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Early marriage and early childbearing in South Asia: trends, inequalities, and drivers from 2005 to 2018

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Early marriage (EM) and early childbearing (ECB) have far-reaching consequences. This study describes the prevalence, trends, inequalities, and drivers of EM and ECB in South Asia using eight rounds of Demographic and Health Survey data across 13 years. We report the percentage of ever-married women aged 20–24 years ($n = 105{,}150$) married before 18 years (EM) and with a live birth before 20 years (ECB). Relative trends were examined using average annual rate of reduction (AARR). Inequalities were examined by geography, marital household wealth, residence, and education. Sociodemographic drivers of changes for EM were assessed using regression decomposition analyses. We find that EM/ECB are still common in Bangladesh (69%/69%), Nepal (52%/51%), India (41%/39%), and Pakistan (37%/38%), with large subnational variation in most countries. EM has declined fastest in India (AARR of –3.8%/year), Pakistan (–2.8%/year), and Bangladesh (–1.5%/year), but EM elimination by 2030 will not occur at these rates. Equity analyses show that poor, uneducated women in rural areas are disproportionately burdened. Regression decomposition analysis shows that improvements in wealth and education explained 44% (India) to 96% (Nepal) of the actual EM reduction. Investments across multiple sectors are required to understand and address EM and ECB, which are pervasive social determinants of maternal and child wellbeing.

Keywords: early marriage; early birth; South Asia; women; inequalities

Introduction

Child marriage refers to any formal or informal union between a child under the age of 18 and an adult or another child.[1] Globally, 21% of women alive in 2020 were married before their 18th birthday and 12 million girls under 18 are married each year—this is about 23 girls married as children every minute.[1] South Asia is home to more child brides than any global region. Together, India and Bangladesh have more child brides than the next 14 countries combined, ranked by absolute burden.[2] Marriages in India and Bangladesh often occur very early; in 2017, 7% of women in India[3] and 22% of women in Bangladesh[4] were married by age 15. Progress toward achieving target 5.3 of the Sustainable Development Goals—eliminating harmful practices, including early and forced marriage by 2030—depends on progress in South Asia.

Getting marriage timing right is a fulcrum for achieving outcomes related to gender equity, maternal and child nutrition, fertility, education, employment, and livelihoods,[5,6] and delaying age at marriage is included in an evidence-based package of recommended interventions addressing adolescent girls and young women.[7] Education and employment in particular are intimately related to early marriage (EM); if girls have neither, EM is the only option for many South Asian families given

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cultural and religious practices. For this reason, delaying marriage requires changing mindsets and social norms. In South Asia, the problem of EM is compounded by the cultural norm to have children soon after marriage; fewer than 1% of births in India occur out of wedlock, in contrast with more than 40% in the United States, the United Kingdom, and Sweden for example.[8] Delaying age at marriage in South Asian countries will, therefore, also delay when young women first have children.

In almost all cases, adolescents are not mentally, socially, or financially equipped to give birth and care for infants. Early childbearing (ECB) also harms the mother—pregnancy and childbirth complications are the leading cause of mortality in girls aged 15–19 years[9]—and works through multiple pathways to influence neonatal morbidity, neonatal mortality, and child growth.[10–12]

Reducing EM and ECB in South Asia requires well-targeted multilevel and multisectoral efforts that converge[13,14] on the right people at the right time during their lives.[15,16] Effective targeting requires a deep understanding of the problem—whom it affects, where it is, how quickly it has changed over time in different subpopulations, and, finally, how these changes relate to changes in known determinants. Previous studies on this topic have focused on single or few countries in the region, or have examined drivers using cross-sectional methods, or did not include inequality analyses, or did not report on both EM and ECB together.[5,17–19] Trends, the relationship between EM and birth spacing, and determinants of EM have been examined using Demographic and Health Surveys (DHS) data from South Asian countries.[17,20] Trends in EM and links with education in South Asia using DHS data from about 1990 to 2010 have also been explored.[21,22] Collectively, these studies show faster reduction in EM prevalence among younger girls, underscoring the importance of disaggregating age groups when reporting trends.

Our aims were to temporally extend and build upon previous work using the most recent DHS data by (1) describing how EM and ECB have changed over approximately the last decade in South Asia, by narrow age bands, to determine if countries are on track to achieve the 2030 SDG target; (2) using new techniques to examine changes in absolute and relative inequalities in EM and ECB prevalence by marital household wealth, residence, and education; and (3) quantifying the reduction in EM attributable to improvements in two key determinants—marital household wealth and women's education.

Methods

Data sources

We used DHS data from four South Asian countries: Bangladesh, India, Nepal, and Pakistan. We included two rounds of surveys from each country: the most recent round and a round approximately one decade earlier. The DHS equivalent in India is the National Family Health Survey (NFHS), and we used the 2006 and 2016 NFHS rounds. The following DHS surveys were used for other countries: 2007 and 2014 for Bangladesh, 2005 and 2016 for Nepal, and 2007 and 2018 for Pakistan. DHS data were unavailable for Sri Lanka and Bhutan, so we did not include these two countries in our analyses. We also did not include the Maldives, despite DHS data being available, as this country is not representative of the region and has a relatively tiny population. Finally, given our goal of assessing trends, we were not able to include Afghanistan given that only a single round of data from 2015 was available at the time of analysis. The total number of households surveyed across all rounds was 867,978. The final sample size of ever-married women aged 20–24 years used for our analyses was 103,150 (Fig. S1, online only).

Below, we describe our key analytic approaches: describing trends and progress, analyzing inequalities, and decomposing the drivers of changes in EM and ECB.

Describing EM and ECB prevalence, trends, and progress toward global targets

We report percentages of ever-married women aged 20–24 years who were married or gave birth by their 18th and 20th birthdays for EM and ECB, respectively. In addition to using the cutoffs of 18 and 20 years, we report the percentage of women aged 20–24 years who were married or gave birth by age 14, ages 15–16, 17–18, 19–20, or after age 20, acknowledging that the legal age of marriage varies across countries. Examining trends in EM and ECB prevalence by narrower age bands allows us to examine progress in reducing these practices in the early teenage years compared with the late teenage years.

In addition to describing EM and ECB prevalence for each survey year, we examined progress

over time in each country with two rounds of data. Absolute change was examined by the percentage point(s) (pp) difference between the two surveys. However, absolute change is not useful for comparing trends across countries since the number of years between surveys and the prevalence at the first survey year differ by country. To examine relative trends, we computed the average annual rate of reduction (AARR) using the following equation:

$$AARR\ (\%) = \frac{1}{years\ between\ surveys} * \ln\left(\frac{prevalence\ at\ second\ survey}{prevalence\ at\ first\ survey}\right) * 100. \quad (1)$$

The AARR in Eq. (1) describes the average relative percent decrease in EM and ECB per year.

SDG target 5.3 aims to "eliminate all harmful practices, such as child, early, and forced marriage and female genital mutilations" by 2030. To assess if countries were on track to meet this target, we predicted the prevalence of EM in 2030 for each country using the following equation:

$$2030\ Prevalence\ (\%) = Prevalence\ at\ second\ survey * (1 - (0.01 * AARR))^{n}, \quad (2)$$

where *AARR* for each country was computed using Eq. (1) and n is the number of years between the most recent survey in a country and 2030.

Inequality analyses

We examined inequalities in EM and ECB by geography, marital household wealth, place of residence (urban or rural), and education. We created maps for all countries to visualize subnational inequalities by state (Bangladesh, India, and Pakistan) or province (Nepal) using the most recent round of surveys. Equity plots for all survey rounds were created to show EM and ECB prevalence by marital household wealth, residence, and education, as explained below.

Creation of categories for inequality analysis. Women in South Asia typically move into the home of their husband's family after marriage. DHS data on household indicators are for the household the woman lives in at the time of survey, not her natal household, hence, the use of the term *marital household wealth*. Marital household wealth was measured using a principal component analysis (PCA) on household asset ownership, building materials, and sanitation facilities, using pooled data on both survey rounds for each country. Households were then divided into wealth quintiles separately for each survey round. Residence was rural or urban. For education, we categorized women into five groups: no education, 1–5 years, 6–9 years, and 10 or more years. These categories, respectively, correspond to no schooling, primary school, secondary school, and high school or higher.

Metrics used to quantify inequalities. Gaps in EM and ECB were estimated using two methods. We first simply compared prevalence for contrasting categories (e.g., marital household wealth quintile 1 versus 5 or 0 versus 10 or more years of education). Second, we used the slope index of inequality (SII),[23,24] estimated using regression models, taking into consideration the population-weighted distribution of marital household wealth, residence, and education.

Regression decomposition analysis

Education and wealth are frequently cited as being strongly associated with EM.[12,25–27] To understand the extent to which historical improvements in education and marital household wealth predict historical declines in EM and ECB, we applied a regression decomposition technique.[28–30] This analysis first estimates coefficients of education and marital household wealth from a pooled logistic regression model predicting EM or ECB, adjusting for residence and survey weights. The coefficients from this model are multiplied by the observed change in the determinant between the 2 survey years to obtain the share of predicted change in EM or ECB predicted by the change in the determinant. For the education variable, we used a dummy variable for completing at least 10 years of education, a milestone that interventions to prevent EM and improve girls' wellbeing aim for. For the marital household wealth variable, we used the continuous marital household wealth indicator generated through PCA as described earlier. As decomposition analysis relies on substantial change in the outcome over time, we were not able to include Bangladesh in the ECB analysis due to limited reduction in ECB (∼2%) in this country. Other potential drivers, such as women's empowerment or sociocultural norms, could not be examined

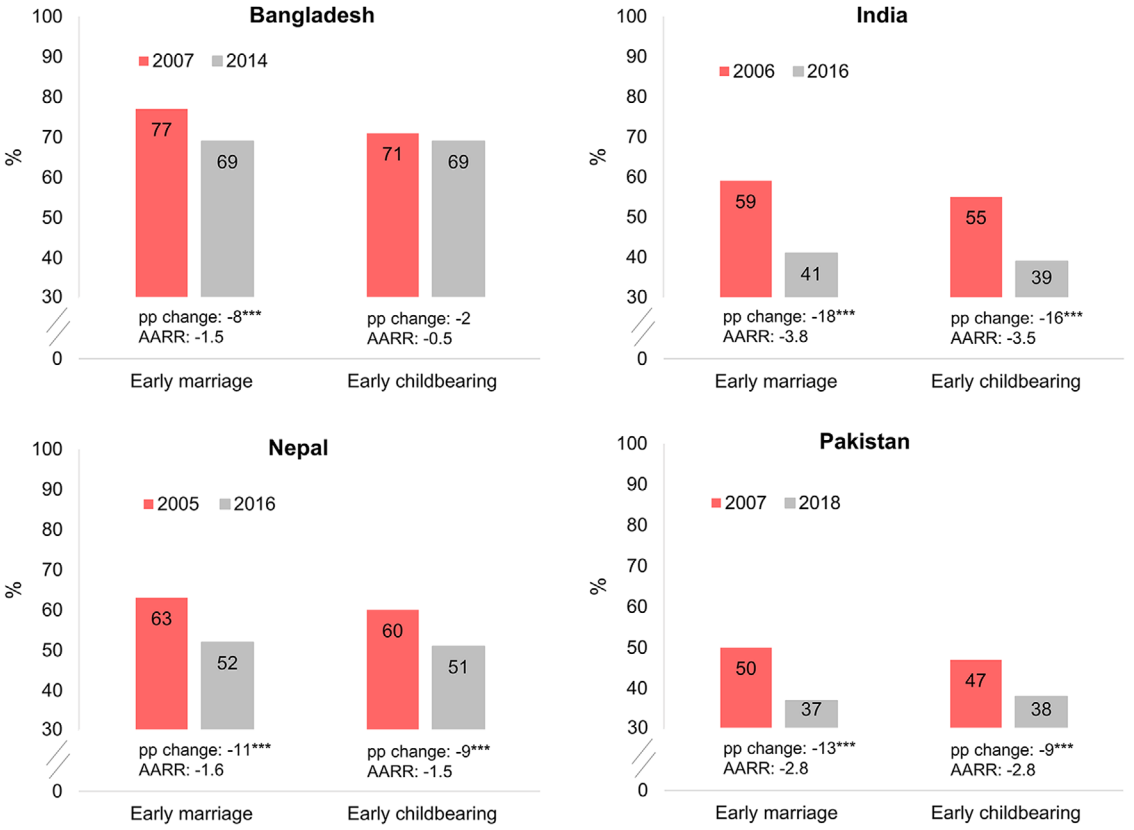

Figure 1. **Prevalence and trends in early marriage and early childbearing among ever-married women aged 20–24 years in South Asia. Data are from multiple rounds of Demographic and Health Surveys. AARR, average annual rate of reduction; pp, percentage points. $^{***}P < 0.001$, $^{**}P < 0.01$, and $^{*}P < 0.05$ for the test of difference between two time points in the same country.**

due to unavailability of data across survey rounds. We report the share of change in EM predicted by improvements in secondary school completion and marital household wealth as well as the amount of unexplained variance in each model.

Results

Sample characteristics

Per our selection, women were aged 22 years on average at the time of survey (Table 1). The mean number of births per woman decreased over time for all countries, while education and wealth showed the opposite trend. The improvement in education was largest in India and Nepal (a 19- to 20-pp increase in women with at least 10 years of education between two survey rounds), followed by Pakistan (10 pp) and Bangladesh (2 pp). Marital household wealth increased the most in Nepal (2.1 SD), followed by Bangladesh (1.2 SD), Pakistan (1 SD), and India (0.6 SD).

Trends in EM and ECB

All countries experienced a decline in EM over approximately the last decade (Fig. 1A). India experienced the largest absolute change over time (18 percentage points, $P < 0.001$) and the fastest decrease. India's AARR of –3.8% was higher than other countries. Despite this reduction, the prevalence of EM remains unacceptably high in most countries. The most recent round of surveys (2014–2018) indicate that 69% of women in Bangladesh were married before their 18th birthday, followed by Nepal (52%), India (41%), and Pakistan (37%).

Women in South Asia have their first child 1–2 years after marriage on average, with the shortest interval between marriage and first birth

Table 1. Descriptive characteristics of ever-married women aged 20–24 years in South Asia

	Bangladesh		India		Nepal		Pakistan	
	2007	2014	2006	2016	2005	2016	2007	2018
Age at survey (years)	21.9	22.0*	22.0	22.2***	22.1	22.1	22.0	22.2**
Age at marriage (years)	15.7	16.2***	16.9	18.0***	16.9	17.5***	17.6	18.3***
Fertility								
Ever pregnant (%)	91.0	90.0	86.2	84.2***	90.2	83.7***	83.8	78.5**
Ever given birth (%)	87.3	85.8	80.9	73.8***	86.6	78.4***	74.9	70.4*
Age at first birth (years)	17.3	17.5	18.3	19.3***	18.5	18.8**	18.8	19.2***
Gap between marriage and first birth (years)	1.6	1.3***	1.9	1.9	1.5	1.3*	1.4	1.2**
Number of births								
Mean (number)	1.4	1.2***	1.4	1.1***	1.4	1.1***	1.4	1.3**
0 (%)	13.5	15.0	20.7	27.4***	15.6	22.5***	25.1	29.6*
1 (%)	45.0	50.6**	35.6	41.8***	40.8	48.7***	28.9	30.3
2 (%)	33.0	29.3*	30	25.5***	34.5	23***	26.1	25.2
≥3 (%)	8.5	5.1***	13.7	5.3***	9.2	5.8**	19.9	14.9**
Education								
Mean (years)	5.9	6.6***	4.9	7.6***	3.7	6.5***	3.1	4.6***
0 years (%)	17.2	9.5***	39.4	18.2***	43.5	19.2***	57.7	44.0***
1–5 years (%)	29.7	28.7	15.4	13.3***	21.4	18.6	18.0	18.4
6–9 years (%)	37.5	43.8***	25.8	29.3***	25.2	33.3***	10.6	13.7
≥10 years (%)	15.6	18.0	19.4	39.2***	10.0	28.8***	13.7	23.9***
Urban residence (%)	22.8	27.9	26.7	27.6	15.0	56.8***	30.0	33.0
Wealth index[a]	−0.8	0.4***	−0.5	0.1***	−1.0	1.1***	−0.5	0.5***

[a] Wealth index was created separately for each country using principal components analysis of assets and building materials.
Note: Data are from Demographic and Health Surveys. Values are means or percentages.
***$P < 0.001$.
**$P < 0.01$.
*$P < 0.05$ for the test of difference between two time points in the same country.

in Pakistan (1.2 years in 2018) and the longest gap in India (1.9 years in 2016) (Table 1). The interval between marriage and first birth has decreased in Bangladesh, Nepal, and Pakistan, but has not changed in India.

Changes in the age at which women have their first child have varied by country. While India has experienced the largest and fastest improvement with a 16-pp reduction in ECB prevalence from 2006 to 2016 (Fig. 1B), Bangladesh experienced the smallest and slowest improvement (a 2-pp reduction over 7 years) among the countries examined. The rate of change in India (AARR of –3.5%) was seven times faster than the rate of change for Bangladesh (AARR of –0.5%).

In Bangladesh, India, Nepal, and Pakistan, there was an upward shift in the age distribution of EM and ECB (Fig. 2). In India, for example, the percentage of women married on or before their 14th birthday decreased from 17% in 2006 to 10% in 2016, whereas the percentage of women married on or after their 21st birthday increased from 8% in 2006 to 15% in 2016 (Fig. 2A; and Table S1, online only). An alarming 27% of girls in Bangladesh were married before their 15th birthday in 2014, down from 38% in 2007. These results show that "very early marriage" is still frequently practiced in South Asia, but that there has been a greater reduction in EM prevalence among younger teenage girls compared with older teenage girls, particularly in Bangladesh and India.

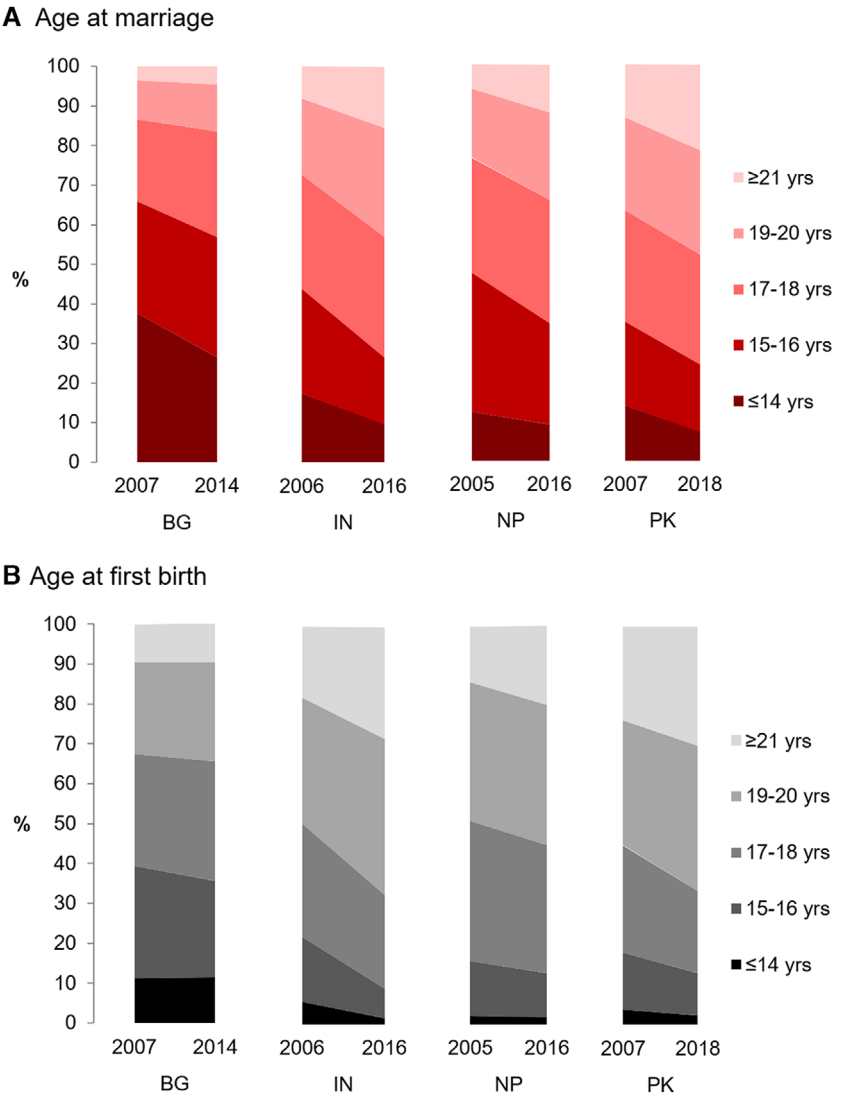

Figure 2. **Changes in the distribution of women's age at marriage and first birth among ever-married women aged 20–24 years in South Asia by age group. The *y*-axis indicates prevalence in percent. Data are from multiple rounds of Demographic and Health Surveys. The denominator for early marriage (A) is ever-married women age 20–24 years, and the denominator for age at first birth (B) is ever-married women 20–24 years with at least one birth. For exact prevalence for each country-year-age group, see Table S1, online only. BG, Bangladesh; IN, India; NP, Nepal; PK, Pakistan.**

Progress toward the SDG target for EM

Without accelerating reductions in EM in the region, the target to eliminate EM will not be met in any country (Fig. 3). Projecting historical rates of reduction, the prevalence of EM in 2030 would be highest in Bangladesh (55%), followed by Nepal (42%), Pakistan (26%), and India (24%).

Inequalities in EM and ECB in South Asia

Geography. Maps show substantial subnational geographic variability in EM and ECB for all countries (Fig. 4; and Table S2, online only). Subnational variability for EM was highest in India (5–53% for states), followed by Bangladesh (51–80%), Nepal (42–71%), and Pakistan (30–59%). A similar

Table 2. Inequities in early marriage in South Asia: percentage of ever-married women aged 20–24 years married before their 18th birthday by wealth, residence, and education

	Bangladesh		India		Nepal		Pakistan	
	2007	2014	2006	2016	2005	2016	2007	2018
Wealth quintiles								
Q1 (%)	86.4	79.9	75.5	55.3	74.7	60.6	68.0	54.3
Q5 (%)	57.7	57.6	28.8	22.6	51.6	39.7	31.8	20.1
Gap Q1–Q5	28.7	22.3	46.7	32.7	23.1	20.9	36.2	34.2
SII	−31.5***	−27.1***	−51.0***	−37.8***	−26.7***	−28.2***	−41.6***	−44.4***
Residence								
Rural (%)	79.6	71.5	63.9	43.5	63.3	57.0	54.0	40.7
Urban (%)	69.1	63.9	45.9	32.5	58.8	48.7	40.9	29.6
Gap rural–urban	10.5	7.6	18	11	4.5	8.3	13.1	11.1
SII	−18.7***	−14.4**	−33.5***	−22.0***	−9.0	−15.7*	−27***	−26.4**
Education								
0 years (%)	89.2	80.7	76.0	56.6	76.3	70.5	59.9	51.9
≥10 years (%)	52.4	39.4	26.3	24.7	25.1	24.3	23.1	14.6
Gap low–high education	36.8	41.3	49.7	31.9	51.2	46.2	36.8	37.3
SII	−39.3***	−40.7***	−58.6***	−44.9***	−51.8***	−58.8***	−50.8***	−56.6***

***$P < 0.001$. **$P < 0.01$. *$P < 0.05$ for significance of SII within country and year. SII, slope index of inequality.

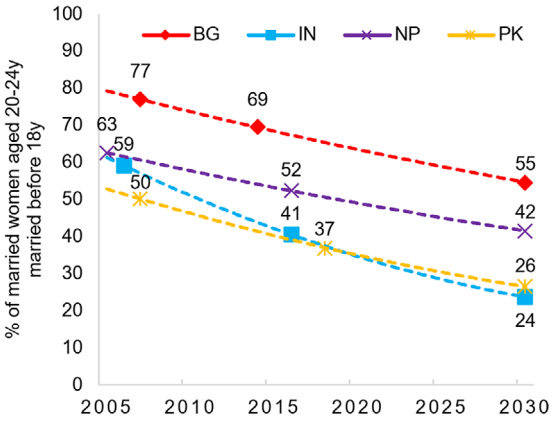

Figure 3. **Predicted prevalence of early marriage in 2030 in South Asian countries. The prevalence at the first two time points for each country is based on DHS data. The prevalence in 2030 is predicted assuming a constant average annual rate of reduction (see Eq. 2). BG, Bangladesh; IN, India; NP, Nepal; PK, Pakistan.**

pattern was observed for ECB, with moderate variability in Bangladesh (29–55%), India (0–24%), Nepal (14–31%), and Pakistan (6–34%) (Fig. S2 and Table S2, online only).

Marital household wealth. EM is much less common among women from richer households at the time of survey compared with women from poorer households in most South Asian countries (Table 2 andFig. 5). In the more recent round of surveys, the marital household wealth gap for EM prevalence was highest in Pakistan (34 pp) and India (33 pp), followed by Bangladesh (22 pp) and Nepal (21 pp). The SII was significant ($P < 0.001$) for all countries. Over time, the marital household wealth gap became smaller in India and Bangladesh, with EM prevalence decreasing more in the poor compared with the rich. Similar patterns of inequality gaps were observed for ECB (Table S4 and Fig. S3, online only).

Residence. EM prevalence was higher among women living in rural compared with urban areas at the time of survey (Table 2 and Fig. 5). The magnitude of the residence gap was smaller than the marital household wealth gap. In the latest round of surveys, the residence gap ranged from 8-pp in Bangladesh and Nepal to 11-pp in India and Pakistan. Over time, residence gaps have not decreased substantially; the largest decrease was from 18 to 11-pp in India. For ECB, similar patterns were observed (Table S3; and Fig. S3, online only).

Education. Large education gaps in EM exist and have persisted in South Asia (Table 2 and Fig. 5). The education gaps are not only between the most and least educated; the prevalence of EM was far lower in those with 10 or more years of education

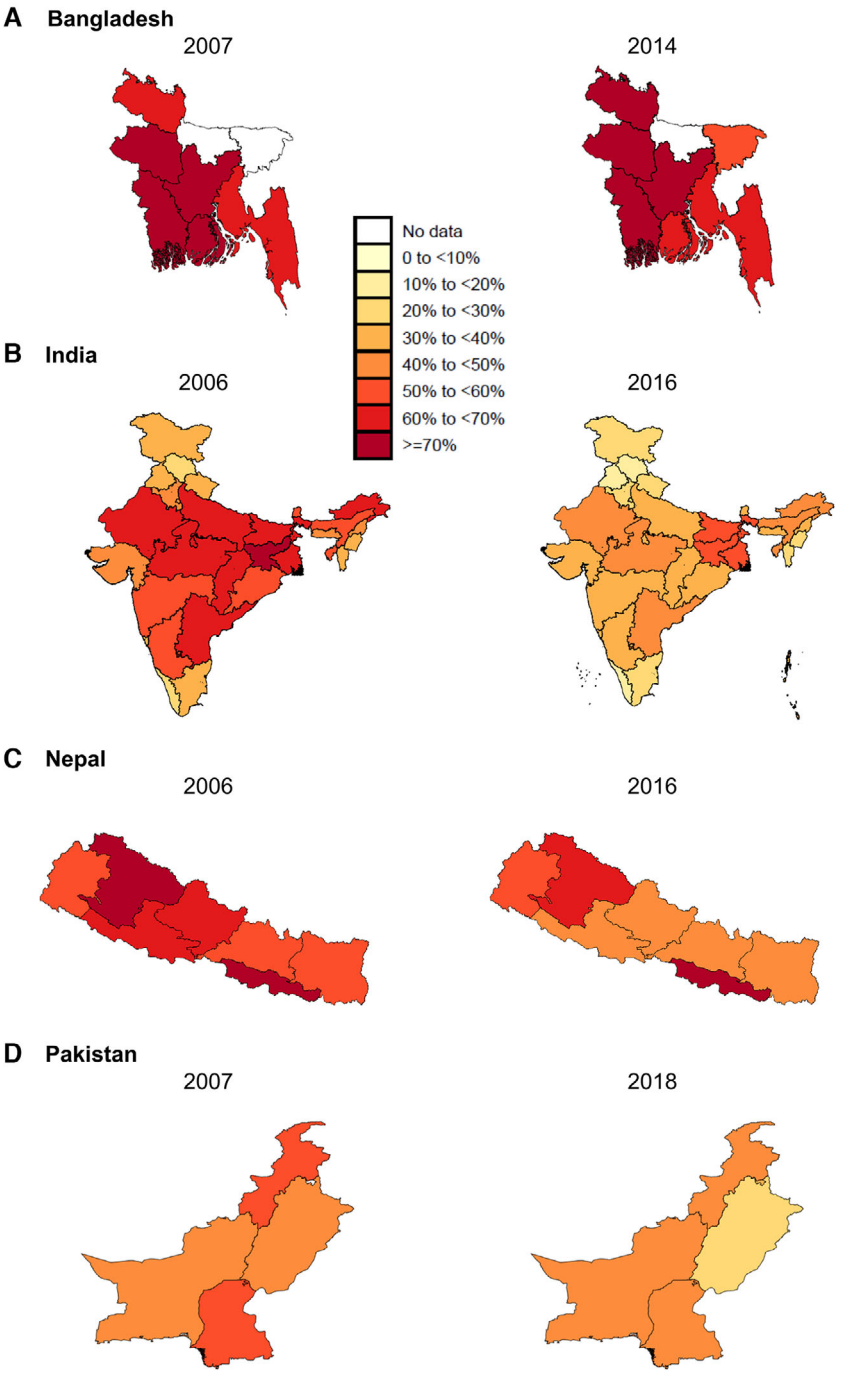

Figure 4. **Subnational variation in early marriage among married women aged 20–24 years in South Asian countries. Relative size of maps is not to scale. Data are from Demographic and Health surveys.**

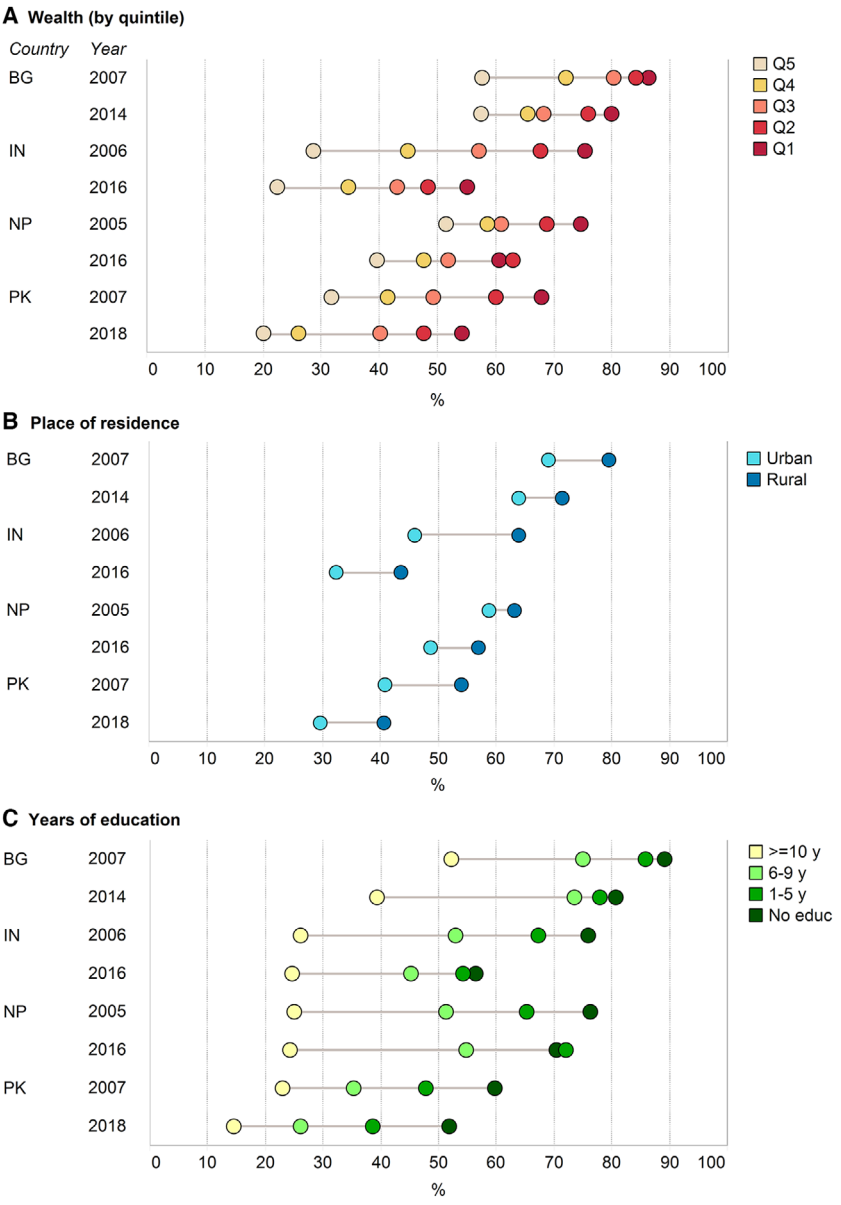

Figure 5. **Trends in inequities in early marriage by wealth, residence, and education among ever-married women aged 20–24 years in South Asia. Data are from multiple rounds of Demographic and Health Surveys. BG, Bangladesh; IN, India; NP, Nepal; PK, Pakistan.**

compared with those with 6–9 years of education, suggesting that secondary school completion is a tipping point for EM reduction. India experienced a large decrease (a 18-pp gap reduction) that was driven by the large reduction in EM among those with no education, from 76% in 2006 to 57% in 2016. Nepal improved slightly (a 5-pp gap reduction) and Pakistan did not change. For ECB, large education gaps also exist, with trends following similar patterns as EM trends (Table S3 and Fig. S3, online only).

Decomposition analysis of drivers of EM reduction

In the pooled logistic regression, education and marital household wealth were both significantly

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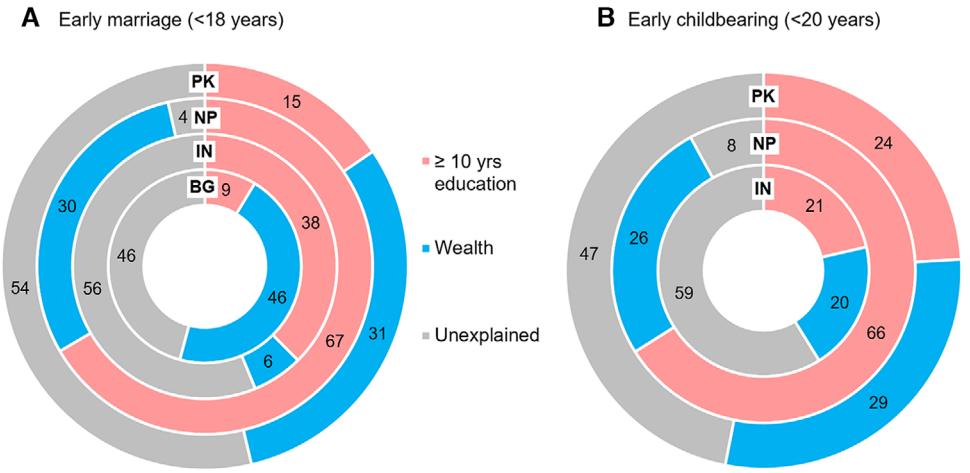

Figure 6. Decomposition analysis. Percentage reduction in early marriage (A) and early childbearing (B) prevalence explained by improvements in education and wealth for four countries. Each donut represents one country (BG, Bangladesh; IN, India; NP, Nepal; and PK, Pakistan). "Unexplained" is the reduction in early marriage not explained by reductions in education and wealth. The prevalence of early childbearing only decreased by 2 pp in Bangladesh, so Bangladesh was not included in the early childbearing decomposition analysis.

($P < 0.01$ to $P < 0.001$) negatively associated with EM for all countries (Table S4, online only). The improvements in education and marital household wealth explained between 44% (India) and 96% (Nepal) of the reduction in EM prevalence (Fig. 6A). Improvements in education predicted a large share of the EM reduction in Nepal (67%) and lower shares in India (38%), Pakistan (15%), and Bangladesh (9%). Improvements in marital household wealth predicted a large share of the EM reduction in Bangladesh (46%) and a moderate share in Pakistan, Nepal, and India (6–31%). We observed generally similar patterns for ECB (Fig. 6B), except for India, where education explained less and wealth explained more of the reduction in ECB relative to the respective contributions of these drivers to the reduction in EM. These differences are due to the stronger association between education and EM than education and ECB, and the weaker association between wealth and EM than wealth and ECB (Table S4, online only).

Discussion

Summary of findings

Both EM and ECB are decreasing but are still unacceptably high in South Asia, particularly in Bangladesh, where over two-thirds of women aged 20–24 years in 2014 were married before their 18th birthday or had a child as a teenager. In the last decade, South Asian countries have experienced varied reductions in EM, but are not on track to eliminate EM by 2030. EM and ECB inequities by marital household wealth, residence, and education also persist; uneducated women from poor rural households at the time of survey are the most likely to be married and have children at a young age. Finally, we have shown that improvements in women's education and marital household wealth in the last decade explained around half or more of the EM reductions during this period.

Why do EM and ECB occur in South Asia?

There are many reasons why the practices of EM and ECB are only changing slowly in South Asia. At a broader level, marriage laws are complex and poorly enforced (Supplemental Text, online only). Context-specific social pressures, customs, and beliefs may lead parents to arrange marriages for their young daughters. Commonly cited factors in the region are to retain sexual chastity, a perception of limited opportunities for young women beyond homemaking, and avoiding high dowry payments, which increase as brides-to-be get older and more educated.[19,31] For many families, the social and economic costs of not marrying off a daughter outweigh the perceived benefits; mass social behavior change campaigns on these

issues are needed. These factors help to explain our inequality findings with respect to (1) education gap: the immediate financial consequences (i.e., dowry) to the family of marrying their daughter later increase the longer she stays in school; and (2) marital household wealth/residence gap: the relative cost of delaying marriage is higher for households with limited financial resources, and rural households are poorer on average than urban households. Furthermore, EM is very often followed by ECB. We showed that women give birth only 1–2 years after marriage. Social pressure from families for newlyweds to prove fertility, low use of contraceptives, and other factors underlie short marriage–birth intervals.[32,33] Thus, reducing EM can also have large returns in terms of reducing ECB, especially in contexts where extramarital births are uncommon.

Unequal progress in eliminating EM and ECB

Compared with India, the AARRs for EM and ECB were 2.5 and 7 times slower in Bangladesh, despite Bangladesh having the highest prevalence of EM and ECB. Though data from the 2018 round of DHS in Bangladesh were not available at the time of analysis, the 2018 "Key Indicators" report indicates an additional 10-pp drop in EM prevalence, from 69% in 2014 to 59% in 2018, a more rapid reduction in recent years compared with 2007 to 2014.[34] Though the current analyses cannot fully explain why progress has differed by country, some results are suggestive. Our decomposition analysis showed that improvements in women's education in Bangladesh explained only 9% of the EM reduction, compared with 38% in India. While the association between women's education and EM was similar in both countries—secondary school completion predicted 29–36% lower EM prevalence (Table S3, online only)—the improvement in women's education over time was much slower in Bangladesh (2.4-pp in Bangladesh versus 19.8-pp in India in the last decade). Our decomposition analyses also revealed that improvements in secondary school completion, which we defined as completing 10 years of school, explained a large portion of the reduction in EM and ECB, especially in Nepal. This finding is consistent with a recent study from Nepal showing that women need to complete grade 9, and ideally grade 11, to substantially increase their odds of marrying after 18 years.[35] Two other studies using DHS data from multiple countries in South Asia found that secondary education but not primary education was strongly protective against marrying early.[17,22] However, our finding that 15–40% (depending on the country) of women who complete 10 or more years of education continue to marry early suggests that actions to address EM must go beyond promoting secondary school completion for girls.

There are several potential explanations for unequal progress in reducing inequalities by wealth and residence. The relatively large absolute reductions in EM and ECB among the poor relative to the rich are likely due in part to two factors: higher baseline prevalence in the poor and propoor programs. First, there is greater scope for improvement in most outcomes when the problem is worse to begin with; an extension of this concept is that, as EM and ECB become less frequent, progress will likely become slower. Second, programs intending to reduce EM and ECB or drivers of these practices typically focus on populations where many women get married and have children too early, such as poor populations. Residence gaps in EM and ECB were smaller and decreased less over time than wealth gaps in these practices. One explanation may be the growing urban slum population in the region and that recent migrants bring gender and social norms from source areas.[36] Households in urban slum areas are often worse off in terms of education, wealth, girls' safety, and living conditions than those in rural areas; the slum portion of the urban population may be pulling the mean prevalence closer to the rural mean.

Actions to address EM exist but require rigorous evaluation in scaled form

Laws, policies, and programs to prevent and reduce EM exist in all South Asian countries but our findings suggest their impact has been suboptimal despite strong government commitment to address the challenges. Government commitment to addressing these problems is apparent; Bangladesh, India, Nepal, and Pakistan (1) are members of the South Asian Initiative to End Violence Against Children, (2) participated in the Kathmandu Call to Action to End Child Marriage in Asia in 2014, (3) either acceded to or ratified the Convention on the Elimination of All Forms of Discrimination Against Women, and (4) have at least two decades of programs targeting child marriage (Supplemental Text,

online only). Nongovernmental organizations are also very active, and recently, interventions, such as the Bangladeshi Association for Life skills, Income, and Knowledge for Adolescents (BALIKA) project, have demonstrated success: community-level EM reduction by 25–30% in an 18-month period.[37] Keys to success in the BALIKA project included engaging adolescents at a young age, creating a favorable community environment toward later marriage, building tangible skills to empower girls, and recruiting educated mentors from the community. It remains to be seen if such programs, when scaled to the national level, would be both effective and cost-effective. Nonetheless, it is increasingly recognized that eliminating EM requires engagement across multiple sectors and levels, as newer theories of change to end EM demonstrate.[38–41] Not only is it important to empower girls to make their own marriage and birth decisions, but programs also must shift the behaviors of men, families, and communities, increase access to and quality of health and education services, and strengthen implementation of marriage laws and policies. Available research continues to highlight that EM is affected by a range of determinants, many of which are not addressed by simple policies or acts targeting the legal age at marriage. Therefore, the efforts across the region to address both EM and ECB need to be multifaceted and grounded in local, contextually relevant diagnostics of the key determinants.

Strengths and limitations

We used the most recent nationally representative DHS data available from four South Asian countries since 2005. These four countries account for 97% of the population in the region. We used advanced methods, such as AARR to assess relative trends, SII to assess inequalities, and regression decomposition to assess drivers. Our main limitation was data availability. Of the eight survey rounds included, three did not sample unmarried women, so we could not estimate the absolute magnitude of the issues, that is, the number of total women with EMs or births. We also could not examine additional drivers of EM, such as women's empowerment, violence against children/girls, changing sociocultural norms, women's labor force participation, or exposure to conditional cash transfers due to the lack of data. Second, we acknowledge that information on residence and wealth was from the woman's current household at the time of survey rather than her natal household. Most women in South Asia move into their spouse's household after marriage, which is often a short distance from their natal village; rural-to-urban and urban-to-rural marital migration are uncommon for women in this context.[42] Additionally, most marriages in South Asia are arranged and homogamous; in other words, families of brides and grooms are more or less matched in terms of wealth, caste, and other hierarchical characteristics.[43,44] Heterogamous marriages (the bride marrying into a family that is much richer or poorer relative to her own family) rarely occur. Third, given that our analyses were mostly conducted at the country level, subnational heterogeneities are likely underappreciated and should be explored further. Finally, these data rely on self-report to ascertain age of marriage and age of first birth and are, therefore, subject to reporting bias, particularly among poor uneducated women.[45]

Conclusions

Our aim was to use empirical data to explore patterns of marriage and childbearing timing in South Asia, the global region with the most child brides. International agreements affirm 18 years as the minimum age for consent to marriage, yet EM is still the norm in several South Asian countries. When girls marry as children and give birth during their teens, there are devastating health and economic consequences for individuals, families, and societies. Child marriage is a human rights violation and a drain on human capital that the global development community is committed to eradicating, but the reality is that policies and interventions have not been effective enough to accelerate progress. Our findings reinforce the need for careful targeting and careful diagnosis of factors contributing to EM and ECB. Marriage timing differs according to wealth, education, and residence. As family norms continue to shift in South Asia,[46] rigorous evaluation of targeted, scaled interventions with demonstrated success is crucial to make further progress in eliminating EM, an event that changes the course of women's and children's lives. In a postpandemic environment where drivers of EM are exacerbated—reduced or lost income, school closures, disrupted family and community networks, reduced access to health services, and so on—and where adolescents' needs may be overlooked by a

focus on COVID-19 mitigation efforts, even more effort will be needed to sustain trends in EM reduction. The protective nature of girls' schooling is clear and efforts to increase higher education among girls need to continue. Multidisciplinary research with more calibrated data to understand the diverse pathways to EM and the effectiveness of legal, policy, and program efforts to address the range of drivers, especially social norms, is also urgently needed to help accelerate progress by deploying a strong evidence base.

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Author contributions

P.N., S.N., P.P., and S.S. analyzed the data and prepared tables and figures. S.S. wrote the initial draft of the manuscript. All authors contributed to interpretation of the findings and revising the intellectual content of the manuscript. All authors approved the final manuscript.

Supporting information

Additional supporting information may be found in the online version of this article.

Figure S1. Sample flow diagram.

Table S1. Trends in marriage and childbearing by age group in South Asia.

Table S2. Subnational prevalence of early marriage and early childbearing among ever-married women aged 20–24 years in South Asia.

Table S3. Inequities in early childbearing in South Asia by wealth, residence, and education.

Figure S2. Subnational variation in early childbearing among married women aged 20–24 years in South Asian countries.

Figure S3. Trends in inequities in early childbearing by wealth, residence, and education among ever-married women aged 20–24 years in South Asia.

Table S4. Decomposition analysis to estimate share of change in early marriage (A) and early childbearing (B) reduction predicted by improvements in women's education and wealth.

Supplemental Text. Overview of legislative actions, policies, and programs to address child marriage in South Asian countries.

Competing interests

The authors declare no competing interests.

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