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Research Article

Exploring The Factors Influencing Teenage Marital Pregnancy In India: Insights From NFHS 5 Using Cox Proportional Hazard Regression Analysis

Dipankar Roy^{1*}, Sandip Rudra Paul², Munmi Sarma³, Deepmala Deb⁴, Dipanjan Roy⁵, Shanku Paul⁶, Kinnor Das⁷

^{1*}Assistant Professor, Department of Economics, Government Model Degree College, Borkhola, Assam.

² PhD Research Scholar, Department of Economics, Assam University, Silchar, Assam.

³Assistant Professor, Department of Economics, Nehru College, Pailapool, Silchar, Assam.

⁴BAMS, M.S (Ay) Surgery, ACGO, M.O (Ay), Chutodudpatil Model Hospital, Cachar, Assam.

⁵Senior Resident, Surgical Oncology, Dr RMLIMS, Lucknow.

⁶PhD Research Scholar, Department of Economics, Assam University, Silchar, Assam

⁷Consultant Dermatologist, Apollo Clinic Silchar, Silchar, Assam.

***Corresponding author:** Dipankar Roy

^{*}Department of Economics, Government Model Degree College, Borkhola, Assam.

<https://orcid.org/0000-0002-0485-5941>, rdipankar013@gmail.com

Abstract

Teenage pregnancy remains a substantial global concern due to its well-documented causes and the health, social, and economic implications it poses. India, having one of the world's largest teenage populations, continues to deal with customs that support early marriage and hence result in teenage pregnancies. Alarming, nearly one-fifth of adolescent women engage in sexual activity before attaining the age of 15, and more than 50% before turning 18. Given the possible deleterious influence of teenage pregnancy on child health, which is a significant prognosticator of future human resources, it is fundamental to analyse the condition in a developing nation like India. The primary objective of this study was to ascertain the risk variables associated with teenage pregnancy in India. A comparative cross-sectional study was done in India utilizing secondary data from the fifth phase of the National Family Health Survey. Descriptive statistics were used to scrutinize the frequency and trends in teen pregnancy in India. Furthermore, to identify possible risk variables for teenage pregnancy in India, a Cox proportional hazard regression was used. Teenage pregnancy in India has seen a noteworthy reduction over time, but significant state-level variations persist. Tripura has the maximum prevalence, followed by West Bengal, Andhra Pradesh, Assam, and Bihar. Regression analysis emphasizes the influence of factors like residency, cultural background, education, media accessibility, and family planning awareness in shaping teenage pregnancy rates in India. Teenage pregnancy is induced by intricate factors, involving socioeconomic settings and gender biases. To combat it effectively, focussing on economic disproportions and fostering girls' education should be linked with inclusive family planning programs and increased consciousness about contraception.

Keywords: Human resources; Teenage pregnancy; Risk factor; Cox proportional hazard regression; India

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1. Introduction

Motherhood is an intimidating endeavour for anybody, but for an adolescent or teenager, it can lead to a behavioural crisis (Riva Crugnola & Ierardi, 2022). Pregnancies among girls aged 10 to 19 are referred to as teenage pregnancy, and a considerable number of these pregnancies are often unplanned or unintentional. Teenage pregnancies are a serious public health concern, with far-reaching consequences for both young mothers and their children (Saikia et al., 2023). On top of that, teens who embrace motherhood often lack the maturity to acknowledge their position, and their psychological ineptitude makes them more likely to prioritize themselves over and above their children's developmental needs (Mangeli et al., 2017).

The issue of teenage pregnancy is universal and transcends all economies and societies. However, the prevalence has been found to be higher in low- and middle-income nations, where the burden is typically exacerbated by limited access to decent healthcare, education, and socioeconomic opportunities (Saikia et al., 2023). Every year, more than 16 million adolescent mothers give birth, and, a simple breakdown, estimates that one in every five adolescent girls worldwide experiences motherhood, with the ratio rising to one in every three in poorer countries. Between the years 2015 and 2019, around 21 million young women aged 15 to 19 in low-income nations became pregnant, giving birth to approximately 12 million babies in the process. However, more than 50% of these pregnancies were not planned. As stated in a latest report, nearly 14 percent of young female adolescents have experienced childbirth prior to reaching the age of 18. (Maheshwari et al., 2022; WHO, 2023). These figures emphasize the serious problem of teenage pregnancy and its global prevalence.

A greater likelihood of unfavourable maternal health consequences is one of the key considerations linked with teenage pregnancy (Parasuramalu et al., 2010). Compared with the general population, adolescent mothers are at an increased risk of complications related to pregnancy. For this reason, they are vulnerable to prenatal conditions such as anaemia, pregnancy-induced hypertension (PIH) and its severe fatalities, preterm premature rupture of membranes (PPROM), infections of the reproductive system, pregnancy loss, or birth of nonviable infants. They are also at a higher risk of facing a multitude of problems during and after delivery which include wound dehiscence, excessive bleeding after giving birth, bacterial infection of the reproductive system, mental disorders such as depressive and psychotic episodes, lengthened hospitalization, and in some cases even death (Kawakita et al., 2016). Pregnancy-related complications remain a common cause of death among adolescent and young adult women, accounting for about 15 percent of total deaths in women aged 10-25 years globally, with even higher rates in low- and middle-income countries (Neal et al., 2016). Maternal mortality can be prevented by avoiding unsafe abortion. But, approximately three

million girls aged 15 to 19 have unsafe abortions each year. And, of the two million adolescent pregnancies that occur in India, 53% result in abortion, with around 78 percent being unsafe (Kassa et al., 2018).

Furthermore, teenage girls frequently face barriers to receiving adequate prenatal care and may experience malnutrition, which has a substantial impact on the well-being of their children (Diabelková et al., 2023). Infants borne by teenage mothers are at a greater risk of developing complications such as IUGR (Intra Uterine Growth Retardation), low birth weight (LBW), premature birth, necrotizing enterocolitis, hyaline membrane disease, injuries at birth, congenital anomalies, under nutrition, abnormal growth patterns, and even dying earlier than most of their peers (Ganchimeg et al., 2014). In fact, in countries such as India, over 80 percent of infants' deaths are attributed to low birth weight problems. Furthermore, babies born with a weight of less than 2.5kg have a high tendency to be malnourished and suffer from illnesses associated with young children such as diarrhoea and pneumonia which are key contributors to neonatal and child mortality (Dandona et al., 2020; Fall, 2013). Furthermore, child malnutrition, which accounts for half of all child fatalities worldwide, is especially prevalent among newborns with low birth weight (Jana et al., 2023). Pregnancy at a young age has a substantial impact on a nation's human resources and its growth prospects (Marvin-Dowle et al., 2018). In addition, decreasing teenage pregnancy and pregnancy-related mortality and morbidity is crucial for attaining better health outcomes throughout all stages of life and must be achieved to meet the Sustainable Development Goals (SDGs) for newborn and maternal health (Saikia et al., 2023). Considering that India has one of the largest adolescent populations and certain regions still practice cultural traditions such as child marriage and child marital pregnancies, nearly one-fifth of all young women were found to be sexually engaged by the age of 15 and over half by the age of 18, respectively (Patra, 2016).

It is, therefore, important to understand the factors contributing to teenage pregnancy in India in order to concentrate on the maternal and child health implications, the socioeconomic issues, and, enhancing reproductive health services. Teenage pregnancy in India is inadequately comprehended due to a lack of far-reaching national-level studies. Despite the fact that a few studies have been conducted (Ganchimeg et al., 2014; Parasuramalu et al., 2010; Saikia et al., 2023), the majority of them were regional and may not be completely true to the nation. As a result, a more thorough analysis of the risk factors linked with teenage pregnancy in India is needed. To bridge this gap, a modest effort was made to assess the prevalence and trends of teenage pregnancy in India as well as to find out the risk factors of teenage pregnancy using the Cox Proportional Hazard Regression analysis. This study aims to deliver new perceptions to existing literature by providing additional evidence into the issue of teen pregnancy in India.

2. Methodology

2.1. Data Source

The study has utilized secondary data obtained from the District Level Household and Facility Survey (DLHS 1 & DLHS 2) and the National Family Health Survey (NFHS 3, NFHS 4 & NFHS 5). All the surveys were carried out by the nodal agency named International Institute for Population Sciences (IIPS), Mumbai with oversight and supervision from the Ministry of Health and Family Welfare (MoHFW), Government of India.

The level and pattern of teen pregnancy in India were investigated using data from the first and second rounds of the DLHS survey, as well as the third, fourth, and fifth rounds of the NFHS survey. Due to a lack of clear-cut information on teenage pregnancy in the first and second rounds of NFHS surveys, DLHS data were utilised. This facilitates us to gain a thorough understanding of the incidence of teen pregnancy in India over time¹.

Furthermore, data from NFHS 5 was employed to find the risk factors accompanying teenage pregnancy. The NFHS 5 is an across-the-board national-level household survey that offers demographic and health-related information on the Indian population. The NFHS survey included 636,699 households and 724,115 ever-married women aged 15 to 49 years in India. Nonetheless, in this study, we limited our analysis to 122480 married women aged 15 to 19 years. The sample approach employed in the NFHS 5 survey is published elsewhere ((NFHS 5).

2.2. Variable of Interest and Statistical Analysis

In this study, teenage pregnancy was defined as the proportion of women aged 15 to 19 who had a live birth or were presently expecting their first child. The respondent's age was classified as the 'time to event'. At the same time, the occurrence of teenage pregnancy was the 'status' or 'failure' variable, and those who did not experience teenage pregnancy were deemed censored.

The level and trend of teenage pregnancy were presented using descriptive statistics. Next, the study aimed to identify predictors of teenage pregnancy using several demographic, socioeconomic, and spatial variables that were identified by previous literature. Cox proportional hazard analysis was employed to estimate the strength and direction of the associations between the predictors and the hazard of teenage pregnancy. We used the Cox

proportional hazards regression method in our analysis because our data had missing observations, and we were unsure about the distribution of the data. This method allowed us to evaluate models without making any assumptions about distributions (Persson, 2002).

To elucidate risk factors linked with teenage pregnancy in India, we estimated the following cox proportional hazard regression model

$$h(t) = h_0(t) \exp(\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p) \quad (I)$$

In the Cox proportional hazard regression 't' denotes time, 'xs' denotes covariates, 'βs' stands for regression coefficients, and the baseline hazard function is denoted by $h_0(t)$ when $x=0$. Here our predicted hazard is the incidence of teenage pregnancy in India. The hazard ratio in Cox proportional hazard regression indicates the relative likelihood of an event occurring at any given time between two groups. In our study, it illuminates the likelihood of teenage pregnancy. A hazard ratio exceeding one signifies an increased risk, while a ratio below one suggests a diminished risk.

3. Result Analysis

3.1. Incidence of Teenage Pregnancy in India

Figure 1 depicts the level and trend of the incidence of teenage pregnancy in India since 1998. Although the proportion of teenage pregnancies has decreased significantly over the years, falling from a staggering 43 percent to a comparatively low 6.8 percent, the sheer magnitude of this percentage in light of India's vast population remains alarming. In 1998-99, the rate of teenage pregnancy was an alarming 43 percent, which subsequently increased to 47 percent by 2002-04. However, a remarkable transition occurred from 2005-06 onwards, and, a significant decrease in the incidence of teenage pregnancy became visible. The recorded figure dropped from a staggering 47 percent to just 16 percent by 2005-2006, then dropped even more to 7.9 percent in 2015-16, and finally down to 6.8 percent in 2019-21. Despite the fact that these numbers may seem upbeat, the nation's expanding population has contributed to a noticeable rise in the absolute number of teenage pregnancies.

¹ It is essential to note that, despite being independent surveys, DLHS and NFHS have comparable statistical techniques. These include using sample designs, rigorous

sampling procedures, and comprehensive interviews to obtain data on a variety of health parameters.

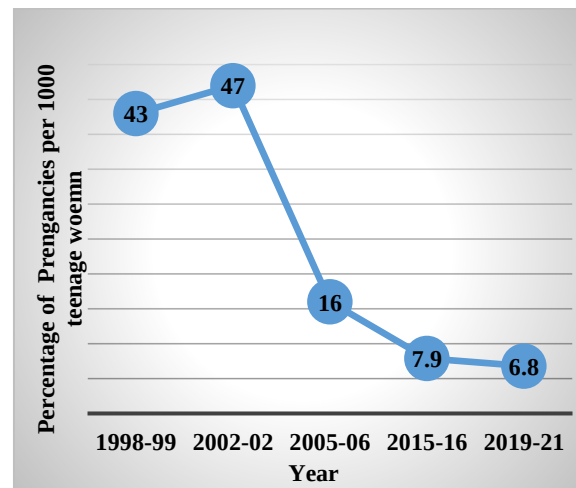


Figure 1: Level and Trend of Teenage Pregnancy in India Since 1998

Source: Prepared by the authors from DLHS 1& 2 [28, 29], NFHS 3, 4 & 5 [30-32]

Table 1 illustrates the prevalence of teenage pregnancy across states and union territories in India in 2019-21. It was found that roughly 7 percent of women aged 15-19 in India started childbearing in 2019 – 21. Approximately 4.5 percent of eligible women had live births, and 2.3 percent were pregnant with their first child. The prevalence of teenage pregnancy varied significantly throughout India's states and union territories. Notably, Tripura had the highest incidence of teenage pregnancy at over 22 percent, followed by West Bengal (16.4 percent), Andhra Pradesh (12.5 percent), Assam (11.7 percent), and Bihar (11

percent). In comparison, Chandigarh had the lowest rate at 0.8 percent, while Jammu & Kashmir had under one percent of teenage pregnancy cases in 2019-21.

Although the majority of states and union territories made remarkable progress in reducing the burden of adolescent pregnancy, there were significant outliers, including Tripura, Tamil Nadu, Lakshadweep, Delhi, Manipur, and Himachal Pradesh. Teenage pregnancy in Tripura scaled from 18.8 percent in 2015-16 to 21.9 percent in 2019-21. Tamil Nadu experienced a 1.3 percent increase, while Delhi and Manipur witnessed an increase of 1.2 percent.

Table 1: Percentage of Women Aged 15-19 Who Have Begun Childbearing in India		
State / UTs / India	2015-16	2019-21
Chandigarh	2.0	0.8
Delhi	2.1	3.3
Haryana	5.9	3.9
Himachal Pradesh	2.5	3.4
Jammu & Kashmir	2.9	0.9
Punjab	2.6	3.2
Rajasthan	6.4	3.6
Uttarakhand	2.8	2.4
Chhattisgarh	4.8	3.1
Madhya Pradesh	7.3	5.1
Uttar Pradesh	3.8	2.9
Bihar	12.2	11.0
Jharkhand	11.9	9.8
Odisha	7.6	7.6
West Bengal	18.3	16.4
Arunachal Pradesh	10.5	6.1
Assam	13.6	11.7
Manipur	7.4	8.6
Meghalaya	8.6	7.2
Mizoram	7.1	4.1
Nagaland	5.8	3.8
Sikkim	2.8	3.1

Tripura	18.8	21.9
DNH & DD²	7.4	4.3
Goa	2.9	2.8
Gujarat	6.5	5.3
Maharashtra	8.4	7.6
A & N Islands³	4.7	3.0
Andhra Pradesh	11.8	12.5
Karnataka	7.7	5.4
Kerala	3.0	2.4
Lakshadweep	0.0	1.1
Puducherry	3.5	4.2
Tamil Nadu	5.0	6.3
Telangana	10.6	5.7
India	7.9	6.8

Source: Compiled by the authors from NFHS 4 & 5 [31, 32]

The incidence of live births among teenagers in India declined from 5.2 percent in 2015-16 to 4.5 percent in 2019-21 (Table 2). Several states and union territories made significant progress in reducing teenage live births. However, Tripura, Manipur, Puducherry, Tamil Nadu, Himachal Pradesh, and Delhi showed an opposite trend, with an increase in teenage live births during 2019-21 compared to 2015-16.

Considerable progress was also made across the country in lowering the proportion of teenagers who were pregnant

with their first child in 2019-21 (Table 3). India recorded a rate of 2.7 percent for teens pregnant with their first child in 2015-16, which then fell to 2.3 percent in 2019-21. From table 3, it can be seen that West Bengal, Arunachal Pradesh, and Karnataka, in particular, had made significant strides in lowering the frequency of teenagers who were pregnant with their first child. However, Lakshadweep, Andhra Pradesh, Odisha, Punjab, Sikkim, and Delhi saw a rise in incidence in 2019-21 as compared to 2015-16.

Table 2: Prevalence of Teenagers Who Had Live Birth in India		
State / UTs / India	2015-16	2019-21
Chandigarh	0.9	0.0
Delhi	1.1	1.8
Haryana	3.4	1.8
Himachal Pradesh	1.8	2.8
Jammu & Kashmir	2.1	0.7
Punjab	1.8	1.6
Rajasthan	3.9	2.3
Uttarakhand	1.4	1.3
Chhattisgarh	3.1	1.5
Madhya Pradesh	4.5	2.9
Uttar Pradesh	2.0	1.7
Bihar	7.4	6.8
Jharkhand	8.6	7.1
Odisha	5.4	4.5
West Bengal	12.8	12.7
Arunachal Pradesh	8.1	5.1
Assam	10.1	7.9
Manipur	4.7	6.2

² DNH & DD represents Dadra & Nagar Haveli and Daman & Diu.

³ A & N Islands represents Andaman and Nicobar Islands

Meghalaya	5.8	5.3
Mizoram	5.1	2.8
Nagaland	4.1	2.2
Sikkim	2.2	1.8
Tripura	13.4	16.2
DNH & DD	4.9	2.3
Goa	2.0	1.8
Gujarat	4.5	3.2
Maharashtra	5.9	5.3
A & N Islands	2.6	1.2
Andhra Pradesh	8.6	8.4
Karnataka	4.8	3.6
Kerala	1.7	1.2
Lakshadweep	0.0	0.0
Puducherry	2.0	3.4
Tamil Nadu	3.2	4.2
Telangana	7.7	3.3
India	5.2	4.5

Source: Compiled by the authors from NFHS 4 & 5 [31, 32]

3.2. Risk Factors Associated With Teenage Pregnancy in India

To identify risk factors associated with teenage pregnancy in India, we estimated the following Cox proportional hazards regression model⁴ and the result has been presented in Table 4

$$h(t) = h_0(t)e[\beta_1 D_1 + \beta_2 D_2 + \beta_3 D_3 + \beta_4 D_4 + \beta_5 D_5 + \beta_6 Res + \beta_7 Ed + \beta_8 HS + \beta_9 WS + \beta_{10} Rel + \beta_{11} Ct + \beta_{12} AM + \beta_{13} AFP] \quad (II)$$

class; AM signifies access to media and AFP stands for awareness about family planning.

Here, D_i s are the regional dummies; Res signifies place of residence; Ed signifies educational attainment of the respondent; HS signifies household size; WS signifies household wealth status; Rel stands for religion of the respondent; Ct refers to social

Table 3: Prevalence of Teenagers Who Were Pregnant With Their First Child		
State / UTs / India	2015-16	2019-21
Chandigarh	1.1	0.8
Delhi	1.0	1.5
Haryana	2.5	2.1
Himachal Pradesh	0.7	0.6
Jammu & Kashmir	0.8	0.2
Punjab	0.8	1.6
Rajasthan	2.5	1.3
Uttarakhand	1.4	1.1
Chhattisgarh	1.7	1.6
Madhya Pradesh	2.8	2.2
Uttar Pradesh	1.8	1.2
Bihar	4.8	4.2
Jharkhand	3.3	2.7

⁴ The key predictors used in the model were identified through review of the literature.

Odisha	2.2	3.1
West Bengal	5.5	3.7
Arunachal Pradesh	2.4	1.0
Assam	3.5	3.8
Manipur	2.7	2.4
Meghalaya	2.8	1.9
Mizoram	2.0	1.3
Nagaland	1.7	1.6
Sikkim	0.6	1.3
Tripura	5.4	5.7
DNH & DD	2.5	2.0
Goa	0.9	1.0
Gujarat	2.0	2.1
Maharashtra	2.5	2.3
A & Ni Islands	2.1	1.8
Andhra Pradesh	3.2	4.1
Karnataka	2.9	1.8
Kerala	1.3	1.2
Lakshadweep	0.0	1.1
Puducherry	1.5	0.8
Tamil Nadu	1.8	2.1
Telangana	2.9	2.4
India	2.7	2.3

Source: Compiled by the authors from NFHS 4 & 5 [31, 32]

Table 4 illustrates the estimated HR derived from the Cox PH model, as well as z values to determine if the factors have a significant influence on teenage marital pregnancy or not. Before interpreting the regression result, it is important to clarify that the diagnostic statistics given by Log pseudo-likelihood (-105568.08) and Wald Chi-Square (2896.18) and the test of proportional-hazards assumption given by Chi-square (265.35) both are significant at 1% level of significance and this justifies the appropriateness of the model.

In Cox regression analysis, the concept of hazard ratio signifies the risk of occurrence of the event at a specified time for the subject in a particular group relative to that in another group. In this analysis, for example, it underscores the statistical likelihood of teenage pregnancy among various populations. When the hazard ratio is greater than one, it denotes a greater risk. On the other hand, when the hazard ratio is less than one, it implies a lower risk (Bradshaw & Dennis, 2009).

In terms of the regression results (Table 4), it was found that regional divergences tend to impact the prevalence of teenage pregnancy in the country. Other than the central region, we found that the risk of teenage pregnancy was significantly higher in the Eastern (0.80 times, [HR - 1.80]), Western (0.63 times, [HR - 1.63]), Southern (0.62 times, [HR - 1.62]), and North-Eastern (0.59 times, [HR -

1.59]) regions compared to the Northern region. The risk of teenage pregnancy was found to be 0.07 times [HR- 0.93] lower in the central region than in the northern region. In terms of place of residence, the risk of teenage pregnancy was found to be 0.39 times [HR - 1.39] higher for rural women than for urban women. The regression results also demonstrated that as educational attainment increased, the risk of teenage pregnancy decreased by 1 - 0.75 = 0.25 times [HR - 0.75] in the country.

When compared to women from smaller families, women from larger families had 0.15 times [HR - 1.15] higher likelihood of teenage pregnancy. Poor women aged 15 to 19 had 0.40 times [HR - 1.40] higher risk of teenage pregnancy than middle-class and rich women. Muslim women had 0.36 times [HR - 1.36] higher probability of becoming pregnant as teenagers, and comparable findings were obtained for teenagers from lower socioeconomic backgrounds. Backward-class women had 0.16 times [HR - 1.16] greater probability of having a teenage pregnancy than their contemporaries. In terms of media accessibility, we noticed that teenagers who did not have access to mass media had 0.21 times [HR- 1.21] greater risk of pregnancy than their peers. Furthermore, this study revealed that women with inadequate knowledge of family planning were 0.19 times [HR - 1.19] more likely to become pregnant during their adolescence.

Table 4: Cox Proportional Hazard Regression Result		
Dependent Variable: Age of the Respondent		
Status Variable: Teenage Pregnancy		
Variables	Hazard Ratio	Z value
Region		
Eastern	1.80	18.06***
Western	1.63	12.25***
North-East	1.62	13.58***
Southern	1.59	12.33***
Central	0.92	-2.49***
Northern	Reference	
Place of Residence		
Rural	1.39	12.90***
Urban	Reference	
Educational Attainment	0.75	-5.37***
Household Size	1.15	18.05***
Wealth Index		
Poor	1.40	15.60***
Middle and Rich	Reference	
Religion		
Muslim	1.36	2.05**
Non-Muslim	Reference	
Social Class		
Backward	1.16	2.73***
Others	Reference	
Access to Media		
No	1.21	7.28***
Yes	Reference	
Awareness about family Planning		
No	1.19	8.53***
Yes	Reference	
Diagnostic statistics	Log pseudo-likelihood -105568.08 Wald Chi- square 2896.18***	
Test of proportional-hazards assumption	Chi- square 265.35***	

Note: *** and ** represents 1% and 5% level of significance
Source: Computed by the authors

4. Discussion

From the analysis of the District Family Health Survey (DLHS) and National Family Health Survey (NFHS) data, we found that the teenage pregnancy rates in India have declined significantly over the years, falling from a high of 43 percent in 1998-99 to a low of 6.8 percent in 2019-21. Nonetheless, the scale of concern emerges when considering India's massive population, particularly its large number of teenagers, which is among the largest in

the world (Saikia et al., 2023). Even a seemingly modest percentage like 6.8 becomes a topic of deep consequence, with catastrophic repercussions for both health and developmental standpoints.

Teenage pregnancy rates vary across different regions in India. The Central region of the country has the lowest risk of teen pregnancy. Furthermore, disparities in poverty levels, child marriage, and contraceptive use may have backed to the regional variance in teenage pregnancy

rates. Previous studies done in the neighbouring country Bangladesh has also found regional disparities in the frequency of adolescent pregnancy (Sarder et al., 2020). The frequency of adolescent pregnancy in India was found to be noticeably impacted by the place of residence. Rural women were found to have greater teenage pregnancies than urban women. Previous studies in South Asian nations (Poudel et al., 2022; Sarder et al., 2020) revealed similar results. This disproportion might be explained by different variables such as high population density, low literacy rates, and a lack of understanding about the health concerns associated with teenage pregnancy (Goonewardene & Deeyagaha Waduge, 2005; Sarder et al., 2020).

The prevalence of teenage pregnancy in India was found to be considerably influenced by the literacy and level of education of the respondents. Precisely, it was observed that, with the increase in educational attainment, the likelihood of teenage pregnancy reduces by 25 percent. And, this finding is consistent with previous study conducted in Bangladesh which highlighted the significance of education in impelling the prevalence of teenage pregnancy (Sarder et al., 2020). In addition, studies from African countries like South Africa (Thobejane, 2015) and Nigeria (Ibrahim Isa & Olugbenga Owuoye Gani, 2012) found that teenagers with at least an elementary school education had much lower pregnancy rates than those without any education.

The research findings on the impact of family size and type on teenage pregnancy are more or less inconclusive. While some research, didn't show any relationship between family size and teenage pregnancies like the one done by such as Sayem and Nury (2011), other research done in Rwanda (Mohammed, 2023; Uwizeye et al., 2020), produced some contradictory findings. Specifically, these studies found that teens from smaller households were more likely to become pregnant than those from big families.

Contrary to prior findings, Sarder et al. (2020) discovered that women from smaller households were firmly less likely to have a teenage pregnancy than those from larger households. This is consistent with our findings, which show a decreased frequency of adolescent pregnancy among women hailing from smaller households, most likely due to socioeconomic stability. Furthermore, Imamura et al. (2007) concluded that the wealth index is a strong predictor of teenage pregnancy in European Union countries, regardless of their level of development or under development. Previous research studies also showed that low wealth indices were associated with a higher likelihood of teenage pregnancy. In line with the prior studies (Poudel et al., 2018; Raj et al., 2010), we also found that in India, young women from low-income or economically backward households were more likely to become pregnant than their counterparts.

Religion and caste play a significant role in defining cultural norms, with significant implications for several aspects of people's lives, including fertility dynamics (Das & Das, 2018). During the course of our study, we observed a notable pattern: a greater incidence of teen pregnancy among Islamic households. This remark is supported by a provision in Islamic law that allows women to marry once

they reach puberty. As a result, there is an increased likelihood of early marriage among Islamic communities, thereby increasing the risk of teenage pregnancies among them (Gangoli et al., 2009). Furthermore, we also observed that in India teenagers from backward communities, such as Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Classes (OBC), were found to be at a greater risk of teenage pregnancy. Both the findings are backed up by previous research findings conducted in different parts of the world (Okoli et al., 2022; Poudel et al., 2022; Sarder et al., 2020).

Access to media is indispensable for circulating pertinent knowledge about contraception and reproductive health. When this access is limited or restricted, there may be a lack of understanding or awareness about contraceptive usage, the different contraceptive methods available (Islam et al., 2016). This emphasizes the significance of open access to media platforms in encouraging informed decision-making and allowing people to make choices that safeguard their sexual and reproductive health. In the current study, we observed that adolescent women having access to different forms of media were less likely to become pregnant than their peers. Similar findings were reported in Bangladesh (Sarder et al., 2020), Nigeria (Poudel et al., 2018), and Zambia (Sserwanja et al., 2022). In addition, consistent with earlier studies conducted in the Philippines (Pepito et al., 2022) and Kenya (Okigbo & Speizer, 2015), we also noticed that teens in India who acquired adequate knowledge regarding family planning were substantially less likely to become pregnant as against their counterparts.

5. Conclusion and Policy Suggestions

Teenage pregnancy rates have dropped considerably in India over the years. However, because of the substantial health effects of adolescent pregnancy, it remains a major health concern that requires due consideration. The primary objective of the study was to determine the risk factors associated with teen pregnancy in India. To do this, we used Cox proportional hazard regression analysis. The regression results revealed that the place of residence, cultural affiliation, educational attainment of the respondent, access to media, awareness about family planning, wealth status, and geographical locations all have a major impact in predicting the prevalence of teenage pregnancy in the country. The factors at play are multifaceted since they are connected to the individual, family, society, and system; practically all are beyond the control of teenagers. Furthermore, teenagers from economically and socially disadvantaged backgrounds frequently become victims of gender prejudice and have little or restricted decision-making power, particularly when it comes to marriage and pregnancy. Hence, to reduce teenage pregnancy, the focus should be placed on improving economic status, creating opportunities for girls' education, and implementing grassroots reproductive health awareness programs. Additionally, efforts to encourage couples, particularly mothers, to use contraception and educate them about the advantages of family planning should be established to lower the prevalence of teenage pregnancy in the country.

6. Limitations

There are a few drawbacks to the study that need to be addressed. To begin, we used data from the District Level Household Surveys (DLHS) for trend analysis due to a lack of specific information on teenage pregnancy in the initial rounds of the National Family Health Surveys (NFHS). Second, due to a lack of data, we were unable to include crucial variables such as parental education and occupation type, limiting our ability to account for all relevant aspects.

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Credit author statement

Dipankar Roy: Conceptualization, Methodology, Writing - Original Draft, Formal analysis; Sandip Rudra Paul: Methodology, Data Curation, Supervision, Validation; Munmi Sarma: Conceptualization, Methodology, Writing - Original Draft, Formal analysis; Deepmala Deb: Data Curation, Writing - Review & Editing, Formal analysis; Dipanjan Roy: Data Curation, Writing - Review & Editing, Formal analysis; Shanku Paul: Data Curation, Writing - Review & Editing; Kinnor Das: Data Curation, Writing - Review & Editing, Formal analysis;

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