 1. Structure of interviewee samples in Oromia, Ethiopia and Jharkhand, India (n=205 total)



Structure of interviewee samples in Oromia, Ethiopia and Jharkhand, India (n=205 total).

## FINDINGS

Early marriage was described as a process by most participants, with diverse influencers affecting initiation, negotiation and final decision-making. In the initiation phase, marriage discussions were generally begun by elders or non-nuclear family members, and girls were often not involved. This phase was deeply rooted in cultural traditions and influenced by the desire to find a "good match" as well as fear of the consequences of not marrying.

**Social resources and support, such as parents in favor of delaying marriage, were the primary mechanisms of resistance to early marriage.**

The negotiation phase was most porous to external influences and had the greatest variety of actors involved. Respondents noted that having an advocate outside of traditional family or cultural circles helped both provide information and deter adverse social repercussions. These external influencers, such as early marriage prevention programme staff and teachers, helped girls voice their resistance to early marriage. Programme staff had a unique advantage in this role based on their knowledge and position, though their role was not easy and their influence was not universal.



## SOME PARTICIPANT QUOTES

### INITIATION

"Lot of proposals use to come but I was never informed about them. Nobody discussed them with me. I would hear my grandfather arguing with my father. My grandfather often use to convince my father to accept proposals but my father wanted me to study and said he will not let me marry before I am 18."

— Girl whose early marriage was delayed/ cancelled, age 23, India

"According to the culture of this society the boy's family take chat (a mild stimulant) to the girl's family and ask for their daughter for marriage. Then, those elders have respect and they cannot say no. So, the girl is given by her parents."

— Male decision-maker for girl whose early marriage was delayed/cancelled (relationship: local administrator), age 26, Ethiopia

### NEGOTIATION

"When I went to meet them, they were very rude to me. The brother was taunting. And the mother did not listen to me. She asked me that if her daughter remains unmarried all her life, will (I) take her responsibility. I went to their home at least 5-6 times and slowly they started listening to me. Then I spent one day with her mother... She thought about the proposal and then cancelled it."

— Female decision-maker for a girl whose early marriage was delayed/cancelled (relationship: program educator), age 25, India

"When she discussed with her aunt, she finally refused the marriage and when they asked her why, she replied, first I don't marry a person I don't know. Second, I don't marry at 14. When she wasn't able to convince her, we went together...Her uncle told me that if he was refusing the marriage he was going to be neglected from the society, so he said that it was better if I spoke. So, I convinced them this way. It has many challenges."

— Female decision-maker for a girl whose marriage was delayed/ cancelled (relationship: teacher/ early marriage prevention program staff), age 28, Ethiopia

### FINAL DECISION-MAKING

"The boy's family send elders to my family to request the marriage. So, my family heard about my marriage first. I only heard only the wedding day held. My husband also did not know about our marriage at first. So, both of us are forced to engage in marriage because of the push from our parents."

— Girl married as a minor, age 18, Ethiopia

"We got the proposal when she was 17 years old. We had a fear that she will run away with someone or will opt for intercaste marriage... We were afraid that she might land up as her aunts who never got married. We liked the boy, he was from a good family. He also did not take alcohol...I made the final decision on her marriage."

— Male decision-maker for a girl married as a minor (relationship: father), age 40, India

### ELDER/ OTHER FAMILY INITIATED

- Majority of interviews
- Discussions largely excluded girls

### FAMILY NEGOTIATION

- Girls have limited voice
- Needs social support to speak for/enable voice

### PARENTAL DECISION

- Primarily father

**Stressors (social pressure, cultural norms, social inequities, compromised family structure) compromised exercise of voice, choice and agency**

### YOUTH INITIATED

- Minority of interviews
- Discussions directly engaged girls

### COUPLE NEGOTIATIONS

- Most consistent demonstration of girls' voice, choice and agency

### GIRL DECISION

- Couples retain autonomy
- Girls often able to block or facilitate marriage



Final decision-makers were mostly parents, particularly fathers. When mothers were the final decision-maker, they often still needed to convince the fathers to agree with their position. Girls largely acquiesced to their parent's decision, even when it was not their preference. The most common justifications for early marriage were finding a "good match" and fear of limited future marital prospects. Along the traditional pathways of early marriage decision-making, there was little to no opportunity for girls to exercise choice, voice or agency.

In a minority of cases, early marriage proposals and decision-making were initiated at, negotiated within, and decided by the young couple. Girls generally maintained their voice and agency in youth-initiated proposals, exhibiting self-efficacy to move forward despite potential disapproval from parents, and notwithstanding the adverse health and well-being implications of early marriage. Couple-led early marriage processes tended to be more influenced by peer pressure and less influenced by parents.

## RECOMMENDATIONS FOR PROGRAMMING

- **Supporting the choice**, voice and agency of girls is critical to curtail child marriage, but must be paired with programme approaches to strengthen social support of decision influencers at critical points of the decision-making pathway.
- **Decision-making pathways** are diverse. Interventions targeting only one pathway are likely to leave out some girls. Programmes should target different influencers depending on the pathways involved.
- **Engaging advocates** such as programme staff and teachers to provide education on consequences of early marriage can help offset the social repercussions of breaking norms, especially in the negotiation stage.
- **Programmes addressing youth-led marriages** may require earlier education on early marriage as well as viable alternatives such as education or vocation channels. Programmes should address peer groups as well, given that peer influence is a greater factor in this pathway.
- **Parents were consistently involved** in early marriage decision-making, and did not always agree on desired outcomes. Programmes involving both parents may better support delay/cancellation of planned marriages.

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**PI: ANITA RAJ, PhD**

Division of Infectious Diseases and Global Public Health  
University of California San Diego, Department of Medicine 9500  
Gilman Drive, MC 0507, La Jolla, CA 92093-0507

Tel: +1-858-246-3283 | Fax: +1-858-534-7566  
[geh@ucsd.edu](mailto:geh@ucsd.edu) | @GEH\_UCSD

### FOR MORE INFORMATION

If you would like more information about this study, or to collaborate with us on its success, please contact the Principal Investigator of this research at UC San Diego.

Communication for Development Section  
Programme Division — UNICEF New York  
[c4dhq@unicef.org](mailto:c4dhq@unicef.org) | [www.unicef.org/cbcs](http://www.unicef.org/cbcs)

Child Protection Section  
Programme Division — UNICEF New York  
[www.unicef.org/protection](http://www.unicef.org/protection)

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This brief summarizes findings from the following research article: McDougal L, Jackson EC, McClendon KA, Belayneh Y, Sinha A, Raj A. Beyond the statistic: exploring the process of early marriage decision-making using qualitative findings from Ethiopia and India. BMC Women's Health. 2018. 18:144. <https://doi.org/10.1186/s12905-018-0631-z>



Brief | December 2020

## THE ROLE OF PARENT-CHILD COMMUNICATION in Delaying Child and Early Marriage of Girls

Data from a prospective cohort of girls followed between 8 and 19 years of age in Ethiopia, India, Vietnam and Peru are showing that parent-child communication and relationship can delay child and early marriage of girls. Interventions on positive parenting and designing or implementing communication focused programmes in early adolescence (10-14 years) can be meaningful agents in influencing intra-familial decision-making around marriage and life choices for girls.

## BACKGROUND

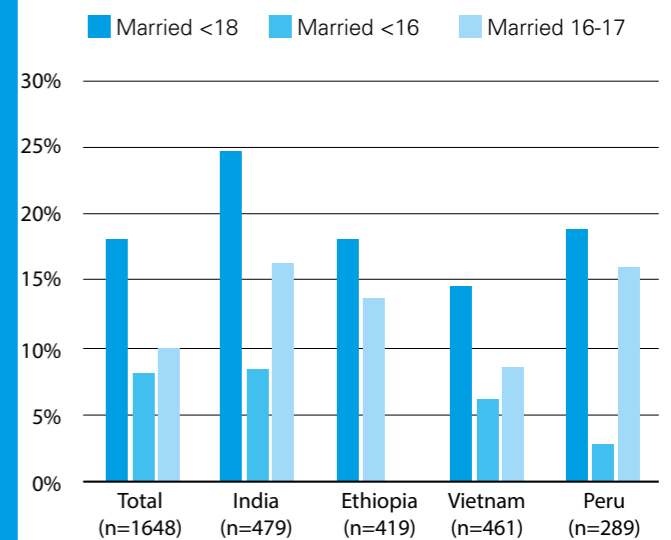
Child marriage compromises the health and well-being of nearly 650 million women and girls globally, leading to higher sexual and reproductive morbidity, and vulnerability to violence and coercion within families.<sup>1</sup> Despite child marriage prevention efforts, the practice remains pervasive affecting the potential of girls in realizing their capabilities for economic and social participation.<sup>2-3</sup>

In present interventions, parents and the extended families are often not included as stakeholders despite their say on decisions around marriage and life choices of girls.<sup>4-5</sup> Parenting styles and communication with children, particularly girls, can reinforce or alter inequitable gender norms, especially as adolescents transition to young adulthood. Few studies in low- and middle-income countries (LMICs) investigate parent-child interactions using a life-course lens. Using the Young Lives study (n=1,648)<sup>7-8</sup>, which follows girls between ages 8 to 19 years (2002-2013) across four contexts, we examined two aspects of positive parenting, parent-child communication and parent-child relationship quality in early adolescence in delaying marriage of girls. Parent child communication was measured through items related to talking to or supporting children on things that mattered to them and parent-child relationship quality was measured by reports of feeling loved, feeling proud of children and children reporting they were treated fairly.

## FOCUS OF RESEARCH

Multivariate association of positive parenting factors (measured at age 12 years) on marriage before 16 years, before 18 years and marriage by 19 years of age, adjusted for sociodemographic factors and other determinants such as menarche, rural residence and school dropout. Child and early marriage were assessed per global standards of marriage.

Graph 1. Child and Early Marriage Prevalence in the Young Lives study



Note: The remaining percent include girls who reported not married by age 19 years of age

## RESULTS

- Nearly 1 in 5 girls (18%) reported marrying prior to 18. Child marriage prevalence was high in both India and Ethiopia, with the latter reporting very early marriages (married<16). (See Graph 1)
- Findings showed that higher parent-child relationship quality at age 12 was protective against very early marriages (before age 16) and moderate quality of parent-child relationship was protective against child marriage (marriage before 18 years of age). Detailed tables can be found in the journal article.
- Results suggested that communication was protective against child and early marriage. However, after 18 years of age, the likelihood of marriage increased as it was legally permissible.
- School dropout and early menarche put girls at greater risk of child (<18 years) and very early (<16 years) marriages.



## SOME INSIGHTS FROM QUALITATIVE RESEARCH

Qualitative research conducted in the Young Lives study showed cultural and generational change, with reports of both pressure and resistance. This research shows that norms around early marriage interact with low value to girls' education and decisions on aspects of their lives.

*"When I ask my caregivers for clothing and school materials, they say, 'we don't have any money'. I buy my clothes by doing paid work. ... They just expect me to get married and earn them bride wealth. They don't care if I learn or not."*<sup>10</sup>

*"When the girl stays at the garment company and works, she is the one who decided when she would get married. If the girl stays at home not working then the parents make the decision about her marriage. They decide themselves when they want to get married because they are earning money."*<sup>11</sup>

### PARENT-CHILD COMMUNICATION INTERVENTIONS MAY INCREASE THE VOICES AND CHOICES OF GIRLS.

Our parents used to give us to somebody we do not know and collect their bride wealth ... they cover our face with a shawl and put us on the horseback to ride us to the groom's house ... it was like sending us into a prison... Now, if I marry off my daughter out of her interest, she will refuse and oblige me to pay back any bride wealth I take."<sup>10</sup>

Now, the girl and boy have to like each other and they have to talk to each other before marriage. They both go into the room and talk. They discuss whether they like each other or not. It was not like that when we were younger. Our parents told us to marry and we married. If they don't like or if we don't allow them to talk they will say that they don't like him and don't want to marry. They bluntly say that they do not like him. If we object, they say that it is they who have to live with him for the rest of their life so they want to talk to him before marrying. We have to marry them to the person they like."<sup>11</sup>

"Nowadays we cannot impose on our children what we want them to do. Instead they impose on us what they want".<sup>12</sup>



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## IMPLICATIONS AND CONCLUSION

- **Better parent-child** communication and relationship quality in early adolescence (10-14 years) was protective against child and early marriage of girls.
- **Interventions for child marriage** prevention need to focus on positive parenting at early ages to influence intra-familial decision-making on marriage and life choices for girls.
- **Qualitative studies** show inter-generational value differences in girls' agency and parent-child communication interventions may increase voice and choice of girls.<sup>10-13</sup>
- **Future studies** should better measure parenting styles,<sup>6</sup> positive parenting aspects, social norms around menarche and girls' agency.
- **Exploration of communication-focused** interventions that examine interactions between communities, families and girls themselves are also needed.

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**PI:** ANITA RAJ, PhD

Division of Infectious Diseases and Global Public Health  
University of California San Diego, Department of Medicine 9500  
Gilman Drive, MC 0507, La Jolla, CA 92093-0507

**Tel:** +1-858-246-3283 | **Fax:** +1-858-534-7566  
[geh@ucsd.edu](mailto:geh@ucsd.edu) | [@GEH\\_UCSD](https://www.ucsd.edu/geh/)

Communication for Development Section  
Programme Division — UNICEF New York  
[c4dhq@unicef.org](mailto:c4dhq@unicef.org) | [www.unicef.org/cbhc](http://www.unicef.org/cbhc)

Child Protection Section  
Programme Division — UNICEF New York  
[www.unicef.org/protection](http://www.unicef.org/protection)



Brief | December 2020

## THE ROLE OF SOCIAL NORMS IN EARLY MARRIAGE IN NIGER: A LOOK AT ADOLESCENT WIVES AND THEIR COMMUNITIES

This study used data from a sample of adolescent wives and their husbands in rural Niger to examine the relationship between early marriage, girls' role in deciding whom to marry, and community norms surrounding marital age and choice. The study found that village-level norms about a girl's choice in when and who to marry, particularly norms reported by male community members, were a key factor influencing age at marriage. Younger age at marriage for girls was linked to lower likelihood of being engaged in the decision to marry. These findings suggest that interventions focused on changing community norms related to both age at marriage and choice in marriage may be important in addressing child marriage.

## BACKGROUND

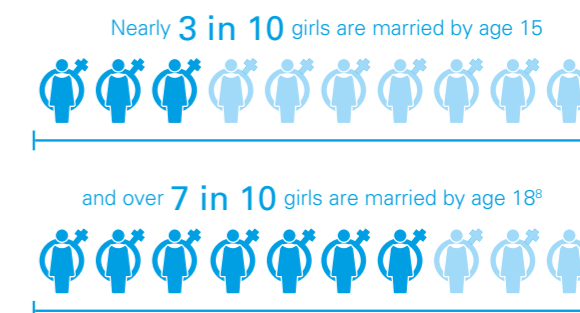
Girls who are married at a young age are more vulnerable to adverse outcomes, from lower educational attainment and fewer economic opportunities, to increased risk of unintended pregnancy and maternal mortality.<sup>1-3</sup> Researchers are beginning to examine how **social norms** – the informal rules in societies that dictate acceptable behavior<sup>4</sup> – may reinforce and contribute to the practice of child marriage.<sup>5,6</sup> This study provided a unique opportunity to quantitatively assess the relationship between community norms about whether and when girls should marry, and the link to girls' age of marriage and involvement in marital decision-making. Data were drawn from a sample of adolescent wives and their husbands (N=581) in the Dossa Region of Niger that were included in an evaluation of a family planning intervention.

Individual attitudes about *marital age* were captured by asking the participants their perceptions of the optimal age for girl's marriage. **Injunctive social norms** were captured for *marital age* by asking the wives and husbands what age people in the village believe is ideal for girls to get married and for *marital choice* by asking whether or not they agree with the statement, "people in my village expect that girls decide when and who to marry." **Descriptive social norms** were measured for *marital age* and *marital choice* using village-level aggregates of the wife's age at marriage, and wives' and husbands' responses to whether the wife was engaged in marital decision-making.

Regression analyses was adjusted for sociodemographic variables such as age, education, household wealth, food insecurity, women's work participation, as well as visits from community health workers.



Figure 1. Niger has the highest prevalence of girl child marriage in the world:<sup>7</sup>



## DEFINING SOCIAL NORMS:

- **Social Norms:** The informal rules, perceptions, or expectations in a community or society of what behaviours are typical (descriptive norms) and thought to be appropriate (injunctive norms).<sup>4</sup>
- **Injunctive Norms:** Individual's perceptions of what others in the community approve of.<sup>9,10</sup>
- **Descriptive Norms:** Individual's perceptions of prevalence of behaviors – this serves as an indication of what is generally acceptable in a community.<sup>10</sup>



## FINDINGS

- **Women in the study sample** were married young (at age 14 on average), and husbands were markedly older than their wives (by an average of nearly 9 years).
- **Adolescent girls married at older ages** in those villages where a larger proportion of girls reported being involved in the decision to marry (a descriptive social norm) and where a larger proportion of husbands believed that their communities were supportive of girls' involvement in marital choice (an injunctive social norm). Girls who married at younger ages were less likely to have been involved in marital decision-making.
- **Adolescent wives** were more likely to report that they had marital choice in communities in which more wives believed the community was supportive of older ages

at marriage and in which more husbands believed that the community supported girls' involvement in marital choice (injunctive social norms). Thus, norms related to both marital age and marital choice were associated with adolescent wives' engagement in marital choice.

- **Men's and women's social norms** had differential associations with marital age and marital choice, which may be reflective of men vs. women's differing roles in the community and assessed outcomes.
- **Far more women reported** that they were engaged in the decision to marry (82%) than men reported that their wife was engaged in the decision to marry (32%), suggesting divergent views on what it means to have marital choice in these communities.

## IMPLICATIONS AND RECOMMENDATIONS FOR PROGRAMMING

Age at marriage and involvement in marital decision-making (marital choice) are highly interrelated and influenced by community-level norms — both descriptive (what behaviors occur) and injunctive (what behaviors are perceived to be appropriate) —and gender-based norms.

- Interventions to address child marriage should assess community-level norms (both real and perceived) regarding marital age and choice. Efforts to shift norms must include consideration of potential backlash against those who fail to conform to social norms.
- Separately capturing norms reported by men vs. women is key to understanding the nuanced roles that men and women in the community play in early marriage decision-making.
- Future studies that examine marital choice should pay close attention to objectively measuring the construct of gender socialization, and include consideration of differential perspectives.

Men's perceptions of whether the community supported girls' marital choice was significantly associated with both girls' age at marriage and girls' involvement in the decision of who to marry.

- There is a role for engaging with men in interventions focused on shifting norms around early marriage. However, this must be done cautiously so as not to reinforce patriarchal practices of men's control over women's marital choice and age at marriage.



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**PI:** ANITA RAJ, PhD

Division of Infectious Diseases and Global Public Health  
University of California San Diego, Department of Medicine 9500  
Gilman Drive, MC 0507, La Jolla, CA 92093-0507

**Tel:** +1-858-246-3283 | **Fax:** +1-858-534-7566  
[geh@ucsd.edu](mailto:geh@ucsd.edu) | @GEH\_UCSD

Communication for Development Section  
Programme Division — UNICEF New York  
[c4dhq@unicef.org](mailto:c4dhq@unicef.org) | [www.unicef.org/cbsc](http://www.unicef.org/cbsc)

Child Protection Section  
Programme Division — UNICEF New York  
[www.unicef.org/protection](http://www.unicef.org/protection)

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Brief | December 2020

## DISTRICT-LEVEL VARIATION IN CHILD MARRIAGE IN INDIA: A GEOSPATIAL ANALYSIS

Neither child marriage, nor the social and normative factors that influence this practice, occur uniformly across India. This study seeks to understand this variation and to examine the prevalence of child marriage across India. The study finds that levels of child marriage in a given district were influenced not only by the characteristics of residents in that community, but by the characteristics of residents in neighbouring districts. This highlights the need for a broader understanding of the geographic factors that influence child marriage, which may be masked by more aggregate estimates. A better understanding of how social and normative factors differ according to location may improve participatory research strategies and allow for better targeting of social and behaviour change prevention efforts.

## BACKGROUND

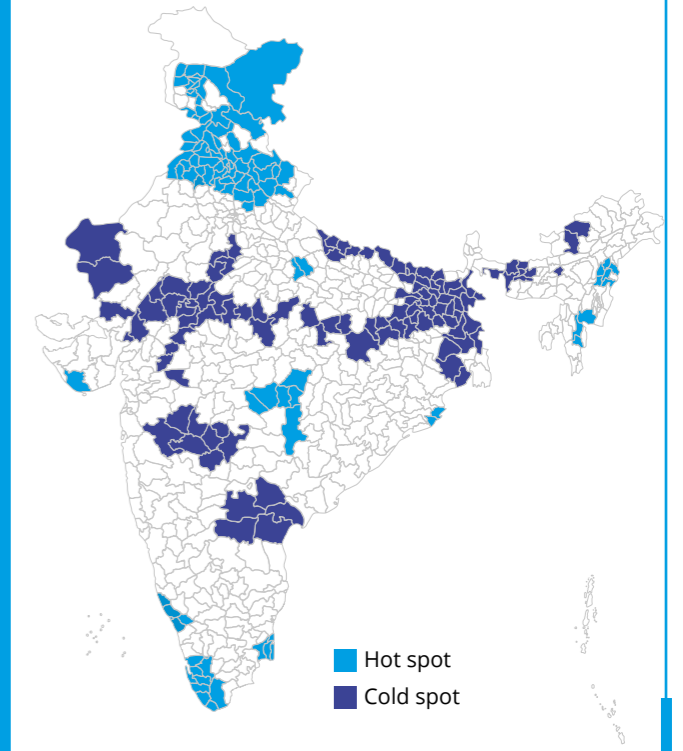
Despite global recognition that marriage before 18 years of age violates the health and human rights of girls, no region in the world is projected to meet the Sustainable Development Goal of eliminating child marriage by 2030.<sup>1,4</sup> In India, more than one in four girls are still married as children.

This study offers an analysis of child marriage in India, exploring sub-national variations in the prevalence of child marriage, including social and media connectivity that may influence child marriage norms. The objective is to assess geographic variations in child marriage across Indian districts, identify hot and cold spots, and quantify how the relationship between different geographic communities might influence factors associated with child marriage.

The geographic analysis focused on data collected through the 2015-16 National Family Health Survey<sup>5</sup> and 2011 India Census,<sup>6</sup> representing 636 districts in total. The analysis used a number of analytic tools often used in geography studies to assess differences across and between geographic areas.



Figure 1. Hot and cold spots of child marriage across Indian districts, 2015-16



## FINDINGS

This study found substantial district-level variations in levels of child marriage. The prevalence of child marriage varies significantly not only between states, but also between different districts within a state (see Figure 1).

- **Neighbouring communities matter.** Geographic factors such as density and area of a given district, as well as of its neighbouring districts, are important in explaining that given community's levels of child marriage.
- **Sociodemographic characteristics** including higher prevalence of marginalized groups<sup>(1)</sup> and increased female education were associated with lower levels of child marriage. These effects were even stronger when the prevalence of marginalized groups and/or female education levels were higher in neighbouring communities as well.
- **Districts with higher levels of newspaper** consumption among females and female mobile phone access also tended to have lower levels of child marriage;
- **Districts with neighbouring districts located nearer to state borders** tended to have higher levels of child marriage.

<sup>(1)</sup> Scheduled caste, scheduled tribe or other class; legally recognized marginalized groups.



# IMPLICATIONS AND RECOMMENDATIONS FOR PROGRAMMING

**Geography matters.** Drivers of child marriage vary significantly based on both local and neighbouring contexts.

- **Effective programming** should be adapted to local contexts based on a detailed understanding of those contexts, as well as buy-in and effective, coordinated local partnerships.
- **Multi-channel social** and behaviour change communications approaches will not be a universally effective approach and should be contextualized to locally relevant media modalities as well as literacy levels.

**Communities are dynamic,** and people constantly cross community borders, for work, school, to visit families, etc. Understanding how social and normative factors differ according to location and the movement of people may contribute to improved targeting of social and behaviour change efforts.

- **Child marriage programmes** that targeted communities in specific administrative boundaries should acknowledge that neighbouring district characteristics also affect the drivers of child marriage in the target area.
- **Interventions to reduce child marriage** through education, social protection, and health should consider regional interventions that cross neighbouring administrative areas, rather than narrowly targeted ones, to address social inequities in a broader geographic area.

**Traditional geographic** administrative boundaries may be inadequate, and even counter-productive, in identifying which communities and localities most influence social norms around child marriage in a given community. Using place-based, participatory strategies of understanding how people draw their own communities and borders is crucial.

In addition, beyond physical territory, the scope of social and communicational interactions and networks could influence on particular segments of population. For example, communities with commercial or family bonds

with communities far away or even abroad (remittances). Diaspora in developed states or countries could contribute as an influential reference for relatives in their villages.

- **Participatory community mapping** may serve as more effective means of identifying cultural and normative boundaries that influence child marriage.
- **Place-based interventions** that call on officials in neighbouring localities to work in concert offer promise. Participatory approaches that engage communities in identifying and drawing their own boundaries of their community and social networks may be more informative in defining programming areas.



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**PI: ANITA RAJ, PhD**

Division of Infectious Diseases and Global Public Health  
University of California San Diego, Department of Medicine 9500  
Gilman Drive, MC 0507, La Jolla, CA 92093-0507

Tel: +1-858-246-3283 | Fax: +1-858-534-7566  
[geh@ucsd.edu](mailto:geh@ucsd.edu) | @GEH\_UCSD

Communication for Development Section  
Programme Division — UNICEF New York  
[c4dhq@unicef.org](mailto:c4dhq@unicef.org) | [www.unicef.org/cbsc](http://www.unicef.org/cbsc)

Child Protection Section  
Programme Division — UNICEF New York  
[www.unicef.org/protection](http://www.unicef.org/protection)

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Original article

## Effects of Parent–Child Relationships on Child Marriage of Girls in Ethiopia, India, Peru, and Vietnam: Evidence From a Prospective Cohort

Nandita Bhan, Sc.D.<sup>a,\*</sup>, Leslie Gautsch, M.Ed.<sup>b</sup>, Lotus McDougal, Ph.D.<sup>a</sup>, Charlotte Lapsansky, Ph.D.<sup>c</sup>, Rafael Obregon, Ph.D.<sup>c</sup>, and Anita Raj, Ph.D.<sup>a</sup>

<sup>a</sup>Center on Gender Equity and Health, Department of Medicine, and Division of Social Sciences, University of California San Diego, La Jolla, California

<sup>b</sup>Department of Education Studies, University of California San Diego, La Jolla, California

<sup>c</sup>Communication for Development, Programme Division, UNICEF, New York, New York

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Keywords: Child marriage; Parent-child communication; Parental determinants; Adolescents

### ABSTRACT

**Purpose:** Parental influence over early marriage of girls is well-documented in qualitative research, but little quantitative work in this area has been conducted. This study assesses the effects of the parent–child relationship in early adolescence (aged 12 years) on early marriage of girls.

**Methods:** We analyzed survey data from a multicountry prospective cohort of girls (n = 1,648) followed over four rounds from age 8 to 19 years (2002–2013), as part of the Young Lives study in India, Ethiopia, Vietnam, and Peru. Multinomial logistic regression models assessed the effects of parent–child communication and parent–child relationship quality, as reported when girls were aged 12 years on child and early marriage (married <16 years, married 16–17 years, married 18–19 years, unmarried). Covariates were wealth, rural/urban residence, maternal education, parents' value of education, early menarche, and country.

**Results:** One in five girls (18.04%) reported marriage before 18 years of age, and 8.1% reported marrying before 16 years (8.3% and 13.7% in India and Ethiopia). Multinomial regression found that girls reporting good parent–child communication and high parent–child relationship quality at age 12 years were significantly less likely to marry before age 16 years (moderate relationship quality, adjusted relative risk ratio: .23, 95% confidence interval: .07–.72; high relationship quality, adjusted relative risk ratio: .34, 95% confidence interval: .11–.99).

**Conclusion:** Parent–child relationship quality and communication in early adolescence are protective against very early marriage of girls cross-nationally, although communication may facilitate marriage soon on completion of school. Primary prevention interventions targeting child marriage may benefit from components focused on improving the parent–child relationship.

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### IMPLICATIONS AND CONTRIBUTION

Evidence from a prospective cohort of girls aged age 8 and 19 years in Ethiopia, India, Peru, and Vietnam found that those with positive parent–child relationships at age 12 years were less likely to marry before age 18 years. Prevention of child marriage may benefit from efforts focused on improving the parent–child relationship.

**Conflicts of interest:** The authors have no conflicts of interest to disclose.

\* Address correspondence to: Nandita Bhan, Sc.D., Center on Gender Equity and Health, University of California San Diego, 9500 Gilman Drive, #0507, La Jolla 92093, CA.

E-mail address: [nabhan@ucsd.edu](mailto:nabhan@ucsd.edu) (N. Bhan).

Despite numerous initiatives to end child marriage, the practice remains a serious ongoing challenge, compromising the health and well-being of 650 million women and girls globally, and particularly in sub-Saharan Africa and South Asia [1]. Girls

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**ANNEXES:  
PUBLISHED ACADEMIC  
RESEARCH**

## ARTICLE IN PRESS

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residing in rural areas, from poorer backgrounds and who are less educated, are at greatest risk [2–5]. The social and health consequences for women married as minors as well as their children are well documented; these include maternal and infant morbidities, vulnerability to family violence, and impeded reproductive autonomy [3,6–9].

Present approaches for preventing child marriage include a mix of awareness and behavior-change programs at the community level (e.g., economic incentives to families to encourage completion of schooling and delay marriage for girls) [10–12], but the role of parents and the extended family as influencers of marital decision-making for girls has been neglected. Social psychology research has long documented the contribution of parental factors in child development and adolescent behavior and well-being [13,14]. Parents are usually part of the wider community as part of child marriage prevention programs, but within family interactions, both parental support and coercion, which may play an important part in enforcing or resisting social norms around marriage and gender equity, are less understood. Girls who receive greater parental support and who communicate more effectively with parents may be more empowered in decisions around higher education, choice of vocation, and marital choice; at the same time, gendered roles and expectations of parents may have intergenerational consequences. Parent–child communication, parental monitoring/engagement, parenting styles, and positive feedback from parents have been linked to better social and health functioning of the youth [13,14]. Parenting style, in particular, *authoritative* and *nurturing parenting*, can influence child and adolescent behavior [15–19]. Much of this work comes from high-income nations with recent studies, also indicating the role of parenting factors for mental health and development in low- and middle-income countries (LMICs) [20–22]. The effects of parenting interventions on child and early marriage in LMICs [22] have not been evaluated; intervention effects on child marriage may be different from other adolescent behaviors, as parents may have greater decision-making power with respect to the former.

Contextual and cultural factors are also likely to influence parents' decisions on higher education and early marriage of girls. Social norms around the readiness of a girl for marriage may be influenced by developmental markers such as menarche, fears that a better proposal may not be forthcoming subsequently, recognition of adolescent's sexual desires within cultures of repressive sexuality (particularly for extramarital sex), the idea of converting a girl from a liability to an asset, the lack of any other avenue for girls to pursue as adults in rural areas with limited employment opportunities [23]. These factors may interact with encouragement of higher education for girls and lead to school dropout. Existing studies on child marriage in LMICs rely on demographic and cross-sectional data [3] and cannot understand the role of parent–child factors, school retention, and other biological and socioeconomic determinants from a longitudinal life course lens. This has impeded our understanding of the role that parenting factors can play in early adolescence on the risks of earlier marriage in subsequent adolescence years for girls.

In this study, we analyzed data from a multicountry prospective cohort of girls, followed between ages 8–19 years, to examine the effects of two parenting factors, parent–child communication, and parent–child relationship quality on child

and early marriage of girls across four countries, Ethiopia, India, Vietnam, and Peru. These countries representing four regions of the world reflect areas that have either higher than global average levels of child marriage (Ethiopia and India) or where the rate of decline in child marriage is slower than the global average. To the best of our knowledge, this is the first analysis that uses a life course perspective following girls from childhood to adolescence, as they navigate issues around parenting, schooling, and marriage.

## Methods

### Data and sample

This study used data from four rounds of the Young Lives study, a multicountry prospective cohort study following nearly 12,000 children across Ethiopia, India, Peru, and Vietnam [24]. Young Lives began in 2002, with two cohorts of children; an *older* cohort aged 8 years and a *younger* cohort aged 1 year; follow-ups were conducted in 2006 (round 2), 2009 (round 3), and 2013 (round 4) [25]. In this study, we used data from girls in the *older* cohort across all four rounds (n = 1,648 girls), who were aged 19 years by round 4 in 2013 (India = 479, Ethiopia = 419, Vietnam = 461, and Peru = 289). Young Lives reported low attrition rates, an average of 8% between rounds 1 and 4 for the older cohort. We used deidentified, publicly available data for analysis from the UK Data Archive.

### Sampling strategy and procedures

The cohorts were sampled from households and children using adapted sentinel monitoring methods from 20 sentinel sites defined specifically for each country. Criteria for selection of sentinel sites varied and included considerations such as ranking of administrative units based on poverty, infrastructure such as road and school networks, and outcomes such as child nutrition and infant mortality. A semipurposive sampling approach was used across geographic clusters with random sampling for selecting children within clusters. In Vietnam, the 20 sentinel sites were located in four provinces, in India across three districts and a state capital, in Ethiopia in five districts, and in Peru across a mix of ecological and socioeconomic landscapes. As the aim of the Young Lives study has been to shed light on the drivers and impact of child poverty, poorer families were oversampled. Young Live study is a cohort follow-up that intends to observationally note changes over time and is not intended to be nationally representative. However, it does represent the share of different social groups in the data. Further details on methods have been published elsewhere [25].

Data were collected by trained enumerators in household settings, and instruments covered a range of thematic areas; separate surveys were conducted for children and caregivers (one of the parents) on different aspects of adolescent development and social conditions. Attrition was minimized by retaining the same data collectors over time to ensure continuity in the relationships between the study staff and communities. Ethical review of instruments and protocols were conducted at each partner site. For current analyses, the Institutional Review Board of the University of California San Diego reviewed the protocol and deemed it exempt.

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Table 1

Characteristics of the sample of adolescent girls (n = 1,648) participating in the Young Lives study

	Total sample (n = 1,648)	India (n = 479)	Ethiopia (n = 419)	Vietnam (n = 461)	Peru (n = 289)	p value for differences between countries
School dropout						
Stayed in school	1,388 (84.27)	352 (73.49)	396 (94.51)	369 (80.04)	271 (94.1)	<.001
Dropped out at 12 or 15 y of age	259 (15.73)	127 (26.51)	23 (5.49)	92 (19.96)	17 (5.9)	
Parent–child communication score <sup>a</sup>						
Low (0)	257 (18.32)	49 (10.32)	82 (19.57)	68 (15.08)	58 (100.0)	<.001
Moderate (1)	528 (37.63)	168 (35.37)	184 (43.91)	176 (39.02)		
High (2)	61 (44.05)	258 (54.32)	153 (36.52)	207 (45.9)		
Quality of parent–child relationship <sup>a</sup>						
Low (0)	27 (1.74)	9 (1.68)	13 (3.13)	6 (1.32)		<.001
Moderate (1)	285 (18.38)	136 (28.63)	95 (22.84)	54 (11.92)		
High (2)	1,239 (79.88)	331 (69.68)	308 (74.04)	393 (86.75)	207 (100.0)	
Menarche by age 12 y						
No	1,288 (78.54)	347 (72.9)	405 (97.36)	366 (79.57)	170 (59.03)	<.001
Yes	352 (21.46)	129 (27.1)	11 (2.64)	94 (20.43)	118 (40.97)	
Maternal education						
None	558 (34.17)	285 (60.0)	206 (50.12)	41 (8.93)	26 (9.03)	<.001
Primary	404 (24.74)	86 (18.11)	125 (30.41)	125 (27.23)	68 (23.61)	
Secondary or higher	671 (41.09)	104 (21.89)	80 (19.46)	293 (63.83)	194 (67.36)	
Wealth quartiles						
Q1	422 (25.1)	98 (20.46)	219 (52.39)	63 (12.65)	42 (14.69)	
Q2	424 (25.4)	118 (24.63)	119 (28.47)	115 (23.09)	72 (25.17)	<.001
Q3	415 (24.69)	139 (29.02)	61 (14.59)	165 (33.13)	50 (17.48)	
Q4	420 (24.99)	124 (25.89)	19 (4.55)	155 (31.12)	122 (42.66)	
Rural–urban						
Urban	588 (35.72)	114 (23.9)	178 (42.48)	81 (17.57)	215 (74.39)	<.001
Rural	1,058 (64.28)	363 (76.1)	241 (57.52)	380 (82.43)	74 (24.61)	
Parents' beliefs on value of education						
Not essential	177 (10.74)	70 (14.61)	39 (9.31)	53 (11.5)	15 (5.19)	<.001
Essential	1,471 (89.26)	409 (85.39)	380 (90.69)	408 (88.5)	274 (94.81)	
Living parent						
Both alive	1,479 (89.75)	425 (88.73)	329 (78.52)	450 (97.61)	275 (95.16)	<.001
One/both not alive	169 (10.25)	54 (11.27)	90 (21.48)	11 (2.39)	14 (4.84)	
Dependent variables						
Child marriage or married before 18 y						
Married after 18 y	1,340 (81.96)	361 (75.37)	359 (86.3)	391 (85.37)	229 (81.21)	<.001
Married before 18 y	295 (18.04)	118 (24.63)	57 (13.7)	67 (14.63)	53 (18.79)	
Age at marriage						
Not married	1,244 (76.09)	305 (63.67)	359 (86.3)	371 (81.0)	209 (74.11)	<.001
Married before 16 y	133 (8.13)	40 (8.35)	57 (13.7)	28 (6.11)	8 (2.84)	
Married 16–17 y	162 (9.91)	78 (16.28)		39 (8.52)	45 (15.96)	
Married 18–19 y	96 (5.87)	56 (11.69)		20 (4.37)	20 (7.09)	

<sup>a</sup> Higher scores indicate improved parent–child communication and relationship quality. For Peru, responses to questions were low and skewed.

### Measures

**Child or early marriage.** The study asked girls about their marital status in round 4 of the study (at 19 years of age), and this was classified as “not married,” “married,” “separated,” “divorced,” and “cohabiting.” In Peru, few girls were married, but a substantial proportion reported cohabiting. In addition, the study asked girls about their age/year of first marriage or cohabitation. We created two measures for Child or early marriage (CEM): (1) a *binary CEM variable* on whether or not the participant married or cohabited before 18 years of age, which is the legal age for marriage in all four countries and (2) a *categorical CEM variable*, with the following categories: “married/cohabited before 16 years of age,” “married/cohabited at 16–17 years of age,” “married/cohabited at 18–19 years,” and “not married or cohabiting.”

**Parent–child communication and relationship quality.** In round 2 of the study, when girls were 12 years of age, the study asked girls and caregivers (a parent) a range of questions (items) on the

parent–child relationship. For 91.3% of girls, mother was the main caregiver. Items assessed dimensions such as aspirations, intergenerational interactions, and challenges faced; items relevant to the conceptualization of communication and relationship quality between parents and children were identified by two authors, and frequencies were examined for variation in responses. We created two measures of the intergenerational relationship: parent–child communication and parent–child relationship quality, with considerations.

**Parent–child communication** comprised two questions asked of the children: whether children felt that their parents rarely talked to them about things that matter to them and whether parents never supported the children in the things they wanted to do. These individual questions, assessed on a 4-point Likert scale, were categorized into agree (0) versus disagree (1), where agree means “do not support,” and disagree means “yes, they support,” and a summation score for parent–child communication was created. Scores were 0 (low), 1 (moderate), and 2 (high), with higher scores show better parent–child communication.



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**Table 2**  
Prevalence differences and the bivariate association between parent–child relationship factors, socioeconomic determinants, and age at marriage among girls in the Young Lives study<sup>a</sup>

	Age at marriage				p value for differences by age at marriage
	Not married	Married <16 y	Married 16–17 y	Married 18–19 y	
Parent–child communication score					
Low (0)	485 (78.73)	38 (6.17)	58 (9.42)	35 (5.68)	.005
Moderate (1)	386 (73.52)	64 (12.19)	38 (7.24)	37 (7.05)	
High (2)	193 (75.98)	23 (9.06)	28 (11.02)	10 (3.94)	
Quality of parent–child relationship score					
Low (0)	13 (50.0)	7 (26.92)	4 (15.38)	2 (7.69)	.003
Moderate (1)	219 (76.84)	20 (7.02)	22 (7.72)	24 (8.42)	
High (2)	947 (76.99)	101 (8.21)	118 (9.59)	64 (5.2)	
School dropout					
Stayed in school	1,145 (83.09)	69 (5.01)	103 (7.47)	61 (4.43)	<.001
Dropped out by 12 or 15 y	99 (38.52)	64 (24.9)	59 (22.9)	35 (13.62)	
Menarche by age 12					
No	1,002 (78.4)	101 (7.9)	103 (8.06)	72 (5.63)	<.001
Yes	237 (67.7)	31 (8.86)	58 (16.57)	24 (6.86)	
Maternal education					
None	369 (66.61)	74 (13.36)	70 (12.64)	41 (7.4)	<.001
Primary	296 (73.63)	41 (10.2)	38 (9.45)	27 (6.72)	
Secondary or higher	567 (85.39)	17 (2.56)	52 (7.83)	28 (4.22)	
Wealth quartile					
Q1	292 (70.87)	60 (14.56)	37 (8.98)	23 (5.58)	<.001
Q2	290 (69.88)	48 (11.57)	53 (12.77)	24 (5.78)	
Q3	318 (78.33)	17 (4.19)	40 (9.85)	31 (7.64)	
Q4	341 (85.46)	8 (2.01)	32 (8.02)	18 (4.51)	
Rural–urban					
Urban	491 (84.36)	18 (3.09)	49 (8.42)	24 (4.12)	<.001
Rural	753 (71.65)	115 (10.94)	111 (10.56)	72 (6.85)	
Parents' beliefs on value of education					
Not essential	24 (70.45)	20 (11.36)	23 (13.07)	9 (5.11)	.1
Essential	1,120 (76.76)	113 (7.75)	139 (9.53)	87 (5.96)	
Living parent					
Both alive	1,120 (76.24)	112 (7.62)	148 (10.07)	89 (6.06)	.1
One/both not alive	124 (74.7)	21 (12.65)	14 (8.43)	7 (4.22)	
Country					
India	305 (63.67)	40 (8.35)	78 (16.28)	56 (11.69)	<.001
Ethiopia	359 (86.3)	57 (13.7)	0	0	
Vietnam	371 (81.0)	28 (6.11)	39 (8.52)	20 (4.37)	
Peru	209 (74.11)	8 (2.84)	45 (15.96)	20 (7.09)	

<sup>a</sup> Of the 1,388 girls who stayed in school, 142 (10.2%) joined at age 12 y; of the 86 girls who dropped out of 12 y, 12 (13.9%) stayed out of school throughout.

Parent–child relationship quality was assessed using three questions from the survey: children's reports that they always felt loved by parents, children's reports that most of the time parents treated them fairly when they did something wrong, and caregiver's reports that they felt proud of their children. These individual questions, assessed on a 4-point Likert scale, were categorized into disagree (0) versus agree (1) and were summed to create a parent–child relationship quality score. Recategorization of this score due to small numbers led to a final parent–child relationship quality score range of 0–2 (0–1 were merged as numbers too few in 0). Hence, scores were 0 (0–1, low), 1 (2, moderate), and 2 (3, high). We used the term parent–child, but in cases where the parent was not present for any reason, this variable is based on the primary caregiver(s).

**Covariates.** We included a range of contextual, parental, and individual factors as covariates that influence child marriage in the models. These included country, wealth quartiles, rural/urban residence, maternal education (none, primary, secondary or higher), whether parents are alive, early menarche (by age

12 years), and school retention (dropped out or not in school at round 2 or 3 vs. completed secondary school). Early menarche was included as a developmental factor, which is being associated in LMICs [26–28] and from high-income countries [28] with sexual initiation and sexual and reproductive health outcomes; it is also associated by itself and interacting with education and birth order with earlier marriage of girls. In the Young Lives study, girls were asked at age 12 years if they had started menstruating, and we created a measure for early menarche categorized as attained menarche by age 12 years (no vs. yes).

Additionally, parental beliefs on value of education norm was assessed using an item where caregivers were asked in round 2 of the survey if they considered formal education as (1) essential, (2) useful but not essential, or (3) not useful to their lives; we categorized the response as essential or not essential. We also considered school type and youth/peer group membership for inclusion in the regression models; however, these could not be included in the analyses, as data on school type lacked within-country variation (98.2% of girls in Ethiopia attended private school, and 99.8% of girls in Vietnam attended government school). Although youth peer-group membership may increase

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**Table 3**  
Regression results from multinomial models (relative risk ratio and 95% confidence interval) reporting the association between parent–child relationship factors, socioeconomic determinants, and age at marriage among girls in the Young Lives study sample (R2: .2292)

	Age at marriage (compared with unmarried girls)		
	Married before 16 y	Married 16–17 y	Married 18–19 y
Parent–child communication			
Low (0)	1.00	1.00	1.00
Moderate (1)	1.02 (.57, 1.85)	.83 (.42, 1.65)	4.14 <sup>a</sup> (1.20, 14.20)
High (2)	.67 (.36, 1.26)	.98 (.51, 1.90)	2.73 (.79, 9.42)
Quality of parent–child relationship			
Low (0)	1.00	1.0	1.00
Moderate (1)	.23 <sup>a</sup> (.07, .72)	.25 (.06, 1.08)	.51 (.08, 2.91)
High (2)	.34 <sup>a</sup> (.11, .99)	.32 (.08, 1.31)	.36 (.07, 2.02)
School dropout			
Stayed in school	1.00	1.00	1.00
Dropped out by age 12 or 15 y	11.76 <sup>a</sup> (6.97, 19.8)	4.91 <sup>a</sup> (3.07, 7.86)	4.86 <sup>a</sup> (2.79, 8.46)
Menarche by age 12 y			
No	1.00	1.00	1.00
Yes	3.03 <sup>a</sup> (1.67, 5.49)	2.1 <sup>a</sup> (1.29, 3.43)	1.07 (.57, 1.99)
Maternal education			
None	1.00	1.00	1.00
Primary	1.29 (.76, 2.18)	.80 (.43, 1.48)	1.67 (.86, 3.24)
Secondary or higher	.49 (.23, 1.07)	.53 (.27, 1.03)	.74 (.33, 1.62)
Wealth quartiles			
Q1	1.00	1.00	1.00
Q2	1.25 (.73, 2.16)	1.21 (.66, 2.21)	.73 (.36, 1.5)
Q3	.51 (.24, 1.07)	.79 (.42, 1.50)	.73 (.36, 1.46)
Q4	.52 (.19, 1.45)	.55 (.24, 1.28)	.32 <sup>a</sup> (.12, .89)
Rural–urban			
Urban	1.00	1.00	1.00
Rural	3.008 <sup>a</sup> (1.44, 6.27)	1.19 (.58, 2.42)	.92 (.39, 2.13)
Parents' beliefs on value of education			
Not essential	1.00	1.00	1.00
Essential	.80 (.43, 1.48)	.86 (.47, 1.55)	2.1 (.86, 4.97)
Living parent			
Both alive	1.00	1.00	1.00
One/both not alive	1.42 (.77, 2.62)	1.37 (.66, 2.84)	.71 (.27, 1.86)

<sup>a</sup> Adjusted for country. Please note for the outcomes, marriage between 16–17 y and 18–19 y, no girls in Ethiopia reported yes. As a result, Ethiopia drops out in the model for the outcomes marriage 16–17 y and marriage 18–19 y. Reference: girls who were not married by age 19 years of age.

social support and agency of girls, these data were unavailable for Peru.

**Data analysis**

We analyzed data from girls who participated in all four rounds of the Young Lives study. Prevalence of CEM using a polytomous variable (married <16 years, 16–17 years, 18–19 years, unmarried) and a dichotomous variable (marriage <18 years, unmarried, or married >18 years) were estimated for the overall Young Lives study sample and stratified by country. We examined bivariate associations of the two outcomes with our independent variables of interest as well as covariates, using chi-squared tests (with p values); covariates associated with our outcomes were included in multivariable regression models, with assessed parent–child relationship factors reported at age 12 years by parents/caregivers and youth with child marriage outcomes. Multinomial regression was conducted with the polytomous outcome, and logistic regression was conducted with the dichotomous CEM outcome. Logistic models were then replicated for each country to explore country-specific findings. All analyses were conducted on STATA 15 (StataCorp LLC, Cary, NC). In addition to quantitative data, we examined published qualitative studies and reports [29–32] conducted on the Young Lives

cohorts for quotes and data that explained mechanistic findings from the quantitative study or reflecting cross-contextual differences. These were synthesized and presented in Appendix Table 1.

**Results***Descriptive findings*

Pooled data from all countries resulted in a sample of girls where 18.0% had married as a minor, and 15.7% had dropped out of school by age 15 years or had never attended school. One third of girls (34.2%) had a mother with no education, and 10.7% of parents of these adolescent girls indicated they did not view education as being essential in life. Ten percent of girls (10.3%) had lost at least one parent (Table 1). There was significant variation across nations across all variables, including age at marriage, with very young marriages (<16 years) ranging from 2.4% in Peru to 13.7% in Ethiopia, and remaining unmarried at age 19 years ranging from 63.67% in India to 86.4% in Ethiopia (Table 1). Cross-contextual differences were also seen in socioeconomic covariates, including maternal education, menarche, and minor differences were noted for parental beliefs on the value of education.

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**Table 4**  
Prevalence differences and bivariate association between parent–child relationship factors, socioeconomic determinants, and child marriage (i.e. marriage before 18 y of age) in the pooled Young Lives study

	Married >18 y/not married	Married <18 y	p value
Parent–child communication score			
Low (0)	203 (17.71)	51 (20.48)	.1
Moderate (1)	423 (36.91)	102 (40.96)	
High (2)	520 (45.38)	96 (38.55)	
Quality of parent–child relationship			
Low (0)	15 (1.18)	11 (4.04)	.002
Moderate (1)	243 (19.15)	42 (15.44)	
High (2)	1,011 (79.67)	219 (80.51)	
School dropout			
Stayed in school	1,206 (90.0)	172 (58.31)	<.001
Dropped out by 12 or 15 y	134 (10.0)	123 (41.69)	
Menarche by age 12 y			
No	1,074 (80.45)	204 (69.62)	<.001
Yes	261 (19.55)	89 (30.38)	
Maternal education			
None	410 (30.87)	144 (49.32)	<.001
Primary	323 (24.32)	79 (27.05)	
Secondary or higher	595 (44.8)	69 (23.63)	
Wealth quartiles			
Q1	315 (76.46)	97 (23.54)	<.001
Q2	314 (75.66)	101 (24.34)	
Q3	349 (85.96)	57 (14.04)	
Q4	359 (89.97)	40 (10.03)	
Rural–urban			
Urban	515 (38.43)	67 (22.87)	
Rural	825 (61.57)	226 (77.13)	
Parents' beliefs on value of education			
Not essential	133 (9.93)	43 (14.58)	.02
Essential	1,207 (90.07)	252 (85.42)	
Living parent			
Both alive	1,209 (90.22)	260 (88.14)	.2
One/both not alive	131 (9.78)	35 (11.86)	
Country			
India	361 (26.94)	118 (40.0)	<.001
Ethiopia	359 (26.79)	57 (19.32)	
Vietnam	361 (29.18)	67 (22.71)	
Peru	229 (17.09)	53 (17.97)	

## Effects of parent–child relationship in early adolescence on CEM

Bivariate associations indicated that higher scores on parent–child communication ( $p < .005$ ) and quality of the parent–child relationship ( $p < .003$ ) in early adolescence (age 12 years) corresponded with age at marriage (Table 2). Adjusted multinomial findings for pooled data indicated that moderate parent–child communication was associated with greater odds of marriage at 18–19 years, relative to girls who reported a low communication score (adjusted relative risk ratio [ARRR]: 4.14, 95% confidence interval [CI]: 1.20–14.20), suggesting an effect on delaying marriage (Table 3). Parent–child communication was found to be protective against child marriage but increased likelihood after it was legally permissible. Higher parent–child relationship quality was protective against very early marriage, that is, <16 years (moderate relationship quality ARRR: .23, 95% CI: .07–.72; high relationship quality ARRR: .34, 95% CI: .11–.99). Dropping out of school and early menarche were associated with marriage before 18 years and marriage before 16 years; rural residence was also associated with marriage before 16 years.

Additional analyses were conducted with the child marriage outcome dichotomized as married at <18 years versus not married at <18 years (inclusive of unmarried girls) for the pooled sample and country-specific samples. Bivariate associations for the pooled sample found quality of parent–child relationship significantly associated with the dichotomized outcome ( $p = .002$ ; Table 4). Pooled adjusted logistic regression analysis showed similar effects, with moderate quality of parent–child relationship in early adolescence associated with lower odds of child marriage (adjusted odds ratio: .26, 95% CI: .10–.70; Table 5). These significant effects were seen in pooled models and in country-stratified models for Vietnam, but not other countries, possibly due to small cell sizes. In both pooled and most country-level analyses, strong trends were seen for the protective value of education and maternal education on child and early marriage and the risk of rural residence and early menarche. Cross-country differences in the association between menarche and maternal education with marriage before 18 years were also noted (Table 5). Menarche was associated with increased risk of marriage before 18 years in the pooled (odds ratio [OR] = 2.43 [95% CI: 1.6–3.66]) as well as in India (OR = 2.27 [95% CI: 1.33–3.88]) and Vietnam (OR = 2.35 [95% CI: 1.03–5.35]) samples; in Ethiopia, risks were even greater (OR = 5.85 [95% CI: 1.29–26.4]). Mother's secondary or higher education was protective against marriage before 18 years in the pooled sample (OR = .56 [95% CI: .34–.95]), India (OR = .39 [95% CI: .15–.98]), and Vietnam (OR = .28 [95% CI: .09–.79]).

Given the importance of the education variable and the availability of school dropout data at 12 and 15 years, we additionally conducted all analyses with a staggered education variable (drop out by 12 years and drop out by 15 years). No difference in findings related to parent–child relationship or any covariates were observed. School retention, compared with dropout at each time point in the staggered model, was always protective. Given the lack of difference in hypothesized findings, we retained only the dichotomized education variable, retention versus dropout by 12 or 15 years in our final models.

## Discussion

Evidence from multicountry follow-ups of girls from childhood to late adolescence shows the importance and complexity of parent–child factors—communication (indicated by talking about things that matter to the girl and supporting the girl) and relationship quality (indicated by parents feeling proud of their daughter, girl feels she is treated fairly, and girl feels loved)—in influencing child and early marriage of girls. We found evidence that higher parent–child relationship quality as characterized by perceived love, fairness, and pride in the child was particularly important as a deterrent for marriage before age 16 years, suggesting that relationship quality is a protective factor against very young marriages. In analyses disaggregated by age at marriage, higher parent–child communication had no effect on marriage before 18 years (child marriage) but was associated with an increased likelihood of earlier marriage (age 18–19 years) relative to the girl staying unmarried at 19 years. These findings highlight nuance in parent–child relationships that need further exploration through both quantitative and qualitative studies. For instance, a recent qualitative research shows that girls who speak to parents about their preferences are more likely to delay marriage [23],

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**Table 5**  
Regression results (odds ratio and 95% confidence intervals) reporting the association between parent–child relationship factors at age 12 y and child marriage for the pooled and country-stratified samples in the Young Lives study

	Total sample <sup>a</sup> (n = 1,338)	India (n = 463)	Ethiopia (n = 401)	Vietnam (n = 441)	Peru (n = 279)
Parent–child communication score					
Low (0)	1.00	1.00	1.00	1.00	
Moderate (1)	.85 (.53, 1.36)	.97 (.43, 2.19)	.72 (.31, 1.66)	.59 (.23, 1.54)	
High (2)	.79 (.49, 1.27)	.84 (.37, 1.86)	.81 (.35, 1.9)	.61 (.23, 1.56)	
Quality of parent–child relationship score					
Low (0)	1.00	1.00	1.00	1.00	
Moderate (1)	.26 <sup>b</sup> (.10, .70)	.4 (.07, 2.21)	.36 (.07, 1.76)	.08 <sup>b</sup> (.008, .87)	
High (2)	.40 (.16, 1.003)	.67 (.12, 3.53)	.48 (.11, 2.09)	.12 (.01, 1.04)	
School dropout					
Stayed in school	1.00	1.00	1.00	1.00	1.00
Dropped out by 12 or 15 y	5.67 <sup>b</sup> (3.96, 8.1)	5.24 <sup>b</sup> (3.14, 8.74)	6.39 <sup>b</sup> (2.37, 17.2)	6.07 <sup>b</sup> (3.1, 11.88)	2.13 (.68, 6.71)
Menarche by age 12 y					
No	1.00	1.00	1.00	1.00	1.00
Yes	2.43 <sup>b</sup> (1.6, 3.66)	2.27 <sup>b</sup> (1.33, 3.88)	5.85 <sup>b</sup> (1.29, 26.4)	2.35 <sup>b</sup> (1.03, 5.35)	2.62 (1.27, 5.4)
Maternal education					
None	1.00	1.00	1.00	1.00	1.00
Primary	1.01 (.67, 1.53)	.94 (.48, 1.82)	2.24 <sup>b</sup> (1.14, 4.39)	.25 <sup>b</sup> (.09, .7)	1.29 (.39, 4.25)
Secondary or higher	.56 <sup>b</sup> (.34, .95)	.39 <sup>b</sup> (.15, .98)	.81 (.21, 3.09)	.28 <sup>b</sup> (.09, .79)	1.13 (.34, 3.75)
Wealth quartiles					
Q1	1.00	1.00	1.00	1.00	1.00
Q2	1.22 (.8, 1.86)	1.61 (.83, 3.14)	1.46 (.65, 3.28)	.73 (.29, 1.83)	1.26 (.47, 3.38)
Q3	.68 (.42, 1.13)	1.2 (.6, 2.38)	1.12 (.21, 5.73)	.23 <sup>b</sup> (.08, .65)	.58 (.16, 2.02)
Q4	.66 (.34, 1.27)	.52 (.18, 1.49)	1.65 (.14, 19.07)	.37 (.11, 1.25)	.37 (.11, 1.26)
Rural–urban					
Urban	1.00	1.00	1.00	1.00	1.00
Rural	2.07 <sup>b</sup> (1.24, 3.43)	.92 (.38, 2.24)	5.75 <sup>b</sup> (1.88, 17.5)	3.24 (.83, 12.6)	.9 (.36, 2.21)
Parents' beliefs on value of education					
Not essential	1.00	1.00	1.00	1.00	1.00
Essential	.78 (.49, 1.2)	.87 (.45, 1.68)	.84 (.28, 2.51)	.8 (.31, 2.04)	.77 (.18, 3.3)
Living parent					
Both alive	1.00	1.00	1.00	1.00	1.00
One/both not alive	1.37 (.84, 2.24)	1.24 (.59, 2.59)	1.69 (.77, 3.67)	2.61 (.38, 17.6)	1.97 (.52, 7.43)
R2 value	.1767	.1965	.1368	.2601	.0630

In Peru, high number of missing for parent–child communication items. For parent–child relationship quality, 94.12% agreed that they feel loved by the parent, 77.16% reported that parents punished them fairly, and 98.27% of caregivers agreed that they feel proud of their children.

<sup>a</sup> Pooled model adjusts for country.

<sup>b</sup> Statistically significant at 0.05 level of significance.

whereas girls who are in household characterized by less invested or even abusive parents are more likely to pursue opportunities of early marriage [3,23]. Young Lives qualitative data also show that parental support can empower girls to express their agency, but pressure from family or the community may lead to girls agreeing to an earlier marriage despite initial reluctance or dissent. It is possible that higher parent–child communication creates an environment in which parents maintain greater investment in keeping the child home longer and where a parent may be more responsive to a child asking to delay a marriage until school completion. This may explain the delayed marriage effect until the girl is aged 18 years, but a greater likelihood of marriage due to community or social pressures or the burden of material circumstances [33,34]. Cross-contextual differences in key dimensions that likely add to the pressure to marry early for girls were also noted such as school dropout, age at menarche, and mother's education, but small country sample sizes do not allow us to test the interactions of these factors. Qualitative data in Appendix Table 1 also highlight that external factors such as exposure to media, schooling, and social networks may be transforming intergenerational

relationships in these countries; data were limited for Peru in this regard.

These findings reinforce calls for more parent-focused interventions to support positive and nurturing parenting [20]. A deeper understanding of parental and household determinants from a gender lens, including support, neglect, and even violence, is needed to understand the changing relationship between parents and girls during adolescence. Improving measurement of parent–child interactions is also needed along with a need to investigate the role of adolescent and parental influencers outside the home. Non-nurturing styles in which there were lower levels of parent–child communication and lower quality of parent–child relationship may impede the agency and self-efficacy of girls, leading to an atmosphere of restricted autonomy and significantly earlier marriage. Culturally specific considerations in nurturing parenting style and gendered effects also need to be studied [35]. For instance, in this study, caregiver beliefs around the value of education need to interpret with consideration that 91.3% of caregiver responders were mothers, and her educational background, socioeconomic status, and gendered role expectations are likely to influence these beliefs. Qualitative data from the Young Lives fieldwork show mixed



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evidence of support and intergenerational conflict in mother–daughter interactions. In Ethiopia, for instance, “obedience” of the younger generation to the authority of the older generations has been changing with greater exposure to education, leading to greater negotiation [29]. Unfortunately, small cell sizes preclude sufficient understanding of these issues from country-specific analyses. Emerging studies such as the Global Early Adolescent Study may be able to shed light on these relationships; however, measurement of parenting factors needs strengthening in particular.

As seen in prior research and more consistently seen in our country-specific as well as pooled findings, sociodemographics, in particular, staying in school, was a key protective factor for child and early marriage of girls [3,11]. Our findings were consistent in terms of the risk from school dropout, regardless of whether dropout occurs by age 12 or 15 years. These findings reinforce that completion of secondary school education is an important deterrent to child and early marriage [11,12]. Reasons for school dropout have varied in the Young Lives sample including family socioeconomic condition, school-level factors including schooling quality, child performance, and wider gender norms around domestic work and marriage [5]. Exploratory analyses showed sharper inequalities in school dropout of girls by maternal education and household wealth. The current paradigm for interventions for girls focuses on keeping girls in school and addressing communities and parents more broadly at the point of marriage, but it is also critical to work with families before the time of marital decision to promote and encourage communicative and supportive parent–child relationships [23]. Earlier menarche was another determinant of child marriage in pooled and country-stratified models, predicting very young marriages, a finding consistent with other studies [26,28]. Communication efforts to shift norms and expectations of adulthood based on school completion or pubertal indicators are required; there is a need to emphasize menarche in communication efforts as a developmental indicator and not a marker for girls’ readiness for marriage or childbearing [26]. Changing traditional norms in communities, particularly in rural areas, is needed; these efforts have shown mixed results for family planning and maternal health, but a greater focus is needed for child marriage prevention efforts beyond increasing awareness of the legal age at marriage or change behavior through inducements [34,36,37].

Findings in the study need to be considered in light of three limitations. First, Young Lives is a unique dataset that allows assessment of the global picture of adolescent development across four contexts along with cross-country insights. Although the cross-national diversity of the sample is an advantage, small country samples, especially for Peru, were a challenge in stratified analyses, and the diversity posed a challenge for interpreting findings, despite common protocols. Second, in the study, we constructed measures for parent–child communication and relationship quality based on items available. These measures were based on available data and are by no means exhaustive, and they provide a useful start to understanding issues around parenting that affect early marriage. Deeper insights are needed through mixed-methods studies to develop stronger measures for parental factors. It is possible that girls’ knowledge that their caregivers or parents are being interviewed may lead to socially desirable responses; however, ethical protocols and the nature of nonsensitive questions analyzed in this study preclude the

possibility of the effects of social desirability bias on the findings in a significant way. Finally, although Young Lives data have been compared with national surveys for generalizability, cohorts are not expected to be nationally representative and aim to observationally capture social and behavioral relationships. The sample from India is unlikely to capture the heterogeneity across states, and rates of marriage in Ethiopia seem lower than the published DHS estimates, where 25.9% were married by age 15 years, and 58.3% were married by age 18 years, compared with 13% in this sample.

Parent–child relationship quality and communication in early adolescence were protective against very early marriage of girls cross-nationally, although communication may facilitate marriage soon on completion of school. This is one of the first longitudinal studies to examine issues affecting child and early marriage of girls from a life course lens, providing evidence that efforts to improve parental engagement and communication in early adolescence can be beneficial in child marriage prevention by changing gender norms at home. Targeting of most vulnerable girls and their parents, including those who drop out of school and those who experience menarche earlier, would also be valuable.

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#### Supplementary Data

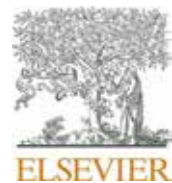
Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jadohealth.2019.05.002>.

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## Associations between village-level norms on marital age and marital choice outcomes among adolescent wives in rural Niger

Holly Baker Shakya<sup>a,\*</sup>, Jay Silverman<sup>a</sup>, Kathryn M. Barker<sup>a</sup>, Charlotte Lapsansky<sup>b</sup>, Jennifer Yore<sup>a</sup>, Sani Aliou<sup>c</sup>, Mohamad I. Brooks<sup>d</sup>, Anita Raj<sup>a</sup>

<sup>a</sup> Center on Gender Equity and Health, University of California San Diego, USA

<sup>b</sup> UNICEF, USA

<sup>c</sup> Pathfinder International, NIGER

<sup>d</sup> Pathfinder USA, USA

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### ABSTRACT

Social norms, the often unspoken rules that dictate behavior, are increasingly understood to play a role in child, early and forced marriage (CEFM) practices, but are less frequently examined in quantitative research on CEFM. No research on this topic has focused on Niger, despite the country having the highest prevalence of child marriage in the world. This study examines the associations of community and individual-level norms on marital age and marital choice with the outcomes of girls' age at marriage and choice in marriage. We used data from a family planning evaluation trial conducted in three districts within the Dosso region of Niger. Survey data were collected from adolescent wives and their husbands (N = 582) on demographics, normative beliefs regarding girls' age at marriage and marital choice, and among wives, age at marriage and engagement in marital choice. We developed our community-level norm variables by using the aggregate data from husbands' and wives' norms and wives' CEFM experiences. Using crude and adjusted regression models, we assessed the associations between our norms variables and our CEFM outcomes. In this context of very high prevalence of CEFM, we found that village-level norms related to marital choice, particularly the norms of men, are associated with younger age of girls at marriage. We also found that younger age of girls at marriage is positively associated with lower likelihood of their engagement in marital choice. Further, we find that village-level norms related to a later age of marriage and support for marital choice, as well as adolescent wives' perceptions of community norms related to a higher age of marriage, are associated with higher odds of a wife having had marital choice. These findings suggest the value of community level social norms change on CEFM in Niger, and the importance of focusing on child marriage and girls' marital choice simultaneously given their interconnection.

### Introduction

Child, early and forced marriage (CEFM) is an internationally-recognized human rights violation that disproportionately affects women and girls globally (UNICEF-UNFPA, May 2019; United Nations High Commissioner on Human Rights, 2019). Child marriage is defined as any marriage where at least one of the parties is under 18 years of age (African Commission on Human and Peoples' Rights, 2017; Fenn, Edmeades, Lantos, Onovo, 2015), and is considered to be a form of forced marriage, given that children are not able to express full, free and informed consent (African Commission on Human and Peoples', 2017; Fenn et al., 2015;

United Nations High Commissioner on Human Rights, 2019). The practice of CEFM has been associated with a host of poor social and health outcomes including lower educational attainment, fewer economic opportunities, unintended and adolescent pregnancy, and increased risk of maternal and infant morbidity and mortality (Nour, 2009; Anita; Raj, 2010; K. G.; Santhya, 2011). Given the health and social risks associated with this practice, the elimination of child marriage by 2030 has been included among the internationally-recognized Sustainable Development Goals, which were adopted by more than 190 countries in 2015 (United Nations, 2016). In order to meet this goal, a clearer understanding of the mechanisms through which child marriage occurs is required. Social norms reinforcing CEFM have been

hypothesized as underlying these practices and are thus a potential lever for change (Bicchieri et al., 2014; Fenn et al., 2015; Heise et al., 2019; Shakya et al., 2018; Steinhaus et al., 2019; Taylor et al., 2019; UNICEF-UNFPA, May 2019). Although initial research examining the associations between norms and practices of CEFM suggests significant associations, this research is still nascent and has been conducted in a limited number of countries. (B. Cislighi et al., 2019; Holly B Shakya et al., 2018). We know of no research that has focused on this issue in Niger, which has the highest rate of girl child marriage in the world (Keeley & Little, 2017). While rates of early marriage have decreased in countries around the world over the past few decades (Jackson, 2012), the rate of early marriage has changed very little in Niger (Fenn et al., 2015).

Niger is one of a small number of nations in which child marriage continues to be legal for girls. Niger civil code forbids marriage below age 18 for boys, but only below age 15 for girls (UNFPA WCARO, 2017). Public perception also reflects this bias. A recent survey conducted in Zinder, one of the most populous regions in Niger, found that 80% of adults agreed boys should be married at 18 years or older, as compared to only 31% of adults agreeing girls should be married at age 18 or older (Regional Institute of Statistics, 2016). Half of adults felt girls should be married between the ages of 15 and 17 years, and 19% felt girls should be married between the ages of 10 and 14 years (Regional Institute of Statistics, 2016). By the age of 15, 28% of Nigerian girls are married, and by age 18, 76% are married (Institut National de la Statistique (INS) and ICF International, 2013). Prevalence of the practice varies throughout the country, with the median age at marriage ranging from 15.6 years in rural areas to 19.5 years in the capital city of Niamey (Institut National de la Statistique (INS) and ICF International, 2013).

Previous work suggests myriad and intersecting determinants of child marriage (Bicchieri et al., 2014; Fenn et al., 2015; Islam et al., 2016; UNICEF-UNFPA, May 2019). For example, studies from Africa and South Asia point to: traditions and gender-discriminatory norms rooted in patriarchal values and ideologies; the lack of educational and economic alternatives to child marriage; as well as exacerbating social factors such as poverty, economic instability, conflict and humanitarian crisis (Ministry of Population, 2016; Regional Institute of Statistics, 2016; Svanemyr et al., 2015; UNFPA & UNICEF, 2018). Research from India suggests that girls who marry young are less likely to have a say in the choice of who they marry (Santhya et al., 2010), and that in areas with lower gender equality, the age of marriage is more likely to be lower (Desai & Andrist, 2010). The association between gender norms and early marriage is complex, however, as the age of marriage can increase in response to other factors, while unequal gender norms may remain relatively stable (Desai & Andrist, 2010; Jackson, 2012). The United Nations High Commissioner for Human Rights as well as the UNICEF-UNFPA Joint Programme to Accelerate Action to End Child Marriage has provided a number of recommendations aimed at addressing CEFM. These range from system-level legislative and legal accountability measures, to increased engagement with community leaders and heads of household, to socio-cultural shifts in the norms that support child marriage and gender inequality (UNICEF, 2018; United Nations High Commissioner for Human Rights, 2017).

Social norms are the informal sets of rules derived from social systems that prescribe what behavior is expected, allowed, or sanctioned in particular circumstances (Mackie et al., 2014). Norms are hypothesized to shape behavior through both descriptive and injunctive norms (Bicchieri & Mercier, 2014, pp. 37–54; Cialdini et al., 1991; Fishbein & Ajzen, 1975; Mackie et al., 2014). Descriptive norms refer to perceptions of regular behaviors performed within a community and serve as an indication of what behaviors or actions are acceptable or "normal" in a given situation (Cialdini et al., 1991). Descriptive norms are optimally measured by asking people within a community their perceptions of how prevalent a certain behavior or practice is (Mackie et al., 2015). However in the case of observable behaviors, aggregating the behavior at the level of a socially relevant group, like a community, can serve as a proxy.

For example, the degree to which a girl is involved in choosing whom she marries and the age at which she marries may indicate descriptive norms in a community surrounding marital choice and marital age, respectively. Injunctive norms, by contrast, are an individual's perceptions or beliefs of what others within the community approve or disapprove of, which in turn influence behaviors through pressures to conform (Cialdini et al., 1991; Fishbein & Ajzen, 2010). For example, in the context of child marriage in Niger, there may be an injunctive norm prescribing the age at which individuals in a community believe a girl ought to get married. This may be assessed by asking an individual the age at which most people in their community believe a woman should get married. Norms may conflict with personally-held attitudes. An individual may personally be opposed to child marriage, but engage in the practice within their own family out of a need to comply with social expectations or pressure.

The enforcement of social norms is hypothesized to occur through individually-perceived pressure to conform to the wishes of important others or referents (Cialdini et al., 1991; Fishbein & Ajzen, 2010). Just who these individuals are remains in question and varies with the behavioral situation (Ajzen & Fishbein, 1970). A key task when examining normative influence, then, is to identify the most valid grouping of referents. Ideally, in norms research, reference groups to assess descriptive norms would be identified through the use of discrete social network ties (Shakya et al., 2014, 2017), but in much health and development research, such data are lacking (Mackie et al., 2014). Instead, researchers looking for evidence of descriptive norms generate data with measures across more crude social units, in which social ties are inferred, such as residents of the same village or neighborhood (the concept behind DHS clusters) to determine whether there is inter-cluster variation. High levels of variation across these spatial units are viewed as evidence of variability in norms (Mackie et al., 2014).

In this study, we examine injunctive and descriptive social norms related to both early marriage and marital choice and whether these are associated with girls' age at marriage and involvement in marital choice in the context of rural Niger. We consider injunctive norms as self-reported individual perceptions of what the community believes regarding when girls should marry and whether they should be involved in the selection of their groom, as reported by married girls themselves, as well as their husbands. We consider descriptive norms based on the aggregate reports of behaviors at the village-level, to provide insight into whether village-level descriptive norms are associated with behavior even after accounting for individual-level injunctive perceived norms. Findings from this work offer important insights into how social norms affect harmful traditional practices such as CEFM and the level of norms upon which to intervene to most effectively address CEFM.

### Methods

#### Study setting

This study involves secondary analysis of data from an evaluation of a family planning intervention conducted between 2016 and 2018 with young married couples in 48 rural villages within the Dosso, Douthi, and Loga districts in the Dosso region of Niger. From each of the three districts, 16 villages were randomly selected based on the following inclusion criteria: 1) having at least 1000 permanent inhabitants; 2) primarily Hausa or Zarma-speaking (the two major languages of Niger); and 3) no known recent intervention specifically around family planning or female empowerment with married adolescent wives or their husbands. Data were collected at two separate time points: baseline (Wave 1) and post-intervention, or one year after the baseline assessment (Wave 2). Primary outcomes, age at marriage and choice of marriage, preceded both data collection points for all respondents. Given the present study is designed to examine normative influence on CEFM rather than intervention effectiveness, data from both intervention and control villages are included in analyses.

\* Corresponding author. UCSD Department of Medicine, Division of Global Public Health, 9500 Gilman Drive, #0507, La Jolla, CA, 92093-0507, USA.  
E-mail address: [hshakya@health.ucsd.edu](mailto:hshakya@health.ucsd.edu) (H.B. Shakya).

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## Participants

As part of the larger evaluation trial, willing and eligible couples were randomly selected (using a random number generator) from a list of all eligible married female adolescents provided by each village chief. Eligible participants were married girls aged 13–19 years and their husbands, fluent in Hausa or Zarma, and residing in the village where recruitment was taking place with no plans to move away in next 18 months or plans to travel for more than 6 months during that period. Of those randomly selected from the willing and eligible list, 88% participated in the Wave 1 survey (N = 1010). Equivalent numbers of couples were selected from each of the three districts. There were no significant differences in wife age, husband age, or time spent away from the village between those who did and did not participate. In Wave 2 2735 men of the original sample participated. With missing data on some measures, the analytic subsample is comprised of adolescent wife-husband dyads (N = 581) from whom there was data from both Wave 1 and Wave 2 surveys. While the outcome preceded the data collection, and therefore a longitudinal analysis was not possible, due to the nature of the data collection some variables were only available in either Wave 1 or Wave 2.

## Recruitment and data collection

Research assistants visited the randomly selected households and conducted a Household Recruitment Screener to confirm eligibility. If the household did not have an eligible couple, research staff recruited a randomly selected replacement in their place. Staff made up to three visits to each of the selected couples; if researchers could not reach the couple after three attempts, they dropped recruitment of the couple into the study. For couples reached for study, sex-matched trained research staff conducted surveys separately with the young women and their husbands.

Surveys were administered in a private location in the village, out of earshot of others and in a location the participant deemed private. Research staff conducted surveys in either the Hausa or Zarma language, depending on participant's language preference. The survey took approximately 40–60 min to complete and was administered using pre-programmed tablets. The staff member then uploaded the encrypted, de-identified data via a secure internet connection on a weekly basis. The data was compiled into dyadic husband/wife observations to be able to include measures from both wives and husbands in our analyses.

## Measures

This study assesses two outcome measures using data captured at Wave 1: age at marriage and women's report of marital choice. Age at marriage was assessed as a single continuous variable. Women's report of marital choice was assessed using an item that asked women, "Who had the greatest say with regard to arranging your marriage to your husband?" Response options were: 1: Respondent chose, 2: Respondent and husband chose each other, 3: Respondent with someone else chose, 4: Respondent's family chose, 5: Husband or his family chose respondent, 6: Someone else chose, 7: Joint decision not including respondent. Responses were coded as 1, 2, as 3 as women engaged in the marital decision making process, all others were coded as not engaged. Men were asked a parallel question, using the following responses: 1: Respondent, 2: Respondent and wife jointly, 3: Respondent with someone else, 4: Respondent's family, 5: Wife's family, 6: Someone else, 7: Joint decision not including respondent. Response 2 was coded as women engaged in marital decision-making. All other responses were as not engaged.

The primary independent variables of interest were individual attitudes, injunctive norms at the individual-level, injunctive norms at the village-level, and descriptive norms. Attitude and descriptive norms variables come from Wave 1, and the injunctive norms questions were added into Wave 2. Attitudes were assessed via items asked of both men

and women on optimal age at marriage for girls. Participants reported their perceptions of optimal age for girls' marriage as a continuous variable. To assess the injunctive norm regarding age at marriage, both women and men were asked: "What age would people in your community say is the best age for a woman to get married?" Participants reported normative age as a continuous variable. To assess the injunctive norm regarding female involvement in marital choice, both women and men were asked whether they agree or disagree with the following statement: "People in my village expect that girls decide when and who to marry." To ascertain village-level injunctive norms, the responses from the individual-level injunctive norms questions were aggregated from both female and male respondents. Descriptive norms related to girls' age at marriage and marital choice were assessed by aggregating both women's and men's reports of the following to the village-level: wife's marital choice (aggregate proportion by village) and wife's age at marriage (aggregate means by village).

To address known confounders, the following sociodemographic variables that are associated with age at marriage for both wives and their husbands were added including: age, spousal age difference, and a binary measure of any Quranic education. Number of wives and residence with extended family were also assessed. Women's and men's secular education were also included, categorized as no formal schooling, incomplete primary, completed primary, and any secondary education. Economic covariates included household wealth and food insecurity. Household wealth was assessed via the standard household assets list, summing each item that was reported in the home: a watch, a mobile phone, a bicycle, a motorbike or scooter, a car or truck, or an animal drawn cart. Food insecurity was assessed via a single item on whether the respondent or any member of the respondent's family went without eating for an entire day in the past 30 days due to a lack of food. Women were also asked if they had worked in the past 12 months. Finally, to assess the influence of a key interpersonal communication concept in social norms and behavior change, an additional control for whether or not a community health worker had visited the individual woman was included, and as well as an aggregate of whether or not a community health worker had visited the women in the village. These variables were included upon recommendation of experts in the field with local knowledge indicating that presence of community health workers may be associated with normative change. While there is not published evidence of this point from Niger, findings from studies conducted in other LMIC contexts highlight the role and importance of community health workers in introducing information regarding potential social and health harms of traditional practices and supporting normative change in these practices as related to marriage and family (Kok et al., 2015; McClendon et al., 2018; Taleb et al., 2015). Though certainly not representative of all underlying interpersonal communication strategies, the community health worker, a widely trusted source of information and normative influence in Niger, frequently plays a key role in behavior change interventions in the country, and therefore serves as a useful proxy for considering the possible influence of extant community engagement activities that may be taking place at the village and household level.

## Statistical approach

For both of our outcomes, age at marriage and women's report of marital choice, between-village variation was tested, using a  $-2$  log likelihood ratio test in which we compared the  $-2$  log likelihood of a null model against a multilevel model clustering on the village. For both outcomes, significant village-level clustering was found (not shown), so all models, bivariate, and multivariable, were run using multilevel modeling clustering on village. Both the mean and median number of couples in each village was 12 (SD: 3.95, range 3–22; inter-quartile range: 9–15). Bivariate analyses were first used, linear regression for age of marriage, and logistic regression for a woman's report of marital choice, to examine the relationship between attitudinal and normative

exposure variables and our two outcomes. For variables significant at  $p < 0.10$ , separate multiple linear regression analyses were conducted to examine the demographic variables of age at marriage and separate multiple logistic regression analyses to examine marital choice at the individual level. For both age at marriage and marital choice, the attitudinal and normative exposure variables that were significant in the separate analyses were included in one full model. Continuous measures, including all village-level aggregates, were scaled in order to improve interpretability. To assess whether the presence of community health workers may confound those results, those variables were included in a second model. Treatment arm was controlled for in all analyses, though treatment was not expected to have any association with the norms of interest as these were not a focus of the study, and the assessed behaviors preceded engagement in the study. Finally, all

models were tested for multicollinearity using the variance inflation factor test in the car package of R (Fox et al., 2007).

## Results

## Characteristics of the sample

Sample characteristics are shown in Table 1. Within the husband and adolescent wife dyads (N = 581), husbands were notably older than were their wives. The mean age of wives within the sample population was 17.3 years (SD = 1.5), while the mean age of husbands was 26.1 (SD = 5.7). Husbands were on average 8.7 years (SD = 5.4) older than their wives. The mean age of marriage for women was 14.1 years of age (SD = 1.9), and 16% of marriages were polygamous. Of the approximately

**Table 1**  
Sample characteristics. Observations are couple level dyads, N=581.

Wives' characteristics			Husbands' characteristics			Correlation between husbands' & wives' variables
	Mean or %	Range		Mean or %	Range	
Wife's age at marriage	14.1	10-19	Husband's age	26.1	15-53	
Age difference between wife and husband	8.7	-1-36				
Wife's age	17.3	13-19				
Wife visited by community health worker	86%					
Quranic education	30%					
Modern education	0.57	(0-3)				
Household assets	2.1	(0.6)				
Food insecurity	22%					
Wife agricultural work	41%					
Live with extended family	19%					
Polygamous	15%					
Ethnic Hausa	36%					
Ethnic Zarma	64%					
District Dosso	27%					
District Doutchi	39%					
District Loga	34%					
Intervention vs control	74%					
Wife reports marital choice	82%		Husband reports wife marital choice	33%		0.13
Wife reports community norm in support of girls marital choice	89%		Husband reports community norm in support of girls marital choice	76%		0.05
Wife report of community norms of ideal age of marriage (continuous)	15.2	8-25	Husband report of community norms of ideal age of marriage (continuous)	16.0	10-24	0.11
Wife's belief in optimal age of marriage	16.8	10-25	Husband's belief in optimal age of marriage	17.0	11-24	0.19
Village aggregate wife reports marital choice	81%	33%-100%	Village aggregate husband reports wife marital choice	31.9%	0%-69.6%	0.26
Village aggregate wife reports community supports wife marital choice	89%	61%-100%	Village aggregate husband reports community supports wife marital choice	75%	44.8%-100%	-0.04
Village aggregate wife's reports of community ideal age of marriage	15.2	13.0-16.9	Village aggregate husband's reports of community ideal age of marriage	16.1	14.2-19.4	0.57
Village aggregate wife reports ideal age of marriage	16.8	13.7-18.8	Village aggregate husband reports ideal age of marriage	17.1	15.3-19.1	0.60

41% of women reporting working outside of the home, almost all were engaged in unpaid agricultural work. There is weak to moderate correlation between the female and male attitudinal and normative variables (range: 0.04 and 0.60). The strongest correlation ( $r = 0.60$ ) was seen between the village-level measure of the ideal age of marriage.

#### Age at marriage

Table 2 shows the results of separate bivariate models for the outcome age of marriage and attitudinal or normative exposure variables. We found that not one of our individual attitudinal or normative exposure variables around marital choice and optimal age of marriage were significant, however all of our village-level aggregate measures were. Table 3 then shows the results of multivariable linear regression model, in which each village-level aggregate measures were used to predict age at marriage, with the inclusion of all sociodemographic controls. We found that the village aggregate of wife's report of involvement in marital choice was positively associated with a greater age of marriage, as was a higher village-level aggregate of wife's reported perception of the community's ideal age of marriage, village-level aggregate of husband's individual attitude of ideal age of marriage, and the village-level aggregate of the husbands perception of a community norm supporting wife's marital choice.

Results from the multivariable analysis (Table 4, Model 1), indicate that only village-level aggregate of wife's report of marital choice and village-level aggregate of husband's perception of a community expectation related to females being involved in marital choice remained significant. Normative variables retained significance when variables related to the presence of community health workers were added to the

**Table 2**

Separate multi-level bivariate linear regression models showing the associations between individual and village norms and attitudes with age at marriage (stratified by female and male level variables) (N = 581 couple level dyads).

Variables reported by wives			Variables reported by husbands		
	Beta	P value		Beta	P value
Wife reports marital choice	0.08	0.27	Husband reports wife marital choice	0.11	0.13
Wife reports community norm in support of girls marital choice	0.05	0.54	Husband reports community norm in support of girls marital choice	0.03	0.70
Wife report of community norms of ideal age of marriage (continuous)	0.09	0.26	Husband report of community norms of ideal age of marriage (continuous)	0.05	0.47
Wife's belief in optimal age of marriage	-0.06	0.78	Husband's belief in optimal age of marriage	0.04	0.84
<b>Village aggregate wife reports marital choice</b>	<b>0.40</b>	<b>&lt;0.001</b>	<b>Village aggregate husband reports wife marital choice</b>	<b>0.30</b>	<b>0.01</b>
<b>Village aggregate wife reports community supports wife marital choice</b>	<b>0.25</b>	<b>0.05</b>	<b>Village aggregate husband reports community supports wife marital choice</b>	<b>0.31</b>	<b>0.01</b>
<b>Village aggregate wife reports of community ideal age of marriage</b>	<b>0.32</b>	<b>0.01</b>	<b>Village aggregate husband's reports of ideal age of marriage</b>	<b>0.40</b>	<b>&lt;0.001</b>
<b>Village aggregate wife reports ideal age of marriage</b>	<b>0.30</b>	<b>0.02</b>	<b>Village aggregate husband reports ideal age of marriage</b>	<b>0.33</b>	<b>0.01</b>

NB: variables in bold are statistically significant at the  $\alpha = 0.10$  threshold.

**Table 3**

Separate multi-level multivariable linear regression models showing the associations between individual and village norms and attitudes with age at marriage controlling for sociodemographics. (stratified by female and male level variables) (N = 581 couple level dyads).

Wives' Variables			Husbands' Variables		
	Beta	P value		Beta	P value
<b>Village aggregate wife reports marital choice</b>	<b>0.32</b>	<b>&lt;0.001</b>	Village aggregate husband reports wife marital choice	-0.05	0.62
Village aggregate wife reports community supports wife marital choice	0.05	0.65	<b>Village aggregate husband reports community supports wife marital choice</b>	<b>0.26</b>	<b>&lt;0.001</b>
<b>Village aggregate wife reports of community ideal age of marriage</b>	<b>0.17</b>	<b>0.08</b>	Village aggregate husband's reports of community ideal age of marriage	0.16	0.15
Village aggregate wife reports ideal age of marriage	0.02	0.88	<b>Village aggregate husband reports ideal age of marriage</b>	<b>0.18</b>	<b>0.10</b>

NB: variables in bold are statistically significant at the  $\alpha = 0.10$  threshold.

model (Table 4 Model 2). Every one standard deviation increase in the proportion of men in the village that report the community supports women's marital choice was associated with an increase in women's age of marriage of 0.22 years (95% CI 0.06–0.38). A one standard deviation increase in the proportion of women who report marital choice, was associated with an increase in women's age of marriage of 0.24 years (95% CI 0.01–0.42). We also found that community health workers seemed to be visiting women who have been married at a young age, and there is some evidence that they may be specifically working within communities where young age of marriage is the norm.

#### Marital choice

Using the same analytic strategy as presented above, we first conducted a series of bivariate analyses looking at our individual and village-level attitudinal and normative exposure variables on the outcome of marital choice (Table 5). We found associations with several different factors, including the wife's perception of the community's ideal age of marriage, village-level aggregate wife's marital choice, and all village-level aggregate norms and attitudes reported by the husband. We next ran a series of separate multivariable models (Table 6) and found that after including covariates, our outcome of individual marital choice was associated with village-level aggregate women's reports of marital choice, wife reporting that the community supports an older age of marriage, husband reporting wife's marital choice, and the village-level aggregate of husband's perception that the community supports women's marital choice. In the final combined multivariable model (Table 7, Model 1), all of these factors retained significance. Again, after adding in individual visits from community health workers and village-level aggregate community health worker visits (Table 7, Model 2), we found no difference in the associations between our final normative exposure variables and marital choice, and a slight increase in the AIC suggests that the addition of those two variables does not positively contribute to model fit. The odds that a woman reports marital choice increased by 1.39 (95% CI 1.04–1.87) for every one standard deviation increase in the proportion of men in the community that believe the community supports marital choice. For every year increase in a woman's report of the ideal age of marriage within the community, the odds that she reported marital choice increases by 1.31 (95% CI 1.02–1.69).

**Table 4**

Multilevel multivariable analysis showing the association with normative factors and age at marriage, controlling for sociodemographics (N = 581 couple level dyads, 47 village clusters).

	Null Model			Model 1			Model 2		
	Beta	SE	P	Beta	SE	P	Beta	SE	P
Village aggregate wife reports of community ideal age of marriage	0.10	0.09	0.31						
Village aggregate husband reports ideal age of marriage	0.02	0.12	0.88						
<b>Village aggregate wife reports marital choice</b>	<b>0.21</b>	<b>0.11</b>	<b>0.05</b>	<b>0.24</b>	<b>0.10</b>	<b>0.04</b>	<b>0.24</b>	<b>0.10</b>	<b>0.04</b>
<b>Village aggregate husband reports community supports wife marital choice</b>	<b>0.17</b>	<b>0.09</b>	<b>0.06</b>	<b>0.22</b>	<b>0.08</b>	<b>0.01</b>	<b>0.22</b>	<b>0.08</b>	<b>0.01</b>
Proportion village visited by community health worker							-0.18	0.08	0.02
Wife visited by community health worker							-0.33	0.21	0.12
Age difference husband-wife	-0.41	0.08	<0.001	-0.37	0.08	<0.001	-0.37	0.08	<0.001
Quranic education husband	0.00	0.16	0.98	-0.05	0.16	0.75	-0.05	0.16	0.75
Quranic education wife	0.02	0.18	0.93	0.03	0.18	0.87	0.03	0.18	0.87
Modern education wife	0.23	0.07	<0.001	0.24	0.07	<0.001	0.24	0.07	<0.001
Modern education husband	0.07	0.07	0.33	0.09	0.07	0.24	0.09	0.07	0.24
Household assets	0.00	0.08	0.95	-0.04	0.07	0.55	-0.04	0.07	0.55
Food insecurity	0.03	0.17	0.88	-0.03	0.17	0.84	-0.03	0.17	0.84
Wife agricultural work	-0.37	0.19	0.05	-0.45	0.19	0.02	-0.45	0.19	0.02
Live with extended family	0.20	0.18	0.26	0.22	0.18	0.22	0.22	0.18	0.22
Polygamous	1.00	0.23	<0.001	0.95	0.23	<0.001	0.95	0.23	<0.001
Ethnic Hausa (ref)									
Ethnic Zarma	1.02	0.51	0.05	0.94	0.50	0.06	0.94	0.50	0.06
Ethnic other	1.15	1.29	0.37	1.42	1.28	0.27	1.42	1.28	0.27
Doutchi (ref Dosso)	0.86	0.54	0.12	0.73	0.52	0.25	0.73	0.52	0.25
Loga (ref Dosso)	0.54	0.21	0.01	0.39	0.21	0.07	0.39	0.21	0.07
Village proportion women agricultural work	-0.50	0.11	<0.001	-0.47	0.11	<0.001	-0.47	0.11	<0.001
Intervention vs control	-0.12	0.18	0.49	-0.15	0.18	0.38	-0.15	0.18	0.38
AIC	2331			2285			2277		
ICC	0.15			0.002			0.000		

NB: variables in bold are statistically significant at the  $\alpha = 0.10$  threshold.

#### Discussion

In this study, we use data collected from rural Niger to try to understand the relationship between marital choice and age at marriage, and the social norms specific to both. We find that norms around marital choice are those most strongly associated with the likelihood that an individual girl marries at an older age. We also find that norms around age at marriage and norms around marital choice are those most strongly associated with the likelihood that an individual girl reports marital choice. Our findings suggest that marital choice and age at marriage are strongly interconnected within these communities, and that both descriptive and injunctive norms may play an important role. These findings, the first of their kind from Niger, extend work largely from South Asia that highlights gendered restrictions against girls' mate selection or even their perceptions of acceptability in choosing their spouse, and the strong association between early marriage and lack of marital choice among girls (Allendorf, 2017; McDougal et al., 2018), by demonstrating the importance of social norms in reinforcing and linking these practices.

Study findings also demonstrate that influential norms not only operate at the individual level in terms of perceptions but also at the community level, in terms of both practices and perceptions. In communities where a larger proportion of the girls report marital choice, and in communities where a larger proportion of the male population believes that the community supports marital choice, individual girls marry at older ages. These normative factors around marital choice are strongly associated with age at marriage whereas norms around age at marriage are not. Our analyses also indicate that when a greater proportion of women in a village believe that the community supports an older age of marriage, and when a greater proportion of men in the village believe that the community supports marital choice, girls in those communities are more likely to report having had marital choice. These findings support the potential value of community-level social norms interventions to address CEFM, and reinforce prior research on the importance of within-community efforts to promote normative change (Cislighi & Heise, 2018). Importantly, prior research evaluating

prevention of child marriage largely demonstrate the value of girl education and cash transfer programs as being most effective in altering the practice. We could identify no rigorous evaluation of normative change approaches for prevention of CEFM; this may be an important area ripe for study (Kalamar et al., 2016).

Our findings indicate a nuanced dynamic, as we note sex differences in the nature of normative influences associated with our outcomes of interest. Specifically, we find that the community level norms that are associated with both of our outcomes are the aggregate measure of men's perceptions of whether the community supports marital choice - an injunctive norm, and the aggregate of women's reported marital choice - a descriptive norm. These findings suggest that the community context is salient in different ways. What men believe the community supports around marital choice is strongly associated with both outcomes, while what women actually report in terms of their own marital choice is also strongly associated with those same outcomes. This is to our knowledge the first study that has quantitatively analyzed associations between norms and practices related to marital choice in Niger or elsewhere, as well as the first study that has considered sex differences in community-level social norms affecting traditional practices. Further research is needed to understand how these sex differences in normative effects may play out in different national contexts and as related to different outcome behaviors.

Our measure of the descriptive norm, the aggregate of women's reported choice, is a proxy for descriptive norms, as we did not ask women what they thought was taking place in their community. Furthermore, the fact that 82% of women report participating in the choice of their marriage, while only 32% of men report their wives participating in that choice suggests that choice in this context may be open to interpretation. Does choice mean actively identifying a potential husband; does it mean having a veto power; does it mean it was discussed with her but she was given little room but to acquiesce? The details of choice in this context are still unclear, consistent with varying interpretations of how marital choice is conceptualized in different Islamic communities (Relief, 2018; Riaz, 2013). Nevertheless, what is salient is that in community contexts where women interpret themselves as having had a choice in whom they



Table 5

Separate multi-level bivariate logistic regression models showing the associations between marital choice and individual and village-level norms and attitudes (by sex) (N = 581 dyads, 47 village clusters).

Bivariate analyses: wives' variables			Bivariate analyses: husbands' variables		
	Beta	P Value		Beta	P Value
			<b>Husband reports wife marital choice</b>	<b>0.70</b>	<b>0.01</b>
Wife reports community norm in support of girls marital choice	0.08	0.49	Husband reports community norm in support of girls marital choice	0.07	0.56
<b>Wife reports of community norms of ideal age of marriage (continuous)</b>	<b>0.31</b>	<b>0.02</b>	Husband report of community norms of ideal age of marriage (continuous)	-0.06	0.62
Wife beliefs in optimal age of marriage	-0.25	0.42	Husband's belief in optimal age of marriage	-0.34	0.24
<b>Village aggregate wife reports marital choice</b>	<b>0.69</b>	<b>&lt;0.001</b>	<b>Village aggregate husband reports wife marital choice</b>	<b>0.32</b>	<b>0.06</b>
Village aggregate wife reports community supports wife marital choice	-0.07	0.73	<b>Village aggregate husband reports community supports wife marital choice</b>	<b>0.50</b>	<b>&lt;0.001</b>
<b>Village aggregate wife reports of community ideal age of marriage</b>	<b>0.32</b>	<b>0.06</b>	<b>Village aggregate husband's reports of ideal age of marriage</b>	<b>0.48</b>	<b>0.01</b>
Village aggregate wife reports ideal age of marriage	0.23	0.19	<b>Village aggregate husband reports ideal age of marriage</b>	<b>0.50</b>	<b>&lt;0.001</b>

NB: variables in bold are statistically significant at the  $\alpha = 0.10$  threshold.

married (i.e., communities in which descriptive norms indicate the practice of women's marital choice), individual girls within these communities are more likely to report having a choice of who they marry and to have married at an older age. Because this measure is an aggregate of women's reported choice, we also don't know whether they believe that other women also have made their own choice. It is possible that this measure is more likely giving us information about contexts in which women are more likely to believe that they have had a choice, rather than an objective measure of community behavior.

The association between the male perception of the community's support of marital choice and both of our outcomes is an important reflection of men's power in the domains of family, marriage, and fertility in this setting. While this offers an important leverage point for intervention, that same opportunity comes with its own risks. Our results suggest that engaging with men to change norms around marital choice may be an important strategy for shifting the dynamics of forced and early marriage in these settings. The caveat is, however, that targeting men in this way does not alter the patriarchal nature of these practices and in fact can reinforce male control over girls' marital practices unless the program specifically works to increase girls agency and change gender norms. At the same time, it can be difficult to engage women who were not given a choice in their marriage and who married as minors because the focus of the interventions is to change behaviors in the community that cannot be changed in their own lives, having already occurred. It is crucial to approach the issue with sensitivity in order not to stigmatize those for whom early or forced marriage has

Table 6

Separate multi-level multivariable logistic regression models showing the associations between individual and village norms and wives reported decision regarding marriage (by sex) (N = 581 dyads, 47 village clusters).

Separate models wives' variables as primary predictor			Separate models husbands' variables as primary predictor		
	Beta	P value		Beta	P value
			<b>Husband reports wife marital choice</b>	<b>0.73</b>	<b>0.01</b>
<b>Wife report of community norms of ideal age of marriage (continuous)</b>	<b>0.24</b>	<b>0.06</b>	Husband report of community norms of ideal age of marriage (continuous)	-0.34	0.24
Wife's belief in optimal age of marriage			Husband's belief in optimal age of marriage		
<b>Village aggregate wife reports marital choice</b>	<b>0.61</b>	<b>&lt;0.001</b>	<b>Village aggregate husband reports wife marital choice</b>	<b>0.42</b>	<b>0.01</b>
Village aggregate wife reports community supports wife marital choice	0.04	0.86	<b>Village aggregate husband reports community supports wife marital choice</b>	<b>0.42</b>	<b>0.01</b>
Village aggregate wife reports of community ideal age of marriage	0.10	0.55	Village aggregate husband's reports of ideal age of marriage	0.28	0.19
Village aggregate wife reports ideal age of marriage	-0.20	0.40	Village aggregate husband reports ideal age of marriage	0.24	0.22

NB: variables in bold are statistically significant at the  $\alpha = 0.10$  threshold.

already occurred. These issues speak to the need for nuance in application of these findings to the field, with consideration of culture and context as well as ensuring an intersectional equity lens in the approach.

While these findings offer important insight regarding the influence of village-level norms, less clear is the value of the normative beliefs of individuals and their associations with CEFM. As noted above, wives' and husbands' normative beliefs at the individual level were not associated with wife's age at marriage after accounting for community norms. Wife's and husband's individual attitudes about appropriate age at marriage were also not associated with wife's age at marriage. However, wife's beliefs regarding community norms related to appropriate age of marriage for girls was associated with whether or not the wife reported marital choice herself. While these findings are captured at the individual level, they only reinforce the role community norms and expectations have on girls with regard to their marital choice. Consequently, alteration of these norms at the community level is important. However, these findings beg the question of how girls may or may not resist harmful practices of CEFM, which have been linked to increased maternal mortality in Niger (Institut National de la Statistique (INS) and ICF International, 2013; Verguet et al., 2016), and the familial and social consequences of this resistance. More research is needed to ensure that supporting girls' resistance and marital choice can be approached in ways that do not result in backlash against girls failing to adhere to social norms.

While our findings offer important insight into issues of social norms and CEFM in the context of a high need an understudied nation, Niger, they should be considered in light of certain study limitations. First, certain factors were associated with retention in the study between Waves 1 and 2. Adolescent wives were more likely to be missing Wave 2 data if at Wave 1 they were nulliparous ( $p = 0.02$ ) or if their husband was polygamous ( $p = 0.06$ ). Husbands were more likely to be missing Wave 2 data if at Wave 1 they were 15–24 years of age compared to older age ( $p = 0.09$ ), if their wife had no schooling ( $p = 0.01$ ), and if they

Table 7

Multilevel multivariable logistic regression analysis showing the association between individual and normative factors with women's reported decision regarding marriage (N = 581 dyads, 47 village clusters).

	Null Model			Model 1			Model 2		
	Beta	SE	P	Beta	SE	P	Beta	SE	P
<b>Husband reports wife marital choice</b>	<b>0.84</b>	<b>0.29</b>	<b>&lt;0.001</b>	<b>0.83</b>	<b>0.29</b>	<b>&lt;0.001</b>			
<b>Village aggregate wife reports marital choice</b>	<b>0.51</b>	<b>0.16</b>	<b>&lt;0.001</b>	<b>0.52</b>	<b>0.16</b>	<b>&lt;0.001</b>			
<b>Village aggregate husband reports community supports wife marital choice</b>	<b>0.28</b>	<b>0.14</b>	<b>0.05</b>	<b>0.33</b>	<b>0.15</b>	<b>0.03</b>			
<b>Wife report of community norms of ideal age of marriage (continuous)</b>	<b>0.24</b>	<b>0.13</b>	<b>0.06</b>	<b>0.27</b>	<b>0.13</b>	<b>0.04</b>			
Proportion village visited by community health worker				-0.21	0.14	0.12			
Wife visited by community health worker				0.22	0.35	0.54			
Age difference husband-wife	-0.20	0.14	0.15	-0.19	0.14	0.17			
Quranic education husband	0.27	0.28	0.32	0.23	0.28	0.40			
Quranic education wife	-0.09	0.29	0.74	-0.13	0.29	0.66			
Modern education wife	0.06	0.13	0.63	0.06	0.14	0.66			
Modern education husband	0.03	0.14	0.84	0.05	0.14	0.70			
Household assets	-0.08	0.12	0.51	-0.1	0.13	0.42			
Food insecurity	0.04	0.30	0.9	0.03	0.30	0.91			
Wife agricultural work	0.30	0.32	0.36	0.26	0.33	0.43			
Live with extended family	-0.01	0.32	0.97	0.01	0.32	0.98			
Polygamous	1.14	0.46	0.01	1.12	0.47	0.02			
Ethnic Hausa (ref)									
Ethnic Zarma	-0.32	0.77	0.68	-0.33	0.77	0.67			
Ethnic other	-2.49	1.64	0.13	-2.46	1.65	0.14			
Doutchi (ref Dosso)	-0.08	0.82	0.92	-0.03	0.82	0.97			
Loga (ref Dosso)	0.54	0.37	0.15	0.40	0.38	0.29			
Village proportion women agricultural work	0.02	0.19	0.90	0.10	0.20	0.63			
Intervention vs control	0.12	0.31	0.69	0.07	0.31	0.81			
AIC	525.4			512.1			513.6		
ICC	0.19			0.00			0.00		

NB: variables in bold are statistically significant at the  $\alpha = 0.10$  threshold.

had spent more than three months away from the village in the past year ( $p < 0.001$ ). Data rely on self-report and thus are vulnerable to recall and social desirability biases. We do not anticipate much concern related to recall given the young age of the sample and thus recency of marriage, and given that age and choice at marriage are memorable phenomena. However, validity of age data may be questionable as access to birth registry data was not possible, and age, both at time of interview and at time of marriage, may not be precise in this population. However, again, given the young age of the population, we expect this study yields more accurate age data than larger scale studies such as the Demographic and Health Survey in Niger (Institut National de la Statistique (INS) and ICF International, 2013), which lack any data on social norms. While optimally descriptive norms would be measured by asking individuals their perceptions of community behaviors, lacking such measures we used a proxy measures of community level behavioral aggregates of individual behaviors.

Generalizability of the findings are also somewhat limited, as the sample was in three districts within the Dosso region of Niger, was specific to married girls involved in a family planning intervention trial, and was only able to include the sample retained for follow-up in that trial. Nonetheless, given the paucity of data from Niger and complex sampling used in the study site areas, these findings offer an important sample of married girls in Niger not seen in previous published research. Additionally and relatedly, the analyses are cross-sectional in nature and interpretation, impeding assumptions of causality from these findings. Of note, some norms data were only available in the follow-up data set, and thus we used norms variables from two points in time, with outcomes assessed at Wave 1. Ideally, in cross-sectional analyses all data would be taken at the same time point. However, we wanted to include the most comprehensive set of measures available given the novelty of the work on social norms and CEFM, and the increasing level of interest in norms as a lever for change (Darmstadt et al., 2019). Importantly, norms variables across the two waves of data were significantly associated as would be hypothesized, increasing our comfort in including all norms data for study.

An additional concern is that as the survey was not comprehensively

designed to understand CEFM norms and practices in Niger and thus potential confounders, such as those related to agency, assets such as information access, and opportunities such as financial inclusion indicators, are not able to be included in our analyses. Additionally, understanding related to the measurement of both social norms and to the measurement of forced marriage are fairly new to quantitative research so there are not standard measures we could use for these assessments. Norms and marital choice measures were developed for this study, often adapted from prior work from our team, who include social and behavioral science experts on these topics and the study of measurement. These measures were built on deep conceptual understanding and prior testing in other national contexts both in the case of social norms and marital choice (Cislaghi et al., 2019; Mackie et al., 2014; Raj et al., 2014), as well as expert and field input on the questions prior to field testing them via cognitive interviews. We then implemented them in the field. Hence, while standard measures could not be used, we engaged in a rigorous process of measurement development to offer potential new measures on these topics.

## Conclusion

This study analyzed community and individual level norms related to early marriage of girls and girls' marital choice in rural Niger, with a sample of adolescent wives and their husbands. In this context of very high rates of child and early marriage we found that village-level norms related to marital choice, particularly the norms of men, may be a key driver of child and early marriage. In addition, earlier age at marriage for girls in this context is significantly associated with lower likelihood of their engagement in marital choice, a finding that may point to limited female empowerment as a driver of both. Further, we find that village-level norms related to early marriage and marital choice, as well as adolescent wives' perceptions of community norms related to early marriage, are associated with odds of a wife having had marital choice. Importantly, we did not find any association with men's or women's attitudes regarding appropriate age of marriage and wife's age of marriage or wives report of marital choice. These findings suggest the value

of community level social norms change on CEFM in this context, particularly targeting males, and suggest that approaches the focus on individual attitudes may not be effective. At the same time, such efforts will require care not to reinforce norm changes on acceptability of CEFM practices that are predicated on maintained male control over and sanctioning of these approaches. Further research is needed to consider how to simultaneously address these norms and reinforce women and girls' autonomy, agency and safety with regard to marriage, given findings of high risk for spousal violence and maternal mortality in the region (Institut National de la Statistique (INS) and ICF International, 2013; Kidman, 2017; Verguet et al., 2016). Gender transformative interventions addressing the intersection of social and gender norms underlying these practices may be useful and have shown success in other national contexts (Hay et al., 2019; Heymann et al., 2019). These findings suggest that community-level norms related to girls' marital choice and agency should be targets of interventions to help avert early marriage of girls in Niger. Such findings highlight that, while previous research has found that education certainly has value in helping delay marriage of girls in contexts affected by the practice (Kalamar et al., 2016), addressing social norms related to marital choice in conjunction with promoting girls education may be more impactful.

#### Ethics and approval and consent to participate

This study was approved by the University of California San Diego IRB, protocol number #160407S and Niger Ministry of Health. Wives aged 13–17 years were included the study. Based on these individuals being married, they are not viewed as children in Niger and have rights to consent to participate in research and to receive family planning services without consent of their parents (i.e., they are considered emancipated). Similar to California Emancipation of Minors Law (Family Code Section 700-7002), in which minors who have entered a valid marriage are legally emancipated, according to customary law in Niger, children become independent from their parents after they first marry. Niger law does not legally define the age of consent beyond the age at marriage. Niger is also a patrilocal culture, so adolescent wives do not live in the same residence or often village as their family or origin, thus, even if deemed appropriate, it would not be feasible to obtain parental consent in this context. All participants provided verbal consent, as the Hausa and Zarma languages are not in written form. The consent script was written in French and administered verbally in the Hausa or Zarma language, based on the native language of the participant. The consent script was approved by the Niger Ministry of Health's Ethics Committee to conform to local laws and standards. In all cases, consent scripts and forms were also approved by University of California San Diego, IRB.

#### Author statement

Holly B. Shakya conceptualization, methodology, formal analysis, writing original draft and review; Jay Silverman supervision, funding acquisition, investigation; Kathryn Barker writing original and review; Charlotte Lapsanky conceptualization, writing original and review; Jennifer Yore investigation and writing review; Sani Aliou investigation and writing review; Mohamad I. Brooks investigation and writing review; Anita Raj funding acquisition, supervision, conceptualization, writing original and review.

#### Declaration of competing interest

The authors have no conflicts of interest or financial disclosures to report.

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## Mapping the patchwork: Exploring the subnational heterogeneity of child marriage in India

Lotus McDougal<sup>a,\*</sup>, Holly Shakya<sup>a</sup>, Nabamallika Dehingia<sup>a</sup>, Charlotte Lapsansky<sup>b</sup>, David Conrad<sup>b</sup>, Nandita Bhan<sup>a</sup>, Abhishek Singh<sup>c</sup>, Topher L. McDougal<sup>d</sup>, Anita Raj<sup>a</sup>

<sup>a</sup> Center on Gender Equity and Health, University of California San Diego, 9500 Gilman Drive, MC 0507, San Diego, CA, 92093, USA

<sup>b</sup> United Nations Children's Fund (UNICEF), UNICEF House 3, United Nations Plaza, New York, NY, 10017, USA

<sup>c</sup> International Institute for Population Sciences, Govandi Station Road, Deonar, Mumbai, 400 088, India

<sup>d</sup> Kroc School of Peace Studies, University of San Diego, 5998 Alcalá Park, San Diego, CA, 92110, USA

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## ABSTRACT

Despite dramatic reductions in child marriage over the past decade, more than one in four girls in India still marry before reaching age 18. This practice is driven by a complex interplay of social and normative beliefs and values that are inadequately represented in national- or even state-level analyses of the drivers of child marriage. A geographic lens was employed to assess variations in child marriage prevalence across Indian districts, identify hot and cold spots, and quantify spatial dependence and heterogeneity in factors associated with district levels of child marriage. Data were derived from the 2015-16 National Family Health Survey and the 2011 India Census, and represent 636 districts in total. Analyses included global Moran's I, LISAs, spatial Durbin regression and geographically weighted regression. This study finds wide inter- and intra-state heterogeneity in levels of child marriage across India. District levels of child marriage were strongly influenced by geographic characteristics, and even more so by the geographic characteristics of neighboring districts. Districts with higher levels of female mobile phone access and newspaper use had lower levels of child marriage. These relationships, however, were all subject to substantial local spatial heterogeneity. The results indicate that characteristics of neighboring districts, as well as characteristics of a district itself, are important in explaining levels of child marriage, and that those relationships are not constant across India. Child marriage reduction programs that are targeted within specific administrative boundaries may thus be undermined by geographic delineations that do not necessarily reflect the independent and interdependent characteristics of the communities who live therein. The geographic, social and normative characteristics of local communities are key considerations in future child marriage programs and policies.

## Introduction

Despite global recognition that child marriage violates the health and human rights of girls, no world region is projected to meet the Sustainable Development Goal of eliminating this practice by 2030 (Raj, 2010; Efevbera, Bhabha, Farmer, & Fink, 2019; UNICEF Data and Analytics Section, 2018). India is home to more than 15 million women aged 20–24 who married below the age of 18, the largest number of any nation in the world, and is therefore a priority country in which to understand and address this abuse (Population Division of UN Department

of Economic and Social Affairs (UNDESA), 2017; International Institute for Population Sciences (IIPS) & ICF, 2017). Over the past decade, India has recorded a nearly 50% reduction in the prevalence of child marriages, from 47% in 2006 to 27% in 2016 (International Institute for Population Sciences (IIPS) & ICF, 2017; International Institute for Population Sciences (IIPS) and Macro International, 2007). This reduction has occurred contemporaneously with improvements in girls' education, social participation, and status, as well as a legal prohibition against marriage before age 18 (International Institute for Population Sciences (IIPS) & ICF, 2017; International Institute for Population

Sciences (IIPS) and Macro International, 2007; Government of India, 2007). Nonetheless, more than one in four girls in India still marry before age 18, with girls residing in rural areas and in socially and economically disadvantaged states, such as Rajasthan, Uttar Pradesh, and Bihar, at greater risk for early marriage (International Institute for Population Sciences (IIPS) & ICF, 2017).

Child marriage is driven by normative values regarding the status, value and rights of women and girls, as well as economic, social, legal and safety considerations (Raj, 2010; McDougal et al., 2018; Raj et al., 2019; Jha, Minni, Priya, & Chatterjee, 2016; Lee-Rife, Malhotra, Warner, & Gliński, 2012). Research from around the world has revealed a complex nexus of factors that contribute to this practice (Bicchieri, Jiang, & Lindemans, 2014; Fenn, Edmeades, Lantos, & Onovo, 2015; Islam, Haque, & Hossain, 2016; UNICEF-UNFPA, 2019). While poverty and educational status are strongly associated with child marriage, in many parts of South Asia and Africa, child marriage is encouraged through cultural traditions that dictate gender-discriminatory norms rooted in patriarchal values and ideologies (Shakya et al., 2018; Cislighi et al., 2019b). Research from India and Niger suggests that girls who marry young are less likely to have a say in the choice of who they marry (Shakya et al., 2020; Santhya et al., 2010), and that in areas with low levels of gender equality, the age of marriage tends to be lower (Desai & Andrist, 2010).

In such contexts child marriage often occurs in a social framework in which cultural models enforce an idea of womanhood that is strongly associated with purity, modesty, submission to men and to elders, and the importance of motherhood. Parents in these settings often see no motivation to postpone marriage past puberty. By marrying off a daughter at a young age, a family is able to protect the honor of the family, and of the child herself, while ensuring that she attains the economic security and respectable status afforded to a married woman (McDougal et al., 2018). Parents also perceive that girls who are married earlier are at lower risk for sexual violence, and less likely to engage in premarital sexual activities (Verma, Sinha, & Khanna, 2013), despite more than a decade of evidence from India highlighting greater risk for sexual violence in marriage for those married as minors (Raj et al., 2010; Begum, Donta, Nair, & Prakasam, 2015). Community norms can counter advancements in knowledge to sustain local and family beliefs that child marriage is socially protective (McDougal et al., 2018). These localized norms may contribute to the continuation of the practice of child marriage in certain states and communities in India, even as the prevalence of child marriage has declined for the nation as a whole.

In recent years, development and public health interventions to address child marriage have increasingly focused on the role of social norms, emphasizing community engagement as well as social and behavior change strategies to shift these norms at the community level (UNFPA & UNICEF, 2018a). While such efforts recognize the contextual nature of social norms as they function at this local level, there is a need for a broader understanding of how factors associated with child marriage, and their relationships with each other, vary across social and geographic contexts. Such variation suggests that the social normative influences that contribute to child marriage transcend simple socio-demographic associations, and require consideration of "place" (Akiyemi et al., 2015; Islam et al., 2016; Maiga et al., 2015; Shiferaw et al., 2015).

Spatial demographers consider place to be an important determinant of attitudes and behaviors. An obvious reason is that geographic features can inhibit or facilitate behaviors due to commonalities such as structural access to resources (for instance distance to a health clinic). More importantly, perhaps, place is important because it is through spatial clustering of socially connected individuals that clustering of social norms typically occurs (Weeks et al., 2004, 2015). It is well known that people with similar sociodemographic characteristics typically choose to interact with each other, a concept known as homophily (McPherson, Smith-Lovin, & Cook, 2001). However because of shared exposures, social reinforcement and direct social influence, people who are

geographically proximal to each other can also become more alike, a concept known in spatial analysis as *spatial dependence*. Spatial dependence is the phenomenon whereby people living and interacting in close proximity to one another are more likely to mutually influence each other's behaviors, and therefore characteristics, than they are the behaviors of those who live at a greater distance (Weeks et al., 2015). *Spatial heterogeneity* (also known as spatially varying relationships), on the other hand, occurs when relationships between different characteristics or behaviors change according to geographic context (Weeks et al., 2015). In other words, spatial heterogeneity takes a relationship between certain characteristics or behaviors that might normally be quantified at only a single, more aggregate level (e.g. a national-level estimate), and identifies how that relationship may vary according to place (e.g. the same relationship may manifest differently in different villages, communities or districts). The existence of spatial dependence and/or spatial heterogeneity can be important markers for patterns of social norms dispersion and variation across geographic communities, providing information that can inform social norms change intervention strategies.

In norms theory, a person's reference group is the group of people to whom an individual turns for expectations around appropriate behavior (Cislighi & Heise, 2018). Ideally, reference groups would be identified through the use of explicitly measured social network ties (Shakya et al., 2014; Shakya et al., 2015), but in almost all health and development research, such data are lacking. As an alternative, researchers can generate data with behavioral or attitudinal measures across more crude social units from which social ties can be inferred, such as across residents of the same village or neighborhood to determine whether there is inter-cluster variation. High levels of variation across these spatial units can be viewed as evidence of variability in norms, and may indeed capture collective, or community, norms (Mackie et al., 2015; Shakya et al., 2019; Costenbader, Lenzi, Hershow, Ashburn, & McCarragher, 2017; Lapinski & Rimal, 2005; Sedlander & Rimal, 2019; Shulman & Levine, 2012). This same principle holds true for spatial heterogeneity. As an example, if the association between education and child marriage varies by region, this suggests that there may be geographically-specific social effects that are driving the behavior beyond what is considered the average association between those two factors (Weeks, Getis, Hill, Agyei-Mensah, & Rain, 2010). Often, for pragmatic reasons, child marriage programs are implemented based on administrative units such as state, district, village, or neighborhood, which may or may not match the actual contours of the participant communities. A better understanding of the role of place and other spatial/geographic dimensions in shaping and upholding social norms can help to better tailor child marriage interventions and social and behavior change strategies to the specific communities of interest.

The prevalence of child marriage, the social and normative factors associated therewith, and the programs and policies designed to intervene therein, are not uniform across India. National, and even state-level, analyses of these factors likely mask district-level inequities (Liang et al., 2019; Roest, 2016; Srinivasan et al., 2015). Not only are states across India quite distinct from one another in a variety of aspects, including population, geography, economy, religion, and culture, but programs designed to mitigate child marriage are generally implemented at smaller scales (International Institute for Population Sciences (IIPS) & ICF, 2017; Jha et al., 2016; Jacob, 2015; Dheer, Lenartowicz, & Peterson, 2015; Prakash et al., 2019; Harriss, 1999). This study thus responds to the global call for an increased understanding of intra-national differences in child marriage levels (Svanemyr et al., 2015). This geographic analysis of child marriage is designed to explore subnational variations in the prevalence of child marriage and the social and connectivity factors that may influence child marriage norms in India. The specific objectives are to assess geographic variations in child marriage across Indian districts, identify hot and cold spots, and quantify spatial dependence and spatial heterogeneity in factors associated with child marriage. Understanding how the social and normative

\* Corresponding author.

E-mail addresses: [lmcdouga@ucsd.edu](mailto:lmcdouga@ucsd.edu) (L. McDougal), [hshakya@ucsd.edu](mailto:hshakya@ucsd.edu) (H. Shakya), [ndehingi@ucsd.edu](mailto:ndehingi@ucsd.edu) (N. Dehingia), [clapsansky@unicef.org](mailto:clapsansky@unicef.org) (C. Lapsansky), [dconrad@unicef.org](mailto:dconrad@unicef.org) (D. Conrad), [nandita.gehindia@gmail.com](mailto:nandita.gehindia@gmail.com) (N. Bhan), [abhi\\_iips@yahoo.co.in](mailto:abhi_iips@yahoo.co.in) (A. Singh), [tlm@sandiego.edu](mailto:tlm@sandiego.edu) (T.L. McDougal), [anitaraj@ucsd.edu](mailto:anitaraj@ucsd.edu) (A. Raj).

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factors that influence child marriage cluster, disperse and interact differently within and across different geographies highlights place-based variations that may directly contribute to improved targeting of social and behavior change prevention efforts.

## Methods

**Data sources.** Non-geographic data were obtained from the fourth National Family Health Survey (NFHS-4) and the 2011 India Census, cross-sectional, nationally representative datasets collected in 2015-16 and 2011, respectively (International Institute for Population Sciences (IIPS) & ICF, 2017; Census of India, 2011). Indian district maps from 2011 were obtained from ML Infomap (ML Infomap, 2011). District population density was derived from the 2011 India Census, district distance to state borders and district area were derived from the district map shapefiles, and all other variables were derived from NFHS-4.

**Measures.** The outcome of interest was district-level prevalence of child marriage, defined as marriage or cohabitation before age 18, excluding marriages in which gauna was not performed (i.e. spouses do not co-reside and the marriage has not been consummated, which was 0.5% of this sample) among women aged 20–24 years (International Institute for Population Sciences (IIPS) & ICF, 2017).

Covariates were selected to represent the social and normative factors most related to child marriage in the available data. Geographic measures were included to account for the physical characteristics of each district, and comprised log distance from each district to the nearest non-ocean state or union territory border (per 100 km; hereafter referred to as ‘non-ocean state border’ for brevity), log district area (km<sup>2</sup>) and log district population density (population/km<sup>2</sup>). Ocean borders were excluded from distance calculations, as distance to the nearest border was intended to measure the distance to a distinct administrative, legal, and therefore economic context (Harriss, 1999). In the context of India, as in many other countries, distance to border may also serve as a proxy for environments that tolerate or even produce illegal practices, such as child marriage (Government of India, 2007). This is due to reduced capacity of local government to police trans-jurisdictional activities and actors, as well as to disparities in local laws and, consequently, prices of related goods and services (Idler, 2019; Reno, 2013; Su, 2018).

Sociodemographic variables associated with child marriage specifically, and gender inequities more broadly, were selected based on previous research (Raj et al., 2015; McDougal et al., 2018; Raj et al., 2019; Roest, 2016; Srinivasan et al., 2015). These measures included the percentage of women aged 15–49 in the district residing in rural areas, the percentage of women in a district who identified as members of scheduled castes, scheduled tribes or other backwards classes (SC/ST or OBC; legally recognized groups of marginalized individuals), the percentage of women in a district who identified as Muslim, the mean years of education among women aged 20–24 in the district, the ratio of all female to all male births to district residents in the past 6 years (per 1000), and the difference between the district vs. state levels of child marriage (positive numbers indicating districts with prevalences higher than the state prevalence). Measures of connectivity were included to assess exposure to media messages and normative discussion about child marriage and the status of women and girls. Media connectivity variables included the percent of women aged 15–49 in the district who report watching television, listening to the radio or reading the newspaper at least one per week (respectively), the percent of women age 15–49 in the district who have a mobile phone that they use, and the percent of households in the district that have internet access. Community connectivity was measured by the percent women age 15–49 in the district who were aware of microcredit programs in the area, and who reported using microcredit programs. Microcredit program awareness and utilization serve as proxy measures for community connectivity in this context, as the majority of microcredit programs in India follow a Self-Help Group model, in which participants support one

another and work collaboratively to problem-solve (Batra, 2012; Folgheraiter & Pasini, 2009; Sankaran, 2005).

**Analyses.** The unit of analysis was the district, which is an administrative sub-division within Indian states or union territories. As analyses focused on proximity-based spatial relationships, districts with no neighbors (e.g. islands) or missing data were excluded (5 of 641 districts), for a total of 636 districts. There were an average of 18 districts in each state or union territory (range 1–71). We conducted both global and local exploratory and confirmatory geographic analyses. Exploratory analyses were used to calculate the prevalence of child marriage and each covariate across assessed districts. Global Moran’s I was calculated for each variable. Moran’s I is a global measure of spatial dependence, or autocorrelation, that measures whether the distribution of a given variable is random across geographic units (districts), or if that distribution is influenced by other nearby units (Getis, 2008). As Moran’s I is a global measure, it provides a single statistic for the entire group of analyzed units (again, districts) that indicates whether, across all analyzed districts, the distribution of a given variable is geographically random or not. Moran’s I test statistic and p-values were computed using Monte Carlo simulations. Distinct from (global) Moran’s I, local indicators of spatial autocorrelation (LISA) measure the degree of non-random spatial clustering around a specific unit (district) (Anselin, 1995). The local Moran’s I statistic is calculated as a LISA, with “hot spots” classified as spatially clustered districts with significantly similar higher values of a given variable, and “cold spots” classified as spatially clustered districts with significantly similar lower values of a given variable. P-values of <0.05 were used for all cluster identification.

Multivariable regression analyses explored spatial variations in two ways. First, global confirmatory spatial analysis used a spatial Durbin regression model to assess multivariable associations while accounting for spatial dependence. Spatial Durbin regression was selected a priori due to its ability to generate unbiased effect sizes, and its flexibility with regards to spillover effects (Elhorst, 2010; LeSage & Pace, 2009). Additionally, model fit robustness checks were conducted using likelihood ratio tests to compare nested regression models (spatially lagged X, spatial lag model, spatial error model, spatial Durbin error model, spatial Durbin model). The optimum fits across these models were the spatial Durbin model, and spatial Durbin error model (results not shown). As these two models are not nested in one another, and thus could not be compared using likelihood ratio tests, AIC was used as a final indicator of model fit, indicating that the spatial Durbin model was the best fit (AIC of 3381.7 vs. 3403.9). Spatial Durbin models include a spatially lagged dependent variable as well as spatially lagged independent variables, and can be represented as follows:

$$y = \rho W y + X \beta + W X \theta + \alpha 1_n + \epsilon$$

where  $y$  is the dependent variable (district-level prevalence of child marriage),  $\rho W y$  is the spatial autoregressive effect, or the endogenous effect of other districts’ dependent variable on a given district’s dependent variable, ( $\rho$  being the spatial autoregressive parameter,  $W$  being a row-standardized, queen contiguity spatial weight matrix representing the influences of neighboring districts, and  $W y$  being the spatially lagged dependent variable [district-level prevalence of child marriage]),  $X \beta$  is the vector of independent variables,  $W X \theta$  is the vector of spatially lagged independent variables (again using  $W$  as the spatial weight matrix representing the influences of neighboring districts),  $\alpha 1_n$  is the intercept coefficient for a vector of 1 by  $n$  geographic units, and  $\epsilon$  is the error term. (Elhorst, 2010; LeSage & Pace, 2009) Spatially lagged variables are thus contiguity-weighted averages of that variable’s values in neighboring geographic units. As spatial Durbin models are able to assess global and local spillover effects that may vary across independent variables, (Anselin, 1988; Elhorst, 2010; LeSage & Pace, 2009) they produce simulated estimates of direct, indirect and total effects. Direct effects are those in which changes in the vector of independent variables in a given unit (district) change the dependent variable in that unit.

(Elhorst, 2010; LeSage et al., 2014; LeSage & Pace, 2009) Indirect effects, often termed spatial spillovers, measure the degree to which changes in the vector of independent variables in a given unit (district) change the dependent variable value in other units (districts). Total effects are the sum of direct and indirect effects.

Second, geographically weighted regression illustrates how global effects may vary across space (spatial heterogeneity). This approach applies linear regressions locally to each unit of analysis (districts) to show how the relationships between factors associated with child marriage may vary in different geographic areas (Fotheringham, Brunson, & Charlton, 2002). All variables used in the spatial Durbin model were fitted to a multivariable linear regression model that was then applied locally at each district to calculate district-level regression coefficients, represented as follows:

$$y_i = \beta_{i0} + \sum_{k=1}^p \beta_{ik} x_{ik} + \epsilon_i$$

where  $y$  is the dependent variable (district level prevalence of child marriage) in district  $i$ ,  $\beta_{i0}$  is the intercept term in district  $i$ ,  $p$  is the number of independent variables,  $\beta_{ik}$  is the regression coefficient for independent variable  $k$  in district  $i$ ,  $x_{ik}$  is independent variable  $k$  in district  $i$ , and  $\epsilon_i$  is the error term in district  $i$ . Geographically weighted regression results are mapped showing significant ( $p < 0.10$ ) coefficient results calculated from t-values. (Mennis, 2006)

All analyses were conducted in Stata 15.1 and R 3.6.0. Ethical exemption for analysis of this publicly available, deidentified data was provided by the University of California San Diego.

## Results

The prevalence of marriage before age 18 among women age 20–24 across assessed Indian districts in 2015-16 is 25% (Table 1). On average across districts, female residents are mainly rural-residing (72%), identify as SC/ST or OBC (75%), have 9 years of education, and television is the most common form of regular media connectivity reported (69% weekly use). An average of more than one in three (37%) women across districts were aware of microcredit programs, and an average of one in six (16%) women across districts reported using a microcredit program. All assessed variables showed significant spatial dependence, indicating that the levels of assessed variables were not randomly distributed across districts. The magnitude of this spatial dependence ranged from a high of 0.75 (female weekly television use) to a low of 0.31 (sex ratio at birth), indicating that all variables have non-random, spatial clustering that warrants adjustment.

District-level mapping shows wide inter- and intra-state heterogeneity in levels of child marriage (Fig. 1). Hot and cold spots (clusters of districts with high and low levels of child marriage, respectively) appeared concentrated around state borders, with examples of this seen for the border of Bihar and Jharkhand, Rajasthan and Madhya Pradesh, and Telangana and Andhra Pradesh. Spatial clustering was also clear for levels of female education, with clusters of lower levels in the eastern and western regions, and clusters of higher levels of education in the northern and southern regions (Appendix Fig. 1). Media use tended to be clustered in the northern and south-western parts of the country, with central India having clusters of low mobile phone access. In terms of community connectivity, districts with higher levels of microcredit awareness and utilization were clustered in southern and south-eastern India.

Multivariable spatial Durbin modeling indicates that district-level child marriage prevalences are driven largely by direct effects from sociodemographic and connectivity measures, and by both direct and indirect geographic effects. Districts that were farther from non-ocean state borders had lower levels of child marriage, though these associations were driven by indirect effects, often referred to as spillovers ( $-5.5, p = 0.001$ ). In other words, districts near border-proximate districts

**Table 1**  
Descriptive statistics for assessed variables.

	Mean (SD)	Global Moran’s I	
		Test statistic	p-value
Child marriage prevalence (%)	25.3 (13.7)	0.71	0.01
<b>Geography</b>			
Log distance to state border (per 100 km)	8.2 (0.9)	0.46	0.01
Log density (population/km <sup>2</sup> )	-1.0 (1.2)	0.69	0.01
Log area (km <sup>2</sup> )	15.1 (1.0)	0.47	0.01
<b>Sociodemographics</b>			
Rural residents (%)	71.6 (21.5)	0.43	0.01
SC/ST or OBC (%)	74.7 (20.3)	0.65	0.01
Muslim (%)	12.6 (17.4)	0.74	0.01
Female education (years)	9.0 (2.1)	0.70	0.01
Female:male sex ratio at birth among births in the last six years (per 1000)	902.5 (59.9)	0.31	0.01
District-state differences in prevalence of child marriage (%)	0.6 (9.4)	0.35	0.01
<b>Media connectivity</b>			
Female weekly television use (%)	68.7 (22.1)	0.75	0.01
Female weekly radio use (%)	10.3 (9.2)	0.68	0.01
Female weekly newspaper use (%)	24.3 (14.5)	0.64	0.01
Female mobile phone access (%)	45.6 (16.9)	0.66	0.01
Household has internet access (%)	13.1 (12.3)	0.64	0.01
<b>Community connectivity</b>			
Female microcredit program awareness (%)	37.4 (17.6)	0.54	0.01
Female microcredit program utilization (%)	15.9 (12.5)	0.44	0.01

SD = standard deviation.

tend to exhibit higher levels of child marriage. Overall, increases in both log population density and log area were associated with increases in child marriage prevalence; the magnitude of association was larger for indirect effects (9.3,  $p < 0.001$  and 3.5,  $p = 0.02$ , respectively) than direct effects (1.7,  $p < 0.001$  and 1.4,  $p < 0.001$ , respectively) (Table 2).

Districts with higher levels of women who self-identified as SC/ST or OBC had slightly lower levels of child marriage ( $-0.03, p = 0.01$ ) (Table 2). Female education was an important factor associated with lower levels of child marriage in terms of direct (within-district) associations, as well as the spillover effects of neighboring districts on levels of child marriage (Table 2). For every additional year of average female education in a district, there was a 0.6% reduction in the prevalence of child marriage in that district. For every additional year of average female education in neighboring districts, there was a 3.1% reduction in the prevalence of child marriage in a given district. District-state differences in child marriage levels were positively associated with direct effects on child marriage prevalence, but not indirect effects. Rural residence, the percent of Muslim female residents, and sex ratio at birth were not associated with district levels of child marriage in this model.

In terms of media connectivity, the majority of effects were direct. The prevalence of women reading a newspaper weekly was associated with a direct effect decrease in child marriage prevalence (every 10 percentage point increase in weekly newspaper use was associated with a 1.2 percentage point decrease in the district prevalence of child marriage) (Table 2). Districts with higher female mobile phone access had lower levels of child marriage (Table 2). Every 10 percentage point increase in female mobile phone access was associated with a 0.4



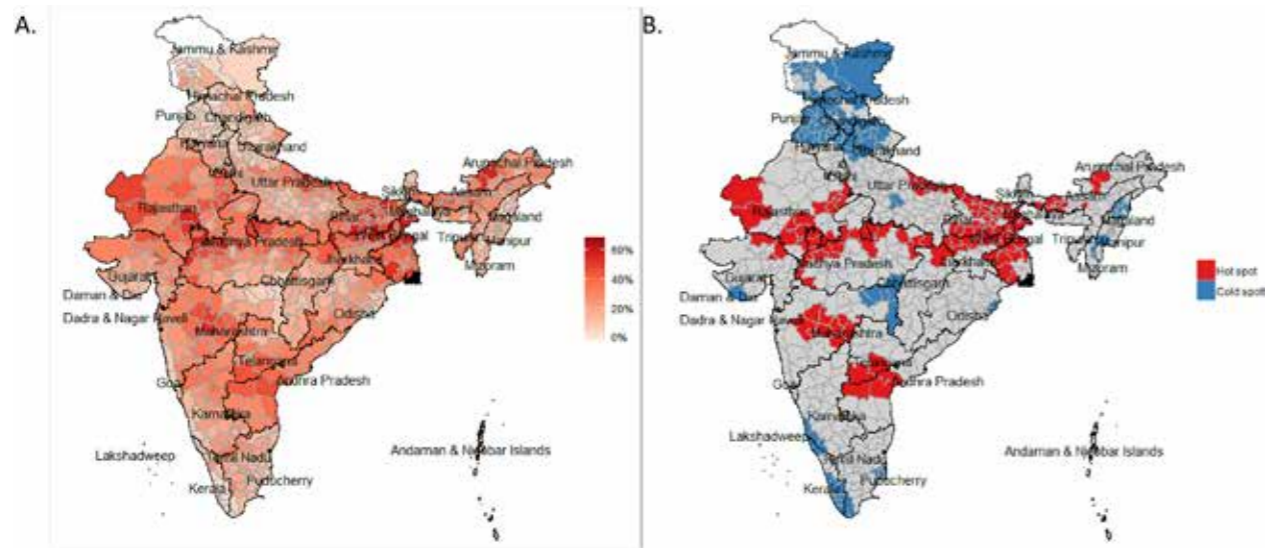


Fig. 1. Prevalence of child marriage among women aged 20–24 years across districts (A), and local indicators of spatial association (B) in 2015–16. Note: In Fig. 1B, hot and cold spots indicate clusters of districts with high and low (respectively) child marriage prevalences that are statistically similar to their neighbors at  $p < 0.05$ . Grey indicates no significance and white indicates data not available.

Table 2  
Spatial Durbin multivariable regression model assessing associations with district-level child marriage prevalence in India, 2015–16.

	Direct marginal effects				Indirect marginal effects				Total marginal effects			
	Coefficient	SE	z-value	p-value	Coefficient	SE	z-value	p-value	Coefficient	SE	z-value	p-value
<b>Geography</b>												
Log distance to non-ocean state border (per 100 km)	0.170	0.200	0.804	0.421	-5.502	1.686	-3.259	0.001	-5.332	1.761	-3.028	0.002
Log density (population/km <sup>2</sup> )	1.363	0.289	4.755	<0.001	3.551	1.464	2.412	0.016	4.914	1.498	3.275	0.001
Log area (km <sup>2</sup> )	1.735	0.256	6.699	<0.001	9.339	2.338	4.003	<0.001	11.075	2.497	4.436	<0.001
<b>Sociodemographics</b>												
Rural residents (%)	-0.009	0.014	-0.579	0.562	-0.080	0.091	-0.808	0.419	-0.089	0.098	-0.829	0.407
SC/ST or OBC (%)	-0.031	0.012	-2.455	0.014	-0.136	0.076	-1.830	0.067	-0.167	0.080	-2.106	0.035
Muslim (%)	-0.023	0.017	-1.345	0.179	-0.093	0.092	-0.967	0.334	-0.116	0.097	-1.147	0.251
Female education (years)	-0.596	0.157	-3.820	<0.001	-3.052	0.894	-3.473	0.001	-3.684	0.940	-3.941	<0.001
Female:male sex ratio at birth (per 1000)	-0.004	0.003	-1.283	0.200	-0.003	0.027	-0.199	0.843	-0.007	0.029	-0.320	0.749
District-state differences in prevalence of child marriage (%)	0.768	0.019	39.623	<0.001	-0.133	0.151	-0.931	0.352	-0.636	0.161	3.898	<0.001
<b>Media connectivity</b>												
Female weekly television use (%)	-0.016	0.017	-0.949	0.343	-0.167	0.100	-1.692	0.091	-0.183	0.104	-1.781	0.075
Female weekly radio use (%)	0.022	0.026	0.790	0.429	0.037	0.164	0.249	0.803	0.059	0.169	0.364	0.716
Female weekly newspaper use (%)	-0.120	0.022	-5.420	<0.001	-0.004	0.125	0.028	0.978	-0.124	0.130	-0.890	0.373
Female mobile phone access (%)	-0.043	0.017	-2.537	0.011	0.181	0.107	1.677	0.094	0.139	0.113	1.207	0.227
Household has internet access (%)	-0.011	0.022	-0.510	0.610	-0.114	0.123	-0.977	0.329	-0.125	0.130	-1.010	0.312
<b>Community connectivity</b>												
Female microcredit program awareness (%)	0.014	0.011	1.288	0.198	-0.077	0.075	-1.018	0.309	-0.062	0.081	-0.771	0.441
Female microcredit program utilization (%)	0.075	0.015	5.002	<0.001	0.163	0.118	1.419	0.156	0.237	0.126	1.919	0.055
<b>Spatial effect</b>												
Rho (Spatial lag)											0.85	<0.001
<b>Model fit statistics</b>												
AIC											3380.8	
Nagelkerke pseudo R <sup>2</sup>											0.94	
Log-likelihood											-1655.38	
Lagrange multiplier test (residuals' autocorrelation)											15.02	<0.001

Results show distributions based on 500 multivariable normal distribution simulations. Fit statistics (AIC, R<sup>2</sup>, log-likelihood, LM test) are for the entire model.

percentage point decrease in child marriage prevalence. Female television use was indirectly, though marginally, associated with child marriage. For every increase of 10 percentage points in female weekly

television use in neighboring districts, there was a 1.7 percentage point reduction in child marriage prevalence in a given district ( $p = 0.09$ ). Female radio use, household internet access and microcredit program

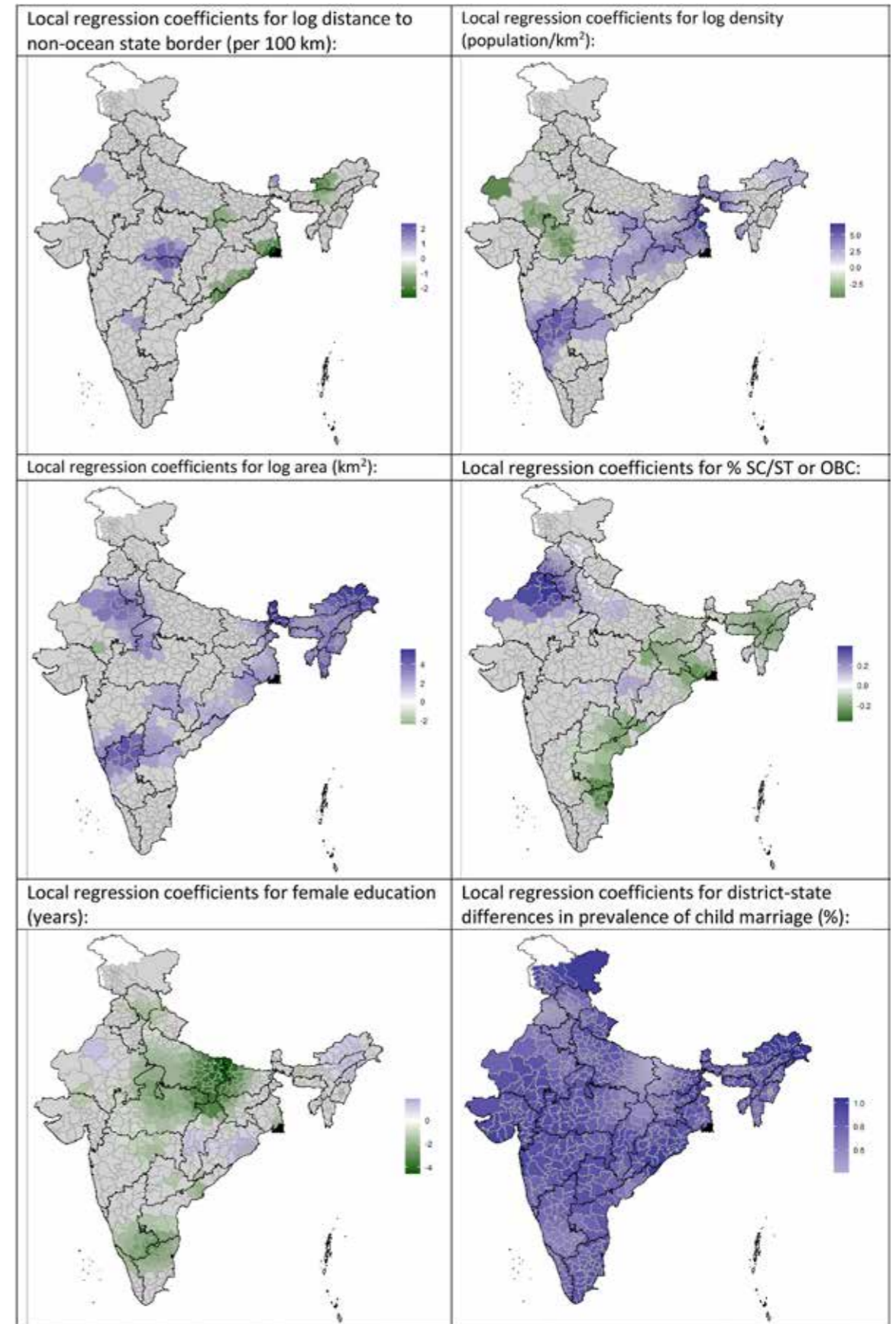


Fig. 2. Geographically weighted regression showing local regression coefficient values for the association between predictor variables and levels of child marriage across Indian districts, 2015–16. Regressions are adjusted for all variables shown in Table 2; only coefficients significant at  $p < 0.10$  are displayed.



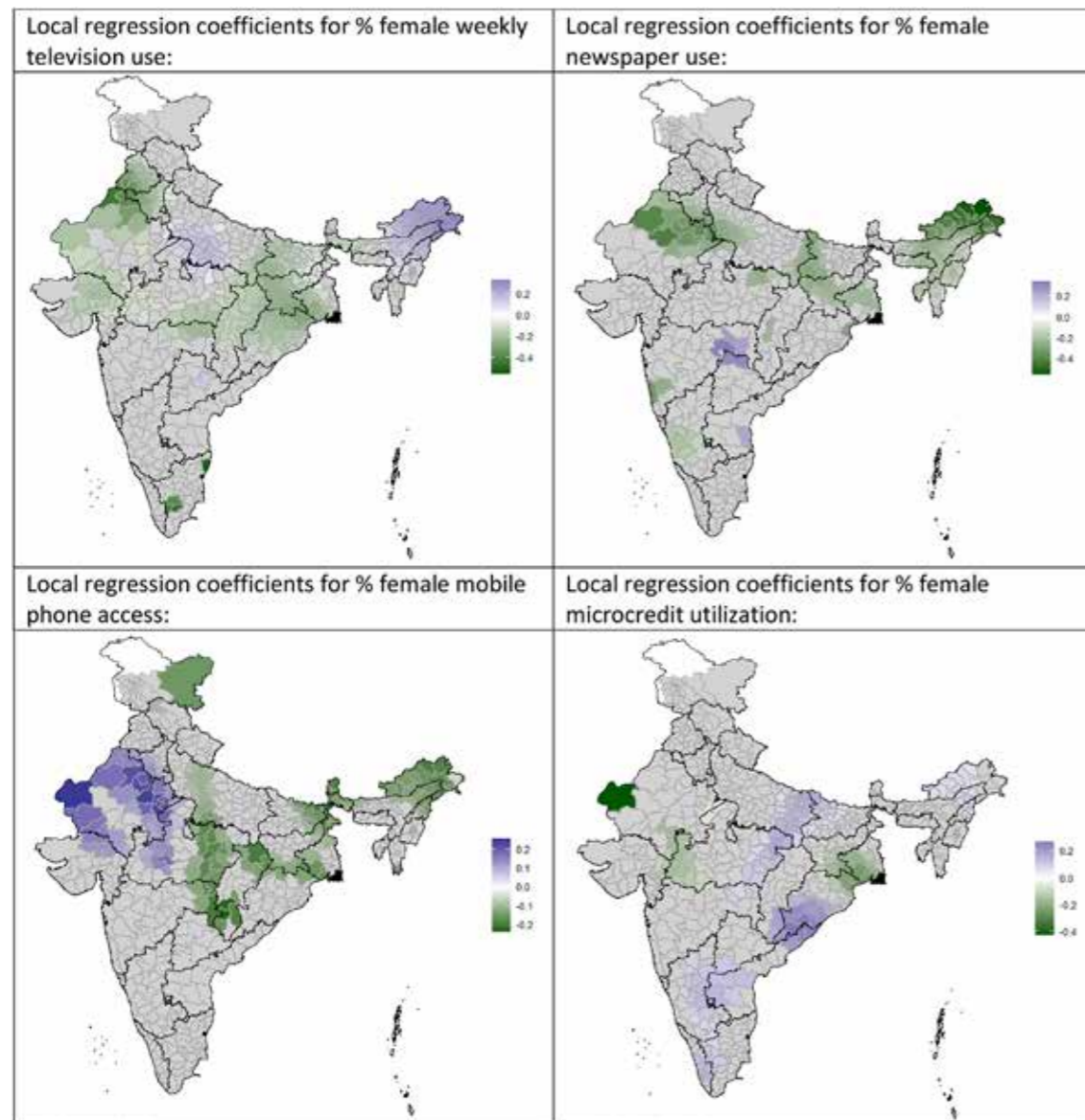


Fig. 2. (continued).

awareness were not associated with district levels of child marriage in this model. Microcredit program utilization, however was associated with a slight increase in district child marriage levels (for every 10% of the female population who reported microcredit program utilization, there was a 0.8 percentage point increase in district child marriage levels).

Geographically weighted regression was used to explore local spatial heterogeneity in the associations identified through the global spatial Durbin model. All variables that were significant in Table 2 showed substantial heterogeneity in their coefficients of association with district-level child marriage levels (Fig. 2). The district-specific associations between distance from non-ocean state borders and levels of child marriage were most strongly positively clustered around the borders between Madhya Pradesh, Chhattisgarh and Maharashtra (e.g. longer distances to state borders were associated with higher district levels of child marriage), and most strongly negatively clustered in West Bengal, Odisha and Arunachal Pradesh (e.g. longer distances to state borders were associated with lower district levels of child marriage). The associations between higher population density and higher prevalences of child marriage were strongest in a swath of districts from the south-west

of India to the north-east, spanning a number of states. SC/ST or OBC status was most associated with higher prevalences of child marriage in northern Rajasthan, and most associated with lower levels of child marriage in northern Tamil Nadu and southern West Bengal. Associations between higher levels of female education and lower levels of child marriage were strongest around the Uttar Pradesh/Bihar/Chhattisgarh border areas. Television use was most strongly associated with lower levels of child marriage in Tamil Nadu and northern Rajasthan, while newspaper use was most associated with lower levels of child marriage in Arunachal Pradesh, central Rajasthan, and the Uttar Pradesh/Bihar/Jharkhand border area. Female mobile phone access was associated with lower levels of child marriage in central and north-eastern India, particularly in southern Chhattisgarh and eastern Maharashtra.

#### Discussion

Findings from this study underscore the need for a nuanced understanding of the geographic, cultural, social, normative and political contexts that influence child marriage in India, and emphasize the importance of local factors associated with child marriage which may be

masked by national, or even state-level, estimates. This analysis of the first National Family Health Survey in India designed to be representative at the district level reveals substantial subnational geographic variation in the district-level prevalence of child marriage among women aged 20–24 in India, as well as the presence of spatial dependence and spatial heterogeneity in factors associated with child marriage. This indicates both that the relationships between some district-level sociodemographic and normative factors (e.g. marginalized group status, female education and some forms of media access) and child marriage levels are influenced not only by the prevalence of those factors within each district, but also levels of those factors in neighboring districts. Additionally, the strength of those relationships varies substantially across geographies.

Geographic factors were strongly predictive of child marriage in multivariable regression accounting for that spatial dependence, suggesting that these place-based characteristics (particularly density and area) are strongly related to levels of child marriage within communities (districts, in this analysis). This relationship was influenced not only by the district's own characteristics, but also by the characteristics of neighboring districts. This statistically significant interplay across districts' characteristics highlights the tremendously contextual nature of child marriage, and particularly the social and normative factors that influence age at marriage (Cislaghi et al., 2020). Hotspots of heightened levels of child marriage were identified in border districts of Madhya Pradesh, Rajasthan, West Bengal, Bihar, Jharkhand, Andhra Pradesh, and Telangana.

These relationships between neighboring states are of great importance in understanding the sub-national heterogeneity of child marriage in India. While Indian states may differ from one another with respect to administrative capacity and legal frameworks (Harriss, 1999), many state boundaries can be considered porous in terms of culture, with people from the same caste or sub-caste communities residing in adjacent states (Dheer et al., 2015). In the context of child marriage, this is key, as traditionally, marriages in India occur between individuals from the same sub-caste or community (Kaur & Palriwala, 2018). In states with male-skewed sex ratios like Rajasthan, families have been known to buy brides from neighboring states, with the majority of the girls being minors (Times of India, 2017). While, to the authors' knowledge, no academic studies examine the spatial prevalence of this practice, it is plausible that such transactions are more common across border regions. Indeed, we find evidence that there are significant and negative indirect effects of distance to state borders, demonstrating that districts whose neighboring districts are near state borders generally exhibit higher prevalences of child marriage. These results seem to substantiate the idea that the illegal practice of child marriage clusters in state border areas, and that additional, geographically-focused prevention efforts may be warranted.

The sharing of communities across state borders may be of particular importance for recently formed states based on shared laws, histories and cultural practices. Telangana and Andhra Pradesh were a single state prior to 2014, with people from the same communities inhabiting both states, clustered around the border regions (Srinivasulu, 2002). Jharkhand was a part of Bihar prior to 2000, and shares borders with both Bihar and West Bengal. There are hot spots of child marriage along all of these recently formed borders. Tribal child marriage fairs are relatively common in districts of West Bengal that are bordering with Jharkhand, and see participation from all neighboring regions (Jha et al., 2016). The neighboring states of Jharkhand, West Bengal, Bihar and Uttar Pradesh also face issues with the trafficking of minor girls across the India-Nepal border, a risk factor for child marriage in that families may marry their minor daughters due to fear of sexual violence (Deb & Sanyal, 2018; Verma et al., 2013; Vindhya & Dev, 2011). These more recently-formed border areas also tend to share similar characteristics in terms of sociodemographic (e.g. SC/ST or OBC) and media/communication (e.g. television and newspaper use in the Bihar/Jharkhand border area) factors associated with child marriage.

This area is also the region in which direct, and particularly indirect, effects of district population density drive child marriage levels. Population density of neighboring districts was identified as a strongly positive predictor of child marriage prevalence overall, and spatial heterogeneity analyses found this relationship to be particularly strong in areas of Karnataka, Chhattisgarh, Jharkhand and West Bengal. Some of the geographically-specific characteristics that may influence this relationship in these areas include high percentages of marginalized groups, low levels of female education (see Appendix Fig. 1), generally low population densities and few large cities apart from Hyderabad. Urbanization in such a context may confer wealth but fewer social norm shifts often associated with urbanity (Elias & Jephcott, 1994). Income distributions between less and more densely sectors are dynamic: relatively wealthy rural residents tend to urbanize, but may find themselves less wealthy and occupying lower social status than their new urban cohorts (Datt, Ravallion, & Murgai, 2016), especially when urban development has been prioritized in national planning (Fan, Chan-Kang, & Mukherjee, 2005). As few megacities exist in this geographic corridor, urbanization may thus magnify the social normative practices of the sending areas. These trans-border cultural, ethnic and social and normative commonalities stand in relatively stark contrast with the majority of child marriage interventions, which are often still organized with states as the unit of analysis and implementation (Government of India, 2020; Jha et al., 2016; Ministry of Women and Child Development and Government of India, 2010); this geographic disconnect may limit the effectiveness of these programs, with particular consequences for communities near state borders.

Higher levels of female education in a given district were significantly associated with lower levels of child marriage, in line with many previous studies (Raj et al., 2019; Baird, Chirwa, McIntosh, & Özler, 2010; Kalamar, Lee-Rife, & Hindin, 2016; Lee-Rife et al., 2012; Malhotra, Warner, McGonagle, & Lee-Rife, 2011). Importantly, however, the results also identify a significant indirect association between female education and child marriage, one that is in fact substantially larger in magnitude than the direct effect. High levels of female education in neighboring districts predict lower levels of child marriage in a given district five times more powerfully than those within its own boundaries. Thus, while the level of female education within a district has a strong and negative association with child marriage, that association is substantially larger based on levels of girl education in neighboring districts. Cross-border marriages, including the practice of bride buying noted above, may in part explain this finding. An additional plausible explanation is that of social diffusion, where districts with higher levels of girl education and lower levels of child marriage may be more likely to both passively and actively share those values and norms, as well as backlash and stigma associated with norm divergence, with nearby communities (Nguyen et al., 2019; Starmann et al., 2018). This may be indicative of a broader social benefit mechanism to girl education, highlighting positive spillover effects of the normalization of increased valuation of girl education and gender equity and thus increased emphasis on girls' schooling and delayed marriage. In India, child marriage prevention programs have in large part focused on incentives for completing secondary school, though there have also been initiatives to improve girls' empowerment, autonomy and rights awareness (Jha et al., 2016; Kalamar et al., 2016; Lee-Rife et al., 2012; Mehra, Sarkar, Sreenath, Behera, & Mehra, 2018; Prakash et al., 2019). Implementation of most of these programs, even those that are centrally funded, has generally been targeted to select states or districts, and evidence is mixed on their effectiveness (Government of India, 2020; Jha et al., 2016; Kalamar et al., 2016; Lee-Rife et al., 2012; Ministry of Women and Child Development and Government of India, 2010; Prakash et al., 2019). These results suggest that interventions designed to reduce child marriage through education would be well served by considering regional, rather than targeted, interventions to increase education in a broader geographic area that may bridge across state borders.

Media connectivity, as measured via weekly newspaper use and



mobile phone access for women, was strongly associated with lower district levels of child marriage, even after accounting for other covariates; this association was present, but marginal, for television use. Access to these forms of media may be broadly representative of higher socioeconomic status, which tends to be associated with lower levels of child marriage (Raj, 2010; Efevbera et al., 2019). Indeed, 74% of women in the highest household wealth quintile in India have mobile phone access, compared to only 22% in the lowest quintile; 61% of women in the highest wealth quintile report weekly newspaper use, vs. 5% in the lowest quintile (International Institute for Population Sciences (IIPS) & ICF, 2017). The associations between media connectivity and child marriage, however, had heterogeneous coefficient values across India, suggesting that there are geographically-specific factors differentially affecting these relationships. To the extent that child marriage prevention programming uses newspapers or text messages as part of their communication strategies, this variation may reflect differences in programming availability and messaging across India. The fact that radio use was not associated with child marriage in this analysis may reflect its low overall prevalence (only 11% of women nationally reported weekly radio use), which may simply be too small to influence norms and behaviors in the nation as a whole (International Institute for Population Sciences (IIPS) & ICF, 2017).

As a result of the normative underpinnings of child marriage, prevention programs, as with many initiatives focused on behavior and norms change, commonly use multi-channel social change communication strategies: individual, small group, or community mobilization approaches within the local community that directly target program recipients, while mass media conveys advocacy, education and awareness messages more broadly to reinforce interpersonal communications (Gage, 2013; Jha et al., 2016; Kalamar et al., 2016; Lee-Rife et al., 2012; Mehra et al., 2018; Prakash et al., 2019; Svanemyr, Amin, Robles, & Greene, 2015; Wakefield, Loken, & Hornik, 2010). The use of mass media creates opportunities for program messages to reach beyond direct intervention recipients, thus expanding and amplifying the potential reach and effects of the program. Diffusion of this sort has been seen in many programs aiming to shift norms and behaviors, as well as within child marriage prevention programs in diverse settings including India, Bangladesh, and Ethiopia (Amin, Saha, & Ahmed, 2018; Gage, 2013; Mehra et al., 2018; Nguyen et al., 2019; Starmann et al., 2018). Connectivity, including to one's neighbors and communities, is one of the main ways that these messages can spread, and there is evidence to suggest that these diffusion pathways can be explicitly integrated into program design (Cislaghi et al., 2019a; Starmann et al., 2018).

However, the associations between weekly newspaper use, mobile phone access and child marriage were primarily direct, and not reflective of neighboring districts. This suggests that diffusion is either occurring at a more localized level (within districts, rather than across), that diffusion of the association between media connectivity and child marriage is not yet uniformly occurring across India, or as noted above, that media connectivity may be indicative of socioeconomic status. Indeed, the geographically heterogeneous associations between media connectivity and child marriage identified in this study highlight stronger protective relationships in the East and Northeast regions. This suggests that the multi-channel approach engaged in social and behavior change efforts is not a universally effective approach across India, but must be contextualized to locally relevant media modalities; newspaper and mobile phone channels may merit particular consideration.

These associations between media connectivity and child marriage should particularly be considered in terms of reach and relationship (International Institute for Population Sciences (IIPS) & ICF, 2017). While newspapers offer a unidirectional transfer of information, mobile phones are more bidirectional, enabling users to initiate and receive communications with others, as well as to receive information in the case of smartphones (not assessed in these data). On average, mobile phones are able to reach more Indian women than most forms of traditional mass media, barring television; overall, districts had nearly

twice as many women with mobile phone access compared to those who read the newspaper weekly (46% vs. 24%). However, women with media and mobile phone access both tend to live in urban areas, be more educated, and live in wealthier households, suggesting that these approaches risk missing the most marginalized and vulnerable populations (International Institute for Population Sciences (IIPS) & ICF, 2017). As mobile phones become more and more common across India, particularly among younger women, they offer important opportunities for regular access to populations both at risk of, and with influence over, child marriage. These avenues for communication may offer low-cost means for engaging more young people in conversations around child marriage messaging and creating additional opportunities for youth-centered interventions and change. Communities with higher levels of mobile phone access for women may be better positioned to benefit from mobile phone-focused child marriage programming efforts, but the relationships between mobile phone access and early marriage in those communities should be considered when determining the suitability of this programmatic approach. Additionally, caution is needed, as the most vulnerable girls and women may be least likely to have access to this technology, emphasizing the importance of closing the digital divide.

Only one measure of community connectivity was associated with child marriage in these analyses. In multivariable models, higher levels of female microcredit utilization were associated with slightly increased levels of child marriage. This finding should be interpreted in context, and with caution. It is not an indication that microcredit programs increase risk for child marriage in India; these data are cross-sectional, and represent average levels of microcredit program participation among all women in India. Microcredit programs can serve as indicators of area level deprivation, as they are often targeted to women who are more socially and economically compromised (Swain & Wallentin, 2009). The prevalence of these programs may thus be acting as a marker of risk for child marriage rather than a direct measure of community connectivity. Importantly, measures of microcredit program awareness and participation were included in only a subset of interviews, and designed to be representative at the state, rather than district, level. The authors, some of whom were involved in the design and implementation of NFHS-4, believe these data were of adequately high prevalence for limited inferences to be made at the district level, but these findings should be interpreted with caution. Additional measures of community connectivity, which is a complex concept, would be of benefit to explicate this relationship and are unfortunately not available in these data.

Effective child marriage programmatic adaptation to local contexts requires both a detailed understanding of those contexts, as well as buy-in and effective, coordinated local partnerships (Chandra-Mouli, Plesons, Barua, Sreenath, & Mehra, 2018; Jha et al., 2016; Lo Forte, Plesons, Branson, & Chandra-Mouli, 2019). These partnerships are needed at the local district level, but also as a convergence of efforts by neighboring districts and states in order to effectively address the practice of child marriage. This further illustrates the importance of community engagement and multimedia efforts that address communities, even when dispersed across state borders, as well as the need for coalitions of districts that cross state borders, as opposed to efforts that are nationally driven or even state-based. Examining factors associated with child marriage from a geographic perspective that accounts for the complex ways that place influences this practice is an important lens with which to advance understanding of the ways that norms affect child marriage at community, rather than individual, levels. Additionally, these findings suggest that traditional markers of geographic administrative boundaries may be inadequate, and even counter-productive, in identifying which communities and localities most influence social norms around child marriage. Place-based engagement efforts that call on officials in neighboring localities to work in concert are likely to be more effective. Further, participatory approaches that engage communities in identifying and drawing their own boundaries of community identification and social network connections can be particularly informative in

defining programming areas (Bates, Marvel, Nieto-Sanchez, & Grijalva, 2019; Igras, Diakite, & Lundgren, 2017).

This study must be interpreted in terms of its limitations. All self-response survey data are subject to recall bias and social desirability bias. As data were aggregated to the district level, this is an ecological analysis, and results should not be interpreted to be representative of each individual living within assessed districts. Data are cross-sectional, and causality cannot be presumed. Finally, this study concerns itself with norms and social change communications with imperfect proxies. For example, one may broadly measure media utilization, but details are lacking of that utilization source and content (e.g. community vs. state vs. national media, child marriage programming exposure). Nevertheless, these data represent the best available measures of these phenomenon in a recent, nationally-representative Indian sample.

Even as significant gains have been made in reducing the rates of child marriage in India at the national level, intra-state inequalities highlight areas where greater push may be needed to enforce policies to more uniformly prevent this practice. Gender discriminatory norms are reinforced by a lack of educational and economic alternatives to child marriage, especially for girls in the lowest socioeconomic strata. These risks are likely to compound in the context of the COVID-19 pandemic with many countries, including India, facing school closures and economic distress (Svanemyr et al., 2015; UNFPA & UNICEF, 2018b; United Nations, 2020). Identifying areas of increased vulnerability to COVID-19-related child marriage accelerations may allow policy-makers to recognize intra-state disparities and more directly target the needs of vulnerable districts. Because of the complexity of factors contributing to child marriage, efforts to combat it span many domains. Prior research has called for understanding of structural factors as well as norms that influence child marriage (Roest, 2016); this analysis supports this call, but additionally demonstrates that geographic place, and the characteristics of neighboring geographies that broadly represent culture and normative values, matter for levels of child marriage and key associated factors. Given the heterogeneous array of child marriage prevention programs that have been implemented in India, in terms of target population and program content and design, these findings underscore the need for a deeper understanding of local challenges to roll-out, delivery, and uptake (Jha et al., 2016; Kalamar et al., 2016; Lee-Rife et al., 2012). Mass media such as newspapers and mobile phones, may be important communication avenues for child marriage prevention and norm change programs, but additional research into the influence of locally rooted, place-based forms of media (i.e. community media) would likely offer additional insights into the most influential platforms for community engagement, particularly in districts near border-proximate districts. Program designers should also consider that girls' education is important within local contexts (districts, in this case), but even more so within larger spatially-dependent cultural and socioeconomic contexts in which normative behaviors and exchange systems associated with child marriage thrive. Finally, more research is needed to understand differential risks for child marriage among border-proximate districts that may require joint action by states. Identifying reasons for these heightened vulnerabilities is needed to facilitate and improve intra- and cross-state child marriage prevention efforts.

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#### Ethical statement

Ethical exemption for analysis of this publicly available, deidentified data was provided by the University of California San Diego.

#### Declaration of competing interest

LM, HS, ND, NB, AS, TLM and AR have no declarations of interest. CL and DC are employed by one of the agencies that funded this analysis. Their input into analyses and objective interpretation of findings were not influenced by their employment.

#### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ssmph.2020.100688>.

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United Nations Children's Fund  
3 United Nations Plaza  
New York, NY 10017, USA

[www.unicef.org](http://www.unicef.org)

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