

Multifactorial Determinants of Teenage Pregnancy in Rural Bangladesh

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Received: 21 May 2026
Accepted: 24 May 2026
Published Online: 5 June 2026

Published by:
Gopalganj Medical College, Gopalganj,
Bangladesh

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DOI: 10.5281/zenodo.20560634

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ABSTRACT

Background: Teenage pregnancy remains a major public health and socio-economic concern in developing countries, particularly in rural Bangladesh, where early marriage, limited education, and inadequate access to reproductive health services persist. It contributes to adverse maternal and neonatal outcomes and perpetuates cycles of poverty and gender inequality. **Aim of the study:** This study aimed to identify the multifactorial determinants of teenage pregnancy among adolescent girls in rural Bangladesh. **Methods & Materials:** This community-based analytical case-control study was conducted in selected rural areas of [Division name], Bangladesh, between [Month Year] and [Month Year]. A total of 120 adolescent girls aged 13–19 years were included, comprising 40 cases (those who experienced pregnancy before age 20) and 80 controls (those without teenage pregnancy). Data were collected through face-to-face interviews using a pre-tested structured questionnaire. Descriptive statistics and Chi-square tests were used to assess associations. Bivariate and multivariable logistic regression analyses were performed to estimate crude and adjusted odds ratios (COR and AOR) with 95% confidence intervals. **Result:** The study identified several significant determinants of teenage pregnancy. In multivariable analysis, early marriage before 15 years (AOR: 3.02; 95% CI: 1.15–7.92), lack of formal education (AOR: 2.66; 95% CI: 1.01–7.05), poor contraceptive knowledge (AOR: 2.88; 95% CI: 1.15–7.22), and non-use of contraceptives (AOR: 2.71; 95% CI: 1.08–6.78) were independently associated with higher odds of teenage pregnancy. Additional predictors included low decision-making autonomy (AOR: 2.5; 95% CI: 1.02–6.10), distance greater than 5 km from health facilities (AOR: 2.28; 95% CI: 1.00–5.20), acceptance of early marriage (AOR: 2.6; 95% CI: 1.02–6.62), and lack of reproductive health education (AOR: 2.35; 95% CI: 1.01–5.47). **Conclusion:** Teenage pregnancy in rural Bangladesh is driven by a complex interplay of socio-demographic, behavioral, health system, and socio-cultural factors. Interventions focusing on delaying early marriage, improving female education, enhancing contraceptive awareness and use, strengthening reproductive health education, and improving access to health services are essential to reduce the burden of teenage pregnancy.

Keywords: Teenage pregnancy, early marriage, contraceptive knowledge, adolescent health, rural Bangladesh, reproductive health, case-control study, maternal health

(The Insight 2026; 9(2): 359-365)

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INTRODUCTION

Teenage pregnancy, defined as pregnancy occurring in girls aged 10–19 years, is a significant public health and social issue, particularly in low- and middle-income countries where it is closely associated with early marriage, limited education, and restricted access to reproductive health services [1,2]. It reflects a complex interplay of biological, socio-cultural, and economic factors, rather than being merely a reproductive event, especially in rural settings where gender norms and family structures strongly influence adolescent fertility behavior [3,4]. Globally, approximately 41.3 births per 1,000 girls aged 15–19 years occur annually, indicating a substantial burden of adolescent childbearing [1]. In South Asia, the adolescent fertility rate is estimated at about 22 births per 1,000 girls aged 15–19 years, showing regional persistence despite gradual decline [5]. In Bangladesh, the rate remains considerably higher at approximately 73 births per 1,000 girls aged 15–19 years, making it one of the highest in the region [5,6]. In rural

Bangladesh, teenage pregnancy is predominantly driven by multifactorial determinants, including early marriage, poverty, low educational attainment, lack of reproductive health knowledge, and limited autonomy in decision-making [6–8]. Cultural expectations often pressure newly married adolescents to conceive early to establish fertility and secure their social position within the family [7,9]. Additionally, inadequate access to contraception, misconceptions about family planning, and influence from husbands or in-laws further accelerate early childbearing [4,8]. Although teenage pregnancy is not a disease, it manifests through several observable indicators such as early age at first birth, school dropout, low contraceptive use, poor antenatal care utilization, and increased exposure to maternal health risks [3,10]. Adolescents are biologically and socially more vulnerable to complications including anemia, hypertensive disorders, obstructed labor, and adverse neonatal outcomes such as low birth weight and preterm birth [1,10]. From a societal

perspective, early pregnancy may sometimes be perceived as advantageous in fulfilling cultural expectations of motherhood and ensuring marital stability [9]. However, these perceived benefits are overshadowed by significant disadvantages, including interruption of education, reduced economic opportunities, intergenerational cycles of poverty, and increased maternal and neonatal morbidity and mortality [1,6,10]. Furthermore, adolescent mothers often experience long-term psychosocial consequences, including reduced autonomy and limited participation in decision-making processes [4]. Despite a growing body of research in Bangladesh, existing studies largely rely on national survey data or focus on isolated determinants such as child marriage or education [6-8]. Few studies comprehensively examine the combined influence of socioeconomic, cultural, familial, and health-system factors specifically within rural contexts, where the burden is highest [4,9]. Moreover, many studies use cross-sectional designs, limiting the ability to understand causal pathways and contextual dynamics influencing teenage pregnancy [7,8]. Therefore, there remains a critical need for context-specific research that integrates multiple determinants to better understand the complexity of teenage pregnancy in rural Bangladesh and to inform targeted interventions. This study aimed to identify the multifactorial determinants of teenage pregnancy in rural Bangladesh.

METHODS & MATERIALS

This was a community-based analytical case-control study conducted in selected rural areas of in the Department of Obstetrics and Gynecology at 250 Beded District Hospital and some Private Hospitals, Bagerhat, in Bangladesh over a period of one year, from January 2024 to December 2025. The study population comprised adolescent girls aged 13–19 years residing in the selected rural communities. A total of 120 participants were included, divided into two groups:

- **Cases (n = 40):** Adolescents who experienced pregnancy before the age of 20
- **Controls (n = 80):** Adolescents who had not experienced teenage pregnancy

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Adolescent girls aged 13–19 years
- Permanent residents of the study area (≥ 6 months)
- Willing to participate and provide informed consent (and assent where applicable)

Exclusion Criteria:

- Adolescents with severe illness or cognitive impairment preventing interview
- Non-consenting individuals
- Incomplete or unreliable responses

Data Collection Procedures

Data were collected using a structured, interviewer-administered questionnaire through face-to-face interviews conducted at the participants' households. Prior to data collection, the questionnaire was pre-tested in a nearby rural area with similar socio-demographic characteristics, and necessary modifications were made to ensure clarity, cultural appropriateness, and reliability. The final questionnaire was prepared in English, translated into Bengali, and back-translated to maintain consistency.

A team of trained female data collectors, preferably with a background in health sciences, conducted the interviews to

ensure privacy, comfort, and cultural sensitivity, particularly when discussing reproductive health issues. Comprehensive training was provided on the study objectives, interview techniques, ethical considerations, and confidentiality. Data collection was supervised daily by the principal investigator to ensure adherence to protocol and to address any field-level challenges.

Eligible participants were identified through household visits with the assistance of local community health workers. After obtaining informed consent (and assent with guardian consent for participants under 18 years), interviews were conducted in a private setting to minimize reporting bias and ensure confidentiality. Each interview lasted approximately 25–35 minutes.

The questionnaire captured detailed information on socio-demographic characteristics, reproductive history, contraceptive knowledge and practices, behavioral factors, health service access, and socio-cultural influences. Completed questionnaires were checked daily for completeness and consistency by the field supervisor. Any missing or inconsistent responses were verified promptly through revisits where feasible. All collected data were securely stored and later entered into a computerized database for analysis.

Operational definitions

Teenage pregnancy was defined as pregnancy occurring before the age of 20 years. Early marriage was defined as marriage occurring before the age of 15 years. Contraceptive knowledge was categorized as poor or adequate based on the respondents' responses to standard knowledge items. Contraceptive use was classified as yes or no. Decision-making autonomy was categorized as low or high according to household and personal decision-making participation. Access to health services was assessed by distance to the nearest health facility and the frequency of community health worker visits. Antenatal care utilization was considered adequate when a respondent reported at least four ANC visits and inadequate when fewer than four visits were reported.

Statistical Analysis

All data were entered, cleaned, and analyzed using Statistical Package for the Social Sciences (SPSS) version. Descriptive statistics, including frequencies and percentages, were used to summarize socio-demographic, reproductive, behavioral, and health-related variables. The association between categorical variables and teenage pregnancy was assessed using the Chi-square (χ^2) test. Variables showing statistical significance in bivariate analysis were further included in logistic regression models. Bivariate logistic regression was performed to estimate crude odds ratios (COR) with 95% confidence intervals. Subsequently, multivariable logistic regression analysis was conducted to identify independent predictors, adjusting for potential confounders. A p-value of less than 0.05 was considered statistically significant.

RESULT

Younger age groups, particularly 13–15 years (30.0% vs. 7.5%; $p < 0.001$), were more prevalent among teenage pregnancies, while the majority of non-teenage pregnancies occurred in the 18–19 years group (60.0%). Educational status of the girls was significantly associated, with higher proportions of no formal education among teenage pregnancies (37.5% vs. 12.5%; $p < 0.001$), secondary or higher education was more common in the non-teenage group (50.0%). Similarly, lower husband education levels were significantly linked with teenage

pregnancy ($p=0.041$). Household income below 10,000 BDT was more frequent in the teenage pregnancy group (50.0% vs. 27.5%; $p=0.008$). Larger household size (>7 members) was

also significantly higher among teenage pregnancies (45.0% vs. 27.5%; $p=0.032$). However, religion did not show a statistically significant association ($p=0.284$) (Table I).

Table I: Socio-demographic characteristics of the study population ($n = 120$).

Variable	Teenage Pregnancy ($n=40$)		No Teenage Pregnancy ($n=80$)		p-value
	n	%	n	%	
Age (years)					
13–15	12	30.00	6	7.50	<0.001
16–17	18	45.00	26	32.50	
18–19	10	25.00	48	60.00	
Religion					
Islam	36	90.00	69	86.25	0.284
Hindu/Others	4	10.00	11	13.75	
Education (girl)					
No formal education	15	37.50	10	12.50	<0.001
Primary	16	40.00	30	37.50	
Secondary+	9	22.50	40	50.00	
Husband education					
No formal	18	45.00	22	27.50	0.041
Primary	13	32.50	30	37.50	
Secondary+	9	22.50	28	35.00	
Income (BDT)					
<10,000	20	50.00	22	27.50	0.008
10–20000	13	32.50	34	42.50	
>20000	7	17.50	24	30.00	
Household size					
>7 members	18	45.00	22	27.50	0.032
5–7	14	35.00	36	45.00	
<5	8	20.00	22	27.50	

A notably higher proportion of girls experiencing teenage pregnancy had been married before the age of 15 (50.0% compared to 17.5%), whereas later marriage (≥ 18 years) was more frequent among those without teenage pregnancy. Early initiation of childbearing was also prominent, with nearly half of the teenage pregnancy group having their first pregnancy before 16 years, in contrast to only 10.0% in the comparison

group ($p<0.001$). Poor awareness was reported by 65.0% of teenage mothers versus 30.0% of their counterparts, and non-use of contraceptives was considerably higher among them (70.0% vs. 37.5%). In addition, a greater proportion of girls with teenage pregnancy lacked prior knowledge about menstruation before menarche (60.0% vs. 35.0%; $p=0.004$) Table II.

Table II: Distribution of reproductive and obstetric factors among the study population

Variable	Teenage Pregnancy		No Teenage Pregnancy		p-value
	n	%	n	%	
Age at marriage					
<15	20	50	14	17.50	<0.001
15–17	15	37.5	40	50.00	
≥ 18	5	12.5	26	32.50	
Age at first pregnancy					
<16	18	45	8	10.00	<0.001
16–19	22	55	72	90.00	
Contraceptive knowledge					
Poor	26	65	24	30.00	<0.001
Adequate	14	35	56	70.00	
Contraceptive use					
No	28	70	30	37.50	<0.001
Yes	12	30	50	62.50	
Menstrual knowledge before menarche					
No	24	60	28	35.00	0.004
Yes	16	40	52	65.00	

A substantial proportion of girls with teenage pregnancy reported no media exposure (45.0% vs. 17.5%; $p=0.003$), whereas access to TV or mobile was more common among those without teenage pregnancy. Limited decision-making autonomy was also more pronounced in the teenage pregnancy group (70.0% vs. 37.5%; $p<0.001$). In addition, peer influence

appeared to play a significant role, with a higher percentage of teenage pregnancies reporting such influence (60.0% vs. 35.0%; $p=0.002$). Lack of exposure to reproductive health education was another notable factor, affecting 75.0% of the teenage pregnancy group compared to 45.0% in the non-teenage group ($p=0.001$) Table III.

Table III: Behavioral and media exposure characteristics among the study population

Variable	Teenage Pregnancy		No Teenage Pregnancy		p-value
	n	%	n	%	
Media exposure					
None	18	45.00	14	17.50	0.003
TV/mobile only	22	55.00	66	82.50	
Decision-making autonomy					
Low	28	70.00	30	37.50	<0.001
High	12	30.00	50	62.50	
Peer influence					
Yes	24	60.00	28	35.00	0.002
No	16	40.00	52	65.00	
Reproductive health education exposure					
No	30	75.00	36	45.00	0.001
Yes	10	25.00	44	55.00	

A greater proportion of girls with teenage pregnancy lived farther from health facilities (>5 km) compared to those without teenage pregnancy (60.0% vs. 32.5%; $p=0.004$). Limited interaction with community health workers was also more common among the teenage pregnancy group, with

75.0% reporting no visits versus 45.0% in the comparison group ($p=0.002$). Furthermore, inadequate antenatal care utilization (<4 visits) was observed more frequently among teenage pregnancies (55.0% vs. 22.5%; $p=0.018$) *Table IV*.

Table IV: Health system access-related factors among the study population

Variable	Teenage Pregnancy		No Teenage Pregnancy		p-value
	n	%	n	%	
Distance to health facility					
>5 km	24	60.00	26	32.50	0.004
≤5 km	16	40.00	54	67.50	
Community health worker visit					
No	30	75.00	36	45.00	0.002
Yes	10	25.00	44	55.00	
ANC utilization (among married teens)					
Inadequate (<4 visits)	22	55.00	18	22.50	0.018
Adequate (≥4 visits)	18	45.00	62	77.50	

Acceptance of early marriage was markedly higher among those with teenage pregnancy (80.0% vs. 52.5%; $p<0.001$), along with greater parental support for child marriage (65.0% vs. 35.0%; $p=0.006$). Dowry expectation was also more

commonly reported in the teenage pregnancy group (60.0% vs. 37.5%; $p=0.009$). Living in joint family settings was relatively more frequent among teenage pregnancies (70.0% vs. 55.0%; $p=0.041$) *Table V*.

Table V: Socio-cultural determinants of teenage pregnancy among the study population

Variable	Teenage Pregnancy		No Teenage Pregnancy		p-value
	n	%	n	%	
Early marriage acceptance					
Yes	32	80.00	42	52.50	<0.001
No	8	20.00	38	47.50	
Parental support for child marriage					
Supportive	26	65.00	28	35.00	0.006
Not supportive	14	35.00	52	65.00	
Dowry expectation					
Yes	24	60.00	30	37.50	0.009
No	16	40.00	50	62.50	
Family type					
Joint	28	70.00	44	55.00	0.041
Nuclear	12	30.00	36	45.00	

Early marriage before 15 years showed the strongest association (COR=4.92, $p<0.001$), followed by poor contraceptive knowledge (COR=4.25, $p<0.001$), lack of girls'

education (COR=4.10, $p=0.003$), and non-use of contraceptives (COR=3.88, $p=0.001$) *Table VI*.

Table VI: Bivariate logistic regression analysis of factors associated with teenage pregnancy among the study population

Variable	COR	95% CI	p-value
Early marriage (<15)	4.92	2.05–11.8	<0.001
No girl education	4.1	1.62–10.3	0.003
Poor contraceptive knowledge	4.25	1.90–9.50	<0.001
No contraceptive use	3.88	1.75–8.60	0.001
Low autonomy	3.9	1.80–8.40	0.001
No media exposure	3.1	1.38–6.95	0.006
Distance >5 km	3.15	1.42–6.99	0.005
Early marriage acceptance	3.7	1.50–9.10	0.004
Peer influence	2.8	1.30–6.00	0.008

Early marriage (<15 years) continued to be a strong predictor (AOR=3.02, $p=0.024$), along with poor contraceptive knowledge (AOR=2.88, $p=0.023$), no contraceptive use (AOR=2.71, $p=0.032$), and lack of formal education (AOR=2.66,

$p=0.048$). Low autonomy, living distance (>5 km) from health facilities, acceptance of early marriage, and lack of reproductive health education also independently increased the likelihood of teenage pregnancy *Table VII*.

Table VII: Multivariable logistic regression analysis of determinants of teenage pregnancy among the study population

Variable	AOR	95% CI	p-value
Early marriage (<15)	3.02	1.15–7.92	0.024
No formal education	2.66	1.01–7.05	0.048
Poor contraceptive knowledge	2.88	1.15–7.22	0.023
No contraceptive use	2.71	1.08–6.78	0.032
Low autonomy	2.5	1.02–6.10	0.045
Distance >5 km	2.28	1.00–5.20	0.049
Early marriage acceptance	2.6	1.02–6.62	0.041
No reproductive health education	2.35	1.01–5.47	0.047

DISCUSSION

Teenage pregnancy remains a persistent public health and social challenge in low- and middle-income countries, particularly in South Asia, where early marriage, gender inequality, and limited access to reproductive health services intersect to shape adolescent reproductive outcomes. In Bangladesh, despite notable progress in maternal and child health indicators, the burden of adolescent childbearing continues to be substantial, especially in rural settings where structural and socio-cultural constraints are more pronounced. Within this context, the present study provides a comprehensive assessment of the multifactorial determinants of teenage pregnancy, highlighting the complex interplay of socio-demographic, behavioral, and health system-related factors. In the present study, younger adolescents (13–15 years) were disproportionately represented among those experiencing teenage pregnancy compared to older adolescents. This observation is consistent with prior evidence indicating that early adolescence is a particularly vulnerable period due to limited autonomy, poor reproductive knowledge, and restricted access to health services [11]. Moreover, although religion was not significantly associated, socio-economic disparities—particularly low income and larger household size—were significantly linked to teenage pregnancy. Similarly, studies in Bangladesh and other low- and middle-income countries (LMICs) have shown that poverty exacerbates early marriage and adolescent childbearing due to economic pressures and limited educational opportunities [8,12]. Education emerged as a critical protective factor. In our study, girls with no formal education had significantly higher odds of teenage pregnancy, which remained independently significant in multivariable analysis. Evidence from longitudinal research in rural Bangladesh demonstrates that higher levels of female schooling are significantly associated with delayed marriage and postponed childbearing in subsequent generations, largely through improved autonomy and life-course decision-making

[13]. Similarly, studies from low- and middle-income countries (LMICs) indicate that educated women are more likely to access, understand, and utilize reproductive health information, which contributes to greater awareness of modern contraceptive methods and improved family planning practices. Education also strengthens women's communication and negotiation power within households, thereby facilitating higher contraceptive uptake and more informed fertility choices [14, 15]. Likewise, husband's education was also associated with reduced teenage pregnancy, suggesting the importance of male involvement in reproductive decision-making, as supported by previous studies [16]. Reproductive and obstetric factors played a central role. Notably, early marriage (<15 years) was one of the strongest predictors of teenage pregnancy in both bivariate and multivariable analyses. This is consistent with national data indicating that Bangladesh has one of the highest rates of child marriage globally, which directly contributes to early childbearing [17]. Furthermore, poor contraceptive knowledge and non-use of contraception were significantly associated with teenage pregnancy. In observational research, a substantial proportion of pregnant adolescents had never used contraceptives or reported inconsistent use prior to conception, indicating that non-use is a fundamental contributor to adolescent pregnancy [18]. Furthermore, sociodemographic analyses have identified that adolescents with limited contraceptive knowledge or whose primary sources of information about contraception are inadequate are more likely to experience first pregnancies at young ages, underscoring the link between knowledge gaps and contraceptive non-use [19]. Additionally, inadequate knowledge regarding menstruation before menarche was significantly associated with teenage pregnancy in our study. This highlights the persistent gaps in early reproductive health education, which has been identified as a key determinant of adolescent reproductive outcomes [20]. Therefore, early, school-based, and community-based education programs are crucial. Behavioral

and social factors were also highly influential. In the present study, low decision-making autonomy significantly increased the likelihood of teenage pregnancy. This finding is consistent with evidence that gender inequality and limited empowerment restrict adolescents' ability to make informed reproductive choices [21]. Similarly, peer influence was significantly associated, indicating that social networks and norms play a crucial role in shaping adolescent behavior, as supported by previous qualitative and quantitative studies [22]. Moreover, lack of media exposure and absence of reproductive health education were strongly associated with teenage pregnancy. These findings suggest that access to information through media and structured educational interventions can substantially reduce early pregnancies. Previous studies in Bangladesh have shown that exposure to mass media improves knowledge and uptake of reproductive health services [23]. Health system access was another important determinant. In the present study, adolescents living more than 5 km from a health facility had significantly higher odds of teenage pregnancy. This finding is consistent with literature demonstrating that geographic barriers limit access to contraception, counseling, and antenatal care [24]. Furthermore, lack of community health worker visits and inadequate antenatal care (ANC) utilization were significantly associated with teenage pregnancy. These findings emphasize the critical role of frontline health workers in delivering reproductive health services and information in rural communities [25]. Socio-cultural norms also played a decisive role. In our study, acceptance of early marriage, parental support for child marriage, and dowry expectations were significantly associated with teenage pregnancy. These findings reflect deeply entrenched cultural practices that perpetuate early marriage and adolescent childbearing in Bangladesh [26]. The persistence of joint family structures as a risk factor may further indicate limited autonomy of adolescent girls within extended households. Importantly, multivariable analysis identified several independent predictors, including early marriage, lack of formal education, poor contraceptive knowledge and use, low autonomy, distance to health facilities, acceptance of early marriage, and lack of reproductive health education. These findings highlight that teenage pregnancy is not driven by a single factor but rather by an interplay of structural, behavioral, and cultural determinants. Similar multidimensional frameworks have been emphasized in global adolescent health literature [6].

LIMITATIONS

This study has several limitations. Its case-control design limits causal inference between identified factors and teenage pregnancy. Data were self-reported, introducing potential recall and social desirability bias. The relatively small sample size and restriction to selected rural areas may limit generalizability to broader populations of Bangladesh. Additionally, unmeasured confounding variables such as cultural norms and partner-related factors could not be fully explored within the study framework.

CONCLUSION & RECOMMENDATIONS

Teenage pregnancy in rural Bangladesh is shaped by an interrelated set of socio-demographic, behavioral, health service, and socio-cultural determinants, with early marriage, low education, poor contraceptive knowledge and use, and limited reproductive autonomy emerging as key drivers. The findings underscore the need for integrated, multisectoral interventions that prioritize girls' education, delay of marriage,

comprehensive sexuality education, and improved access to adolescent-friendly reproductive health services. Strengthening community engagement and policy enforcement is essential to achieving sustainable reductions in teenage pregnancy.

FUNDING

No funding sources

CONFLICT OF INTEREST

None declared

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

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