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Full paper

Title

Impact of Gender Role Attitudes on Sexual and Reproductive Health Outcomes of Adolescents in India: Evidence from Udaya Longitudinal Survey

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Abstract: Despite potential policy implications, there is limited research on the impact of gender role attitudes on sexual and reproductive health (SRH) outcomes among adolescent girls and young women. This study examines the effects of gender role attitudes on sexual and reproductive health outcomes in India over time. A sample of 1551 unmarried girls and 5808 married girls were drawn from the UDAYA study, a longitudinal study of adolescents aged 10-19 in Bihar and Uttar Pradesh, conducted during 2015-2016 (Wave 1) and 2018-2019 (Wave 2). We used lagged logistic regression models to study the influence of gender role attitudes on different SRH indicators over time. Findings highlight that egalitarian attitudes positively influence various SRH practices and outcomes. Adolescent girls with high egalitarian attitudes in Wave 1 had 43% higher odds of delaying marriage, a 17% higher odds of seeking treatment for sexually transmitted infections, and a 2.7-fold increase in comprehensive HIV knowledge by Wave 2. Furthermore, egalitarian attitudes enhanced decision-making ability, exercise of choice in partner selection, use of modern contraceptives, and reduced intimate partner violence among married girls. The study recommends investment in evidence-based programs promoting gender equality and improving adolescents' sexual and reproductive health.

Introduction

Evidence from low- and middle-income countries (LMICs) indicates that gender role attitudes (GRA) and gender stereotypes have a strong causal relationship with adolescents' quality of life, particularly in areas such as physical, mental, and reproductive health. GRA also directly affects physical health outcomes through gendered practices like unequal food distribution (often biased against girls), greater physical demands for household chores placed on girls, and lower prioritization of girls' sexual and reproductive health needs (Oniango & Mukudi, 2002; Blackden and Wodon, 2006). This is especially concerning given that adolescent girls have increased nutritional needs and require more attentive sexual and reproductive health care (Das et al., 2017). According to Nutrition International, girls with access to proper nutrition are more likely to thrive academically, and more egalitarian gender role attitudes promote gender equality and more equitable intra-household nutrition distribution. Poor maternal nutrition in LMICs is closely linked to biased GRA norms (Di Cesare et al., 2014), compounded by factors such as early marriage and inadequate use of antenatal care (UN, 2019).

Adolescents' psychosocial and mental health is also at risk in LMICs, where nearly half of all mental illness cases begin by age 14, and neuropsychiatric disorders are a leading cause of adolescent disability (WHO, 2019). Gender-biased GRA increases girls' susceptibility to mental health issues. Parents often perceive daughters as more compliant and responsible, assigning them a disproportionate share of household chores, which can result in social isolation and fewer opportunities for personal development (John et al., 2016; Samuels, Jones, & Abu Hamad, 2017). Adolescence tends to deepen this isolation, particularly in contexts where girls face mobility restrictions and early marriage, often losing daily support from their natal families. Restrictive GRA is associated with lower self-esteem among girls (Abu Hamad et al., 2018; Edmeades, Hayes, & Gaynair, 2014; Jones et al., 2015; WHO, 2014).

Despite the prevalence of restrictive GRA norms and poorer adolescent health and demographic outcomes in LMICs, most research on gender norms and their impact on health has focused on high-income countries (Yu et al., 2017). Moreover, the limited body of literature from LMICs tends to emphasize physical and mental health, with fewer studies exploring the relationship between GRA and sexual and reproductive health, particularly in developing countries like India. In structurally gender-biased societies such as India, these associations appear especially strong and warrant further exploration (Guilmoto et al., 2018). Women in India are more vulnerable across the life course—particularly during adolescence—due to factors such as low socioeconomic status, limited education, early marriage, and poor general and reproductive health (Santhya et al., 2010; Prakash et al., 2011; Srinivasan et al., 2015; Marphatia, Ambale, and Reid, 2017). Research has shown that less egalitarian gender attitudes negatively impact adolescent sexual and reproductive health, wellbeing, and healthcare utilization (Marston and King, 2006; Goicolea et al., 2012; Torres et al., 2012; Galinsky and Sonenstein, 2013; Landry et al., 2019; Guilmoto et al., 2018).

However, literature from the Indian context remains scarce in documenting how GRA influences various sexual and reproductive health outcomes among adolescents and young women. A key limitation has been the lack of large-scale, longitudinal data on adolescents. The *Understanding the Lives of Adolescents and Young Adults* (UDAYA) study is a unique

longitudinal survey in India that tracks adolescents' life courses over two time points. Building on this, the current paper aims to explore how gender role attitudes among adolescent girls affect their sexual and reproductive health outcomes, and how these attitudes evolve over time among younger and older adolescent girls in India.

Data and Methods

Study setting

The study was conducted in the states of Bihar and Uttar Pradesh in India. Uttar Pradesh, with a population of 199.8 million in 2011, has the largest population of any state in the country, accounting for 17 percent of India's population (Office of the Registrar General and Census Commissioner, India 2013). Bihar, with a population of 104.1 million, is the third largest state in terms of population, accounting for nine percent of India's population. Both states are predominantly rural with just 11 percent of the population in Bihar and 22 percent in Uttar Pradesh residing in urban areas in 2011. Economically, Bihar and Uttar Pradesh are the poorest among all the states and union territories in India with per capita income well below the national average and 34 percent of the population in Bihar and 29 percent in Uttar Pradesh estimated to be living below the poverty line in 2011–12 (Planning Commission 2014). Bihar and Uttar Pradesh, with 72 million adolescents aged 10-19, are home to every fourth adolescent in India (Office of the Registrar General and Census Commissioner, India 2013). Gender inequality and harmful gender norms and practices are also prevalent in both states.

Study design and study population

Data presented in this paper were drawn from a unique longitudinal study of adolescents aged 10-19 (Understanding the lives of adolescent and young adults study – hereafter referred to as UDAYA study) in Bihar and Uttar Pradesh. The first wave was conducted in 2015-2016, and the follow up interview was conducted three years later in 2018-2019. The 2015-16 survey was conducted among a state-representative sample of unmarried boys and girls aged 10-19 and married girls aged 15-19. The study adopted a systematic, multi-stage stratified sampling design to draw sample areas independently for rural and urban areas. A total of 150 primary sampling units (PSUs)—villages in rural areas and census wards in urban areas—were selected in each state, using the 2011 census list of villages and wards as the sampling frame. In each primary sampling unit (PSU), households to be interviewed were selected by systematic sampling. A complete mapping and household listing operation was carried out in each selected PSU (or in selected segments or linked villages as appropriate). Based on this list, a PSU was divided into two nearly equal segments where one segment was randomly chosen for conducting interviews of females and the other for interviews of males (Married girls were interviewed from both male and female segments). The list of households within each segment provided the necessary frame for selecting households within the segment. Within each selected household, no more than one respondent per category was interviewed, which resulted in a maximum of three interviews from any household—one younger girl, one unmarried older girl, and one married older girl in the female segment, and one younger boy, one older boy,

and one married older girl in the male segment. In case more than one respondent from a single category was found in the household, one respondent was selected randomly using the Kish table. Using a structured questionnaire, the field investigators interviewed 20,594 adolescents in 2015-16; response rate for the survey was 92%, and 1% of selected respondents refused to participate.

In 2018-19, we interviewed again those who were successfully interviewed in 2015-16, and who consented to be re-interviewed. Of the 20,594 who were eligible for re-interview, we re-interviewed 12,251 girls, with a follow-up rate of 84%. The main reasons for loss-to-follow-up were that the participant had migrated (6% for girls), and the participant or his/her parent or guardian refused (6% for girls). We excluded cases (3%) that gave inconsistent responses in age and/or education between the two survey rounds. Thus, 11,864 girls were retained for analysis (a total of 16,292 adolescents and young adults), thus resulting in an effective follow-up rate of 81% for girls. We note that the characteristics of those who were re-interviewed and those who could not be re-interviewed differed significantly in terms of age, education, place of residence, caste and religion. The analysis presented in this paper drew on sub-sample data from adolescent girls who were aged 15-19 and unmarried at wave 1 (N=6168), and married girl adolescents at wave 1 (N=4257).

Ethical statement

The study protocol was approved by the Institutional Review Board of the Population Council, and strict ethical safeguards were followed. To protect participants, girls were interviewed in separate areas to avoid reputational harm or discomfort. Multiple respondents from the same household were interviewed separately and simultaneously. Sensitive questions were framed using adolescent-friendly language, and younger adolescents (10–14) were not asked about sexual and reproductive health. Interviewers received extensive ethics training and informed community leaders about the study. Informed consent was obtained from all participants, and for unmarried adolescents aged 10–17, parental consent was also secured. Data collection excluded names to ensure confidentiality, and interviewers signed a statement affirming they had explained consent procedures. Measures were taken to maintain privacy, including relocating or terminating interviews if privacy was compromised. Participants needing services were referred to local NGOs, helplines, or public health authorities.

Variables

Outcome variables:

The outcome variables used in the analysis from wave 2 include:

Age at marriage (<18 years, >= 18 years): This variable captures the age at which adolescent girls entered into marriage during the inter-survey period. It is categorized into two groups: those who were married before the age of 18 and those who were married at or after the age of 18.

Spousal selection (no, yes): This variable assesses whether the girl had any say or involvement in choosing her spouse. The response is recorded as either 'Yes' or 'No'. The indicator reflects the degree of agency and decision-making power that girls exercise in the context of their own marriages.

Currently using any modern contraceptive method (no, yes): This variable indicates whether the respondent is currently using any modern contraceptive methods, such as IUDs, condoms, pills, injectables, implants, diaphragms, foams/jellies, or sterilization (female or male), to avoid pregnancy. It is applicable to those who are currently married or married during the interim period and are living with their spouses.

Desired number of children (>=2, <2): Among respondents who are married or married in the interim period and are cohabiting with their spouses, this variable measures their expressed desire regarding the number of children they would like to have.

Experience of intimate partner violence (IPV) (no, yes): These variable records whether the respondent has experienced any form of physical and/or sexual violence from their partner. It is applicable to girls who are married or were married in the interim period and are currently cohabiting.

Sought treatment for reproductive tract infections (no, yes): This indicator captures whether girls - both married and unmarried - sought treatment for symptoms suggestive of reproductive tract infections (RTIs).

Age at first birth (<18 years, >= 18 years): This variable refers to the age at which adolescent girls, who were married or married in the interim period, gave birth to their first child during the inter-survey period.

Four ANC visits (no, yes): This variable identifies whether the respondent made at least four ANC visits during pregnancy, among those who gave birth at wave-2 and were married or married in the interim period.

Comprehensive knowledge of HIV (no, yes): This variable assesses whether the respondent possesses comprehensive knowledge about HIV transmission and prevention. Questions include understanding that HIV risk is reduced through monogamy, awareness that HIV cannot be transmitted through mosquito bites, food sharing, or hugging, and recognition that one cannot identify someone with HIV just by looking. It applies to girls who are married or married in the interim period and reflects health literacy and awareness.

Explanatory variable:

The main explanatory variable in our analysis was an index of gender role attitudes (GRA). Five context- and age-appropriate questions were posed to respondents to assess their gender role attitudes at both waves of the survey. Older adolescents, aged 15-19 at wave 1, were asked whether they agreed or disagreed with the following statements: (1) it is wrong for a girl to have male friends, (2) girls like to be teased by boys, (3) girls should be allowed to decide when they want to marry, (4) the husband should mainly decide how household money should be spent, and (5) bathing and feeding children were women's responsibility only. We created an additive index that summarised the participants' responses to these questions, giving a score of 1 for each gender egalitarian response and 0 otherwise. Those who responded with the option of 'don't know/cannot say' were combined with 0 (0.4-5% of respondents). The index was created separately for those who were aged 10-14 and 15-19 at wave 1; the value of the index ranged from 0, indicating inequitable views, to 5, indicating adherence to egalitarian attitudes.

Additionally, the possible explanatory variables used in the lagged regression models were years of education, a wealth index, interaction with front line workers, place of residence, religion, caste, and state.

Data analysis

We used univariate and bivariate analyses to examine changes in adolescents' gender role attitudes over time. We used lagged logistic regression models to study the influence of gender role attitudes at wave-1 on marriage-related outcomes, experience of IPV, and sexual and reproductive health practices and outcomes at wave-2 among unmarried and married girls. A lagged regression model (also known as a distributed lag model) is a powerful tool in time series analysis, especially when one is studying the effect of an independent variable (or variables) over time. We fitted separate models for outcome variables as well as girls married in interim period and married girls in order to capture difference in influences of gender role attitudes on different outcome variables. All analyses were conducted using STATA software (version 15.0).

Results

Sociodemographic characteristics

Most of the adolescent girls included in the study were from rural areas (82-83%) and belonged to Hindu religion (77-83%) (Table 1). More than half of the respondents belonged to other backward castes (55-57%) and a quarter belonged to scheduled castes or tribes (23-29%). While almost all (90%) unmarried 15–19-year-olds had completed at least 5 years of schooling less than three quarters (72%) of married girls had done so. More than one third of adolescent girls belonged to poor wealth quintiles (28-36%). More than 60% of respondents were from Uttar Pradesh state.

Gender role attitudes

Younger adolescent girls were significantly more likely to hold gender egalitarian attitudes - i.e., scoring 4 or 5 on the gender attitude index – than others during their adulthood transition (42.6% at wave 1 to 64.2% at wave 2) (Table 2). Gender role attitudes became more egalitarian over time among girls who were aged 15–19 at wave 1 as well – those who scored 4 or 5 on the index of gender role attitudes increased by 11 percentage points by wave 2 when participants were 18-22 years old (from 56% at wave 1 to 67% at wave 2). However, gender role attitudes hardly changed over time among married girls who were aged 15–19 at wave 1. The proportion of married girls who scored 4 or 5 on the index of gender role attitudes increased significantly but only by 3 percentage points between waves - 48% at wave 1 and 51% at wave 2.

Marriage, IPV, and sexual and reproductive health at wave-2

Among unmarried adolescent girls (15-19 years at wave 1) who got married during the inter-survey period, about a third (36%) were married by age 18 (Table 3). Only 9% of girls married between wave 1 and wave 2 had a say in choosing their spouse. At wave 2 a minority (16%) of married girls (both those who married in the interim period and those who were married at wave 1) were using any modern contraceptive method. Almost half (43%) of married girls had experienced IPV in the past year. One fifth of married girls (20%) had sought treatment for an RTI compared to 14% of unmarried girls. Among girls (married and married in interim period) who gave birth in the interim period, most had their first birth after age 18 (87%), had an institutional delivery (74%), and had the birth attended by a professional health provider (80%). Less than half (46%) reported four ANC visits.

Effect of gender role attitudes at wave 1 on sexual and reproductive health, IPV, and marriage outcomes at wave 2

Table 4 describes the effects of gender role attitudes on sexual and reproductive health, IPV, and marriage outcomes among adolescent girls (15-19 years old at wave 1) through lagged logistic regression models. Among adolescent girls married in the interim period, those who held highly egalitarian gender attitudes at wave 1 were more likely to marry after age18 compared to those with low egalitarian attitudes at wave-1 (high: 68.5% vs. low: 59.2%, AOR: 1.43; 95% CI: 1.15-1.79, $p<0.01$). Similarly, girls with highly egalitarian views at wave 1 were almost 50% more likely to report at wave 2 that they had a say in decisions regarding choice of their spouse compared to adolescent girls who held less equitable views (high: 9.6% vs. low: 7.7%, AOR: 1.48; 95% CI: 1.02-2.15). Among girls who were married at wave 2 (both those who were married at wave 1 and who married in the interim) the percentage who reported (at wave 2) seeking treatment for RTIs was slightly, but significantly, higher among those who had highly egalitarian gender attitudes at wave-1 compared to those who held less equitable views (high: 22.0% vs. low: 19.0%, AOR: 1.17; 95% CI: 1.01-1.38), followed by older girls (High: 16.0% vs. 11.7%, AOR: 1.14; 95% CI: 0.97-1.33). Among married girls and girls married in the interim period, those who reported highly egalitarian gender attitudes at wave-1 were 20% more likely to delay their first birth beyond 18 years compared to those with

inequitable attitudes (high: 87.1% vs. low: 81.9%, AOR: 1.20, 95% CI: 1.00-1.45, p<0.10). These girls reporting more equitable views at wave 1 were also 39% more likely to attend four ANC visits compared to those with low egalitarian attitudes (high: 52.1% vs. low: 40.2%, AOR: 1.39, 95% CI: 1.19-1.63, p<0.001). Among married girls and girls married in the interim period, those who reported highly egalitarian gender attitudes at wave 1 were 2.7 times more likely to report comprehensive knowledge of HIV at wave 2 than girls with inequitable attitudes at wave-1 (High: 9.2% vs. Low: 2.3%, AOR: 2.70, 95% CI: 2.06-3.55).

Discussion

Evidence from our study highlights gender role attitudes as a significant attribute among the cohort of girls covered in the UDAYA longitudinal survey in two large states of India. Over time, gender role attitudes became more egalitarian among adolescent girls. However, both younger and older unmarried girls consistently held more egalitarian views compared to their married counterparts. The study clearly demonstrates that, over time, egalitarian gender attitudes have a positive impact on various sexual and reproductive health practices and outcomes among adolescent girls.

Our study illustrates that holding egalitarian gender role attitudes positively influences the delay of early marriage, pushing the age at marriage beyond 18 years among adolescent girls. Previous research has shown that women who believe that wives should primarily be homemakers tend to marry earlier, whereas those with more egalitarian attitudes tend to delay marriage (Barber and Axinn, 1998). A study among ever-married women in India also highlights that various dimensions of gender norms within Indian society shape decisions regarding early marriage (Desai and Andrist, 2010). Field and Ambrus (2008) explain that in many traditional settings, there is strong social pressure for girls to marry soon after the onset of puberty. Early marriage, in turn, has negative consequences for several outcomes, including girls' schooling, timing of childbirth, maternal health, and the health and education of their children (Field and Ambrus, 2008; Sekhri and Debnath, 2014; Chari et al., 2017).

Our study also demonstrates that strong egalitarian gender attitudes positively influence adolescents' involvement in decisions regarding spouse selection, alongside other household members. Evidence from this study suggests that acquiring egalitarian gender attitudes enhances adolescents' decision-making ability in choosing their partners. Supporting this, a study in Nigeria found a positive shift in women's involvement in household decision-making and other outcomes as a result of holding egalitarian gender attitudes (Sebany, OlaOlorun, and John, 2020).

This study demonstrates that gender-equitable attitudes are associated with increased use of modern contraceptive methods among married girls and those married during the interim period. Furthermore, it shows that possessing egalitarian gender attitudes is linked to a preference for having fewer than two children among this group. In other words, gender attitudes are closely associated with the fertility intentions of adolescents. Supporting this, a study in Tanzania among married couples found that more equitable gender attitudes in wives

were positively associated with contraceptive use, whereas husbands' gender attitudes showed no significant association with contraceptive behavior (Nanda, Schuler, and Lenzi, 2013). Current family planning programs should not overlook the importance of women's egalitarian attitudes, especially given that both men and women may internalize and support gender inequality in a patriarchal context. In some cases, it is women's gender attitudes that most strongly influence family planning decisions. Similarly, a study in Japan among young single men and women found that egalitarian gender role attitudes were associated with lower fertility intentions among women (Kato, 2018). Numerous global studies have also shown that women's autonomy and empowerment are significantly linked to lower fertility and increased contraceptive use (Gage, 1995; Morgan & Niraula, 1995; Govindasamy & Malhotra, 1996; Schuler et al., 1997; Do & Kurimoto, 2012; Nanda, Schuler, and Lenzi, 2013; Kato, 2018).

Our study also shows that stronger egalitarian gender attitudes are associated with a reduced experience of intimate partner violence among married girls or those married during the interim period of the study. Numerous studies globally have reported similar findings, indicating that holding egalitarian attitudes towards gender roles decreases both the likelihood of experiencing and accepting spousal violence (Ali et al., 2017; Herrero et al., 2017; Terzioglu et al., 2018). Amin and Chandra-Mouli (2014) emphasized the importance of promoting egalitarian gender norms, particularly during adolescence, as well as empowering women and girls as essential strategies to prevent such violence. Furthermore, the World Health Organization (2009) also underscores that promoting gender equality is a critical component of violence prevention efforts targeting women.

The study illustrates that egalitarian gender attitudes are associated with increased treatment-seeking behavior for reproductive tract infections (RTIs) as well as higher uptake of antenatal care (ANC) visits. It also shows that adolescents who hold egalitarian gender attitudes are more likely to possess comprehensive knowledge about HIV. Similar findings have been reported in other studies, where women's egalitarian gender-role attitudes were significantly associated with seeking medical help and utilizing antenatal care services (Wado, 2013). A study in Turkey also highlighted the positive influence of gender role attitudes on health-seeking behavior during pregnancy (Ay et al., 2009). Notably, our study is among the first to demonstrate that possession of egalitarian gender attitudes enhances the use of sanitary napkins among adolescent married girls. In turn, this suggests that egalitarian attitudes contribute to improved hygiene practices among adolescent girls.

Earlier studies have shown that adolescent girls with less egalitarian gender attitudes are more vulnerable to negative sexual and reproductive health (SRH) outcomes and are less able to negotiate safer sexual behaviors (Smith et al., 2003; Zuo et al., 2012; Pilgrim and Blum, 2012). During adolescence, sexual and reproductive development is a critical phase, and gender role attitudes play a significant role in shaping related health outcomes (Marston and King, 2006; WHO, 2012). Meyer et al. (2014) suggested that holding gender-equitable attitudes has a positive impact on adolescents' sexual and reproductive health and overall well-being. A study conducted in the United States also underscored the importance of gender role attitudes in

shaping sexual behaviors and beliefs among women (Lefkowitz, Shearer, Gillen, and Espinosa-Hernandez, 2014).

This study illustrates several important observations worth noting. Unmarried girls are more likely to hold gender-equitable attitudes compared to married girls. The study addresses key research gaps by highlighting the significance of possessing egalitarian gender attitudes in shaping sexual and reproductive health outcomes, using a longitudinal data perspective. Among girls who married during the interim period, those with egalitarian gender attitudes were significantly more likely to delay marriage beyond the age of 18, postpone childbearing beyond age 18, and participate in decision-making around spouse selection. Similarly, among adolescent girls who were married or married during the interim period, gender-equitable attitudes were positively associated with modern family planning use, a preference for fewer children, reduced experience of intimate partner violence, greater comprehensive knowledge of HIV, and increased uptake of antenatal care (ANC) visits. In addition, the study also highlights that egalitarian gender attitudes positively influence treatment-seeking behavior for reproductive tract infections (RTIs), both among older adolescent girls and married girls.

While the study findings offer several important insights into gender role attitudes and how they change, these findings must be cautiously interpreted given the study's limitations. First, gender role attitudes, and other indicators are self-reported, which means that they are susceptible to social desirability and recall biases. Second, the study findings are only representative of adolescents in Bihar and Uttar Pradesh - hence these findings may not be generalizable to adolescents in other places across the globe, or even across India.

This study concludes that gender-equitable attitudes are crucial for adolescents as they transition into adulthood. Egalitarian gender attitudes not only enhance adolescents' decision-making abilities and sense of agency but also have a positive impact on their sexual and reproductive health outcomes and practices. The study recommends investing in evidence-based programs that promote gender-equitable attitudes among adolescents, alongside initiatives that support their sexual and reproductive health. Interventions should also focus on strengthening adolescents' and young people's negotiation skills in conjunction with fostering gender-equitable attitudes, to help them avoid potentially risky situations or relationships. Furthermore, additional evidence-based research is needed to better understand the relationship between gender attitudes and specific sexual and reproductive health outcomes - such as unintended teenage pregnancies and mental health - particularly within longitudinal research settings.

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Table 1: Background characteristics of adolescent girls (15-19) years at Wave-1 of Udaya Survey by age, 2015-16

	Unmarried Girls	Married Girls
Background Characteristics	**Wave 1 (15-19) %**	**Wave 1 (15-19) %**
Place of residence		
Urban	18.3	17.2
Rural	81.7	82.8
Religion		
Hindu	76.9	82.5
Muslim/Others	23.1	17.5
Caste		
SCs/STs	22.9	29.4
OBCs	54.7	56.9
Others	22.4	13.7
Completed years of schooling		
None	6.5	22.8
1-4	3.1	5.3
5-9 years	46.6	43.8
10+ years	43.8	28.1
Household wealth quintiles		
Lowest	11.5	13.4
Second	16.8	20.2
Middle	21.6	22.9
Fourth	25.1	25.1
Highest	25	18.3
State		
Uttar Pradesh	65.9	62.7
Bihar	34.1	37.3
N	**6168**	**4257**

Table 2: Percentage of adolescent girls reported egalitarian gender attitudes by age, 2015-16 and 1018-19

Egalitarian Gender Attitudes	Girls		Married girls	
	Wave 1 (15-19)	Wave 2 (18–22)	Wave 1 (15-19)	Wave 2 (18–22)
Egalitarian Gender Attitudes Index				
Low (0-3)	43.7	32.7	51.9	48.9
High (4-5)	56.4	67.3	48.1	51.1
N	**6168**	**6168**	**4257**	**4257**

Note: low and high are defined respectively for 0-3 score and 4-5 score.

Table 3: Selected sexual and reproductive health practices and outcomes in wave-2 (2018-19) among adolescent girls (unmarried and married) in wave-1 (2015-16)

Sexual and reproductive health practices and health outcomes at wave-2 (2018-19)	Girls (15-19) years at wave 1 (N=6168)	Married girls (15-19) at wave 1 (N=4257)
Age at marriage[$] (N=1551)		
<18 years	36.1 (560)	
>=18 years	63.9 (991)	
Spouse selection[$] (N=1551)		
No	91.3(1416)	
Yes	8.7 (135)	
Currently using any modern contraceptive method[#] (N=5760)		
No		84.2 (4851)
Yes		15.8 (909)
Desired number of children[#] (N=5760)		
> 2		33.8 (1947)
<= 2		66.2 (3813)
Experience of IPV[#] (N=5760)		
No		57.1 (3288)
Yes		42.9 (2472)
Sought treatment for symptoms of reproductive tract infections		
No	85.9 (5299)	79.6 (3387)
Yes	14.1 (869)	20.4 (870)
Age at first birth[@] (N=2725)		
<18 years		15.5 (422)
>=18 years		84.5 (2303)
Four ANC visits[@] (N=2725)		
No		53.8 (1467)
Yes		46.2 (1258)
Comprehensive knowledge of HIV[#] (N=5808)		
No		94.3 (5479)
Yes		5.7 (329)

Note: [$]among those married in inter survey period; [#]Total married at wave2 (among those married at wave 1 and those who were married in interim period among (15-19) years); [@] calculated among those who had given birth in the interim period among those married at wave 1 and who were married in interim period.

Table 4: Sexual and reproductive health, marriage, and IPV outcomes at wave 2 (2018-2019) among adolescents who reported gender role attitudes at wave 1 (2015-2016)

	Gender role attitudes at wave-1 (2015-16) among all unmarried girls (15-19) years and among all married girls							
Sexual and reproductive health practices and outcomes at wave-2 (2018-19)	**Unmarried girls (15-19) years at wave1**				**All married girls at wave 1**			
	Low (%)	High (%)	CORs (95% CI)	AORs (95% CI)	Low (%)	High (%)	CORs (95% CI)	AORs (95% CI)
Age at marriage[$] (N=1551)								
<18 years	40.8	31.5	Ref	Ref				
>=18 years	59.2	68.5	1.61(1.31-1.98)***	1.43(1.15-1.79)**				
Spouse selection[$] (N=1551)								
No	92.3	90.4	Ref	Ref				
Yes	7.7	9.6	1.53(1.06-2.20)*	1.48(1.02-2.15)*				
Currently using any modern contraceptive method[#] (N=5760)								
No					85.2	83.2	Ref	
Yes					14.8	16.9	1.42(1.19-1.68)***	1.21(1.01-1.46)*
Desired number of children (N=5760)								
> 2					37.2	30.0	Ref	Ref
<= 2					62.8	70.0	1.49(1.34-1.67)***	1.18(1.04-1.32)**
Experience of IPV[#] (N=5760)								
No					53.3	61.1	Ref	Ref
Yes					46.7	38.9	0.72(0.65-0.80)***	0.81(0.73-0.90)***
Sought treatment for RTIs								
No	88.4	84.0	Ref	Ref	81.0	78.0	Ref	Ref
Yes	11.7	16.0	1.22(1.05-1.41)**	1.14(0.97-1.33)#	19.0	22.0	1.29(1.10-1.51)**	1.17(1.01-1.38)#
Age at first birth[@] (N=2725)								
<18 years					18.1	12.9	Ref	Ref
>=18 years					81.9	87.1	1.29(1.07-1.55)**	1.20(1.00-1.45)#
Four ANC visits[@] (N=2725)								
No					59.8	47.9	Ref	Ref
Yes					40.2	52.1	1.64(1.41-1.91)***	1.39(1.19-1.63)***
Comprehensive knowledge of HIV[#] (N=5808)								
No					97.7	90.8	Ref	Ref
Yes					2.3	9.2	3.73(2.86-4.86)***	2.70(2.06-3.55)***

*Note: CORs stands for crude odds ratios; AORs stands for adjusted odds ratios; *** p <0.0001, ** p<0.01, * p <0.05, # p<0.10; In all the lagged logistic regression models, low egalitarian attitude at wave 1 is the reference. All the lagged regression analyses were adjusted for years of education, wealth index, interaction with front line workers, place of residence, religion, caste and state. Additionally, the analysis on currently using any contraceptive methods was adjusted for knowledge of at least one modern contraceptive method and the analysis on treatment of reproductive tract infections was adjusted for knowledge of at least one sexually transmitted infection. [$]indicates those married in inter survey period among (15-19) years adolescent girls; [#]indicates the married girls (15-19) years and those who got married in the interim period among (15-19) years adolescent girls; Four ANC visits and Age at first birth were calculated among those given birth in the interim period among those married and married in interim period.*