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REPRODUCTIVE HEALTH CHALLENGES AMONG PAUDI BHUIYAN WOMEN IN INDIA: AN EMPIRICAL ANALYSIS

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Reproductive Health Challenges among Paudi Bhuiyan Women in India: An Empirical Analysis

Namita SETH[1], Arun Kumar ACHARYA[2]

Abstract

Reproductive health is a fundamental human right with significant implications for public health, societal development, and economic prosperity. This study examines the reproductive health performance of Paudi Bhuyan women, a Particularly Vulnerable Tribal Group (PVTG) in Odisha, India. The focus is on how early marriage affects reproductive health outcomes among this tribal group. Despite the legal marriage age being 18, early marriage remains prevalent, leading to unintended pregnancies and severe health complications. We used stratified purposive sampling to select a total of 120 women from three villages in the Barkote block of Deogarh district, Odisha, with 40 women from each village aged 18 to 35 years. The findings reveal that early marriage is linked to earlier childbirth, reduced contraceptive use, and increased rates of miscarriage, stillbirth, and infant mortality. Additionally, socio-economic factors, including low education levels and limited employment opportunities, exacerbate these health issues. The study highlights significant correlations between delayed marriage and improved reproductive health outcomes, underscoring the need for targeted interventions and policy improvements. Recommendations include enhancing nutritional programs, addressing socio-economic and cultural barriers, and promoting gender equality to improve maternal and child health outcomes for Paudi Bhuyan women.

Keywords: reproductive health; Paudi Bhuiyan; tribal; early marriage; maternal health; child health.

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Introduction

Reproductive health encompasses the well-being of the reproductive system (Santhya & Jejeebhoy, 2015; United Nations Population Fund, 2020; Grace *et al.*, 2022). The World Health Organization (2011) comprehensively defines reproductive health as including the improvement of antenatal, prenatal, postpartum, and newborn care; the provision of high-quality family planning services, such as infertility services; the elimination of unsafe abortion; the combat against sexually transmitted infections, including HIV and reproductive tract infections; the management of other gynecological morbidities; and the promotion of sexual health. It covers diseases and conditions that affect the female reproductive system, including symptoms, diagnosis, treatment, and prevention of related health issues (Bhardwaj & Tungdim, 2010).

The recognition of reproductive health as a basic human right, particularly for women is crucial to overall public health, societal development, and economic prosperity at both community and national levels (Biswal *et al.*, 2017). The importance of women's reproductive health issues was highlighted in 1994 during the International Conference on Population and Development (ICPD), emphasizing that every individual has the right to fully experience and benefit from their reproductive well-being (Goswami *et al.*, 2009; WHO, 2011).

Furthermore, globally around 287,000 women die during and following pregnancy-related childbirth, and approximately 210 women per 100,000 face a lifetime risk of maternal death (Say, 2014; WHO, 2023). Reproductive health also significantly influences infant health through factors such as maternal health and nutrition, prenatal care, and breastfeeding practices. A comprehensive review of the literature suggests that child marriage is a significant cause of maternal and child death, increasing the likelihood of early motherhood, leading to unintended pregnancy, abortion, miscarriage, stillbirth, reproductive tract infections (RTIs), and infant death. Unsafe abortion accounts for approximately 7.9% of women's deaths (Say, 2014; Ross & Winfrey, 2002; Glasier, 2006). UNICEF reports around 4.9 million infant deaths worldwide (UN IGME, 2023), with newborn deaths within the first week of life accounting for a high percentage of child mortality (Lawn *et al.*, 2005; WHO, 2011).

Additionally, early marriage is an important indicator of reproductive status, with around 640 million girls and women married before the age of 18, and South Asia alone accounting for 16% of this population (WHO, 2023). In India, the fifth NFHS (2019-21) indicates that 23.3% of women are married before the age of 18, whereas 6.8% of women aged 15–19 were already mothers or pregnant at the time of the survey (Bramhankar & Reshmi, 2021). Early marriage has a negative impact on both mothers and children, leading to complications such as anemia, delivery complications (Siddiqui *et al.*, 2017), postpartum hemorrhage (Kozuki

et al., 2012), preterm labor, low birth weight, preterm birth, and neonatal anemia in children.

Early pregnancy also adversely affects women's fertility (Solanke, 2015). Recent NFHS-5 data found that the teenage fertility rate among women aged 15 to 19 years is 43%. The contraceptive prevalence rate is a key indicator for understanding and monitoring reproductive health in a population (Choi *et al.*, 2019). Around 200 million women worldwide have unintended pregnancies and cannot access modern contraceptive information and services (WHO, 2023). Despite the shortcomings of traditional family planning programs and fertility policies (Price & Hawkins, 2007), only 66.7% of individuals aged 15 to 49 utilize family planning methods in India (NFHS-5). The birth interval continues to be a significant public health concern in most countries, including India (Tesema *et al.*, 2021). In addition, Dixit *et al.* (2017) found a connection between shorter birth intervals and high infant mortality rates.

Child marriage is a worldwide phenomenon, with socio-economic conditions and cultural and traditional norms being the leading causes and consequences. It has an adverse impact on women's social, physical, mental, and psychological well-being, as well as on their children. Studies reveal the significant influence of socio-economic status, age at marriage, nutritional status, and educational status on the reproductive health of women (Gupta, 2011). Cultural factors, such as the concept of patriarchy, contribute to this issue (Jesmin & Salway, 2000; Khan *et al.*, 2002), leading to heightened risks of unwanted pregnancies, domestic abuse, restricted autonomy, and challenges in accessing healthcare services (Campbell & Graham, 2006; Rahman *et al.*, 2014). Child marriage often limits educational and economic opportunities for young women, perpetuating the cycle of poverty.

Moreover, tribal women face greater disadvantages in reproductive health status compared to non-tribal women. Multiple factors contribute to the reproductive health status of tribal women, such as socioeconomic status and educational levels, which influence health practices (Geetha *et al.*, 2015). Studies show that the utilization of modern contraceptive techniques is significantly lower among the illiterate population, particularly in rural and tribal areas (Singh *et al.*, 2023). High fertility rates, poorer mortality, deprived nutritional status, and poor sexual health outcomes are prevalent among tribal groups (Kanrar & Goswami, 2020; Agrawal, 2013).

This research aims to assess the reproductive health outcomes of Paudi Bhuyan women, a Particularly Vulnerable Tribal Group (PVTG) in Odisha. We evaluate reproductive health outcomes with respect to women's age at marriage using various parameters such as fertility rate, contraceptive prevalence, maternal morbidity and mortality, and child mortality and morbidity. We also examine how independent variables such as social position, economic affluence, and traditional norms influence these outcomes. Additionally, we explore how gender roles act as barriers to women accessing reproductive rights. The study investigates gaps

between implemented government policies and programs in the Paudi Bhuyan community, focusing on their effectiveness and impact.

Methodology

The study focused on women from the Paudi Bhuyan community in three villages within the Barkote block of Deogarh, Odisha. The tribe's population is approximately 4,500, with 818 females. This empirical research aimed to investigate the cause-and-effect relationships between the age at which women marry and their reproductive performance. In this study, the independent variable is women's age at marriage, while the dependent variable is reproductive performance.
Data collection involved two schedules: Schedule 1 focused on household wealth and economic status, while Schedule 2 collected information on fertility indicators, contraception, child mortality, and maternal and child health. In-depth personal interviews were conducted with 120 participants, 40 from each village, during the year 2022-23. Participants were selected based on the following criteria: (a) they must be female; (b) between the ages of 18 and 35; (c) currently married and cohabiting with their husbands; (d) have at least one child; and (e) have resided in the study areas of Deogarh district for a minimum of 2 years. A household census was conducted to determine the population and a representative sample was chosen using a stratified purposive sampling method.

Primary data were collected through face-to-face interviews, while secondary data were sourced from relevant journals, periodicals, reports, and books for comprehensive analysis. The primary explanatory variable is the age at which women marry. Covariates include the women's current age (categorized as 18-23, 24-29, and 30-35), their educational attainment, the gender of the household head, and the women's current employment status. Descriptive and bivariate correlation analyses were employed to examine the characteristics of the data and relationships between variables. Bivariate correlation tests were used to investigate the relationships between outcomes of interest, such as fertility rates and maternal health, and the age at marriage. Additionally, binary logistic regression models were constructed to assess the influence of early marriage on selected outcomes, controlling for the aforementioned covariates.

Results

This study aimed to provide a comprehensive understanding of the factors influencing the well-being of women in Paudi Bhuyan society. The findings could potentially inform interventions and policies to improve the overall quality of life for women in this community.

Table 1. Distribution of different variables related to the respondent in Barkote blocks,i.e., Debichua, Sarankot, and Rugdakudar, from Deogarh district of Odisha

Variables	Categories	N	%
Age of the respondent	18-23	59	49.6
	24-29	31	25.8
	30-35	30	25
Educational qualification of respondent	Illiterate	28	23.3
	Literate without formal education	9	7.5
	Primary education	8	6.6
	Upper primary education	39	32.5
	Secondary education	34	28.3
	Higher secondary education	2	1.6
Head of the household	Male	108	90
	Female	12	10
Women working status	Day labour/Housewife	114	-
	Employee	3	2.5
	Business at home	3	2.5
Occupation of respondent's husband	Migrated for work	25	20.8
	Farmer	92	76.6
	Employee	3	2.5
Monthly income of household	Low income (-5000)	86	71.6
	Middle income (5000-10000)	29	24.1
	High income (11000-above)	5	4.1
Decision making	Yes	6	5
	No	114	95
Educational status of the respondent	Illiterate	12	10
	Literate without formal education	10	8
	Primary	30	25
	Upper primary	52	43.5
	Secondary	13	11
	Hr secondary	3	2.5
Wealth Index	Poorest	95	79.1
	Poorer	23	19.1

The socio-demographic characteristics of the respondents, as represented in Table 1, pertain to the age group of women between 18 and 35 in Paudi Bhuyan society. Data revealed that a majority of the respondents belonged to the age group between 18-23 years (49.6%), with 25.8% in the 24-29 age group and 25% in the 30-35 age group, showing only a marginal difference. Men headed the majority of households, accounting for 90%, while women headed only 10%. Additionally, men predominantly make decisions regarding family matters, leaving only 5% of women with decision-making rights, highlighting the male-dominated nature of Paudi Bhuyan society.

Despite farming being the primary occupation, 76.6% of men engage in it, 20.8% migrate for work, and only 5% of men are salaried employees. Contemporary women contribute to their family's financial growth by working as employees (2.5%) and running businesses from home (2.5%). However, most women (95%) still work as seasonal and wage laborers. Additionally, the government and various non-governmental organizations promote self-help groups (SHGs) to help Paudi Bhuyan women economically through various policies.

Nearly 72% of households have a low income because they depend solely on agriculture and wage earnings (Table 1). Around 24.1% of households fall into the middle-income category, while only 4.1% have a high income. Education is recognized as a crucial determinant of social change and an important indicator of socio-economic status. It is vital to shaping a woman's life. Unfortunately, more than 23.3% of women in Paudi Bhuyan society have no education, and 7.5% are literate without formal education, meaning they can only sign their names. Additionally, 6.6% have attended primary school, 32.5% have attained an upper primary level of education, and only 1.6% have received a higher secondary level of education. Nevertheless, improvement in the educational level in this society is essential because education provides opportunities for women to take part in different types of occupations and reduces their economic dependence on men and children. Education among women helps in developing their rationality, personalities, and independence and improves their overall status in the family as well as in society. Additionally, in the case of their male counterpart, 10% are illiterate, 8% are literate without formal education, 25% have attended primary school, and 43.5%, which is the highest percentage, have attended upper primary school. Similarly, 11% of their male counterparts had completed secondary school, while only 2.5% of the males had attended higher secondary education. 79.1% of respondents fall into the poorest category, and 19.1% come from poorer families (Table 1).

Age at marriage and reproductive behaviors

The age of marriage is considered one of the vital determinants of the reproductive health status and rights of women. The data represented in Figure 1 show the age at marriage of ever-married women in the Paudi Bhuiyan society. According to the data, 19.1% of women married between the ages of 13 and 14 years. Additionally, 71.6% of women married between the ages of 15 and 17 years, and 9.1% married between the ages of 18 and 21 years. This indicates that a significant proportion of Paudi Bhuiyan women marry at a young age.

From Figure 1, it is evident that the age of marriage is low among Paudi Bhuiyan women, with 71.6% marrying before reaching the legal marriage age of 18 years. This early age of marriage has serious implications for the reproductive health and rights of these women, potentially impacting their health, education, and socio-economic status.

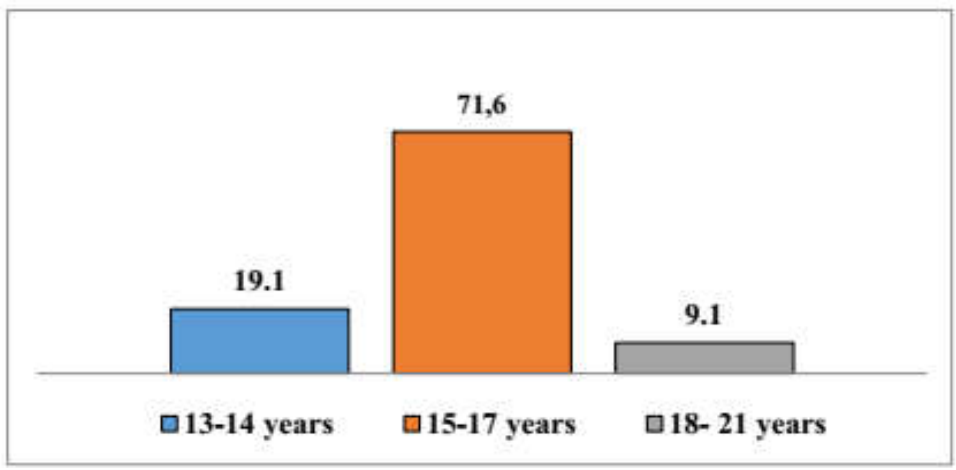

Figure 1.Percentage of marriage age of the ever-married women

Figure 2 illustrates the age at which women give birth to their first child. 40% of women give birth to their first child between the ages of 15 and 17, while 59% deliver their first child between the ages of 18 and 21. Although it is extremely rare for women to have their first child between the ages of 13 and 14, the average age for first childbirth is 17.4 years. Despite marrying at an early age, women typically become mothers at the age of 17, which exposes them to several health risks. Moreover, 58% of women have a two-year gap between consecutive births, while 29% maintain a three-year gap between their two childbirths.

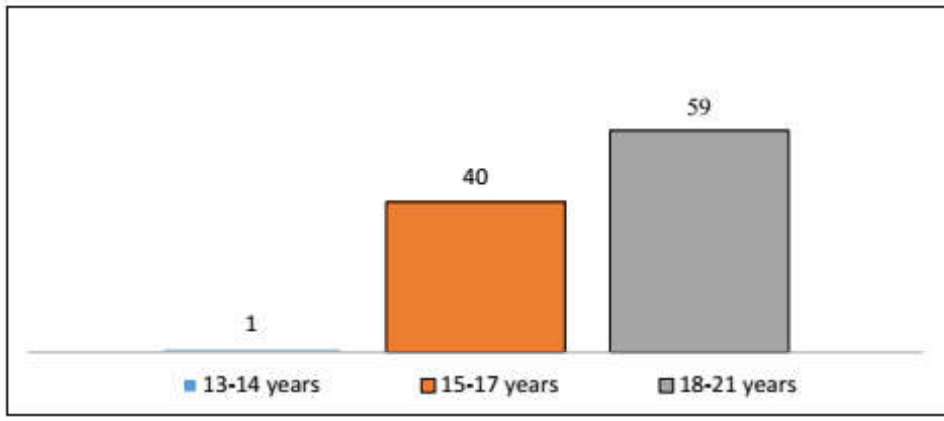

Figure 2.Percentage of age at first childbirth of the ever-married women

A notable 11.6% of couples choose a one-year interval between the births of their children (Figure 3). To minimize the likelihood of adverse pregnancy outcomes, the World Health Organization recommends a minimum inter-pregnancy interval of 33 months. Poorly spaced pregnancies (Tesema, 2021) are a significant factor in adverse pregnancy outcomes, including reduced birth weight, stillbirth, uterine rupture, neonatal mortality, maternal mortality, child malnutrition, and maternal hemorrhage. It is noteworthy that a mere 29% of couples managed to maintain a three-year age gap between two consecutive live births, whereas 11.6% of couples had a one-year age gap between two live births. Despite the relatively modest number, the impact on Paudi Bhuiyan women and children is nonetheless substantial. Although the percentage is low, it still significantly affects Paudi Bhuiyan women and children.

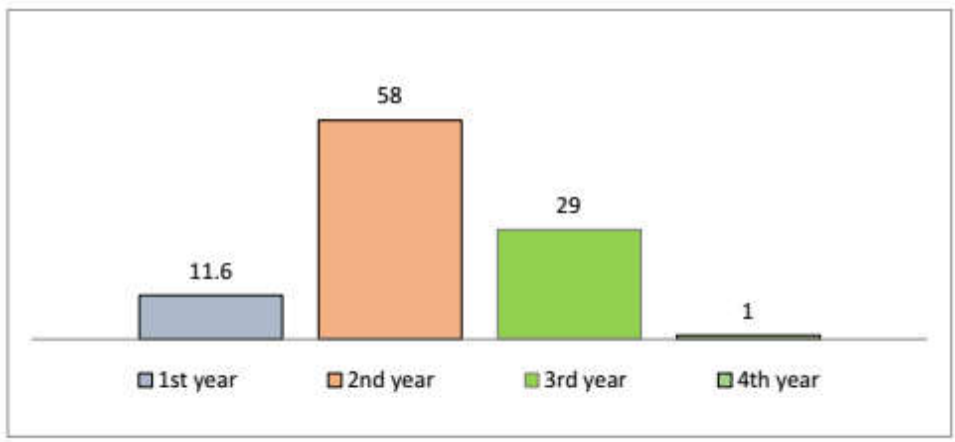

Figure 3.Percentage of time duration between two successive live births

Tribal women and fertility history

Figure 4 represents the family welfare data collected from the Paudi Bhuiyan tribe society. It shows that 34% of women had undergone sterilization, 14% had undergone IUD insertion, and 16.6% of women used oral contraceptives. However, it is important to note that 35% of couples did not use any form of contraceptive method. This indicates that a significant percentage of the population is at risk for various types of sexually transmitted diseases. Furthermore, not using any contraceptive method leads to frequent unintended pregnancies.

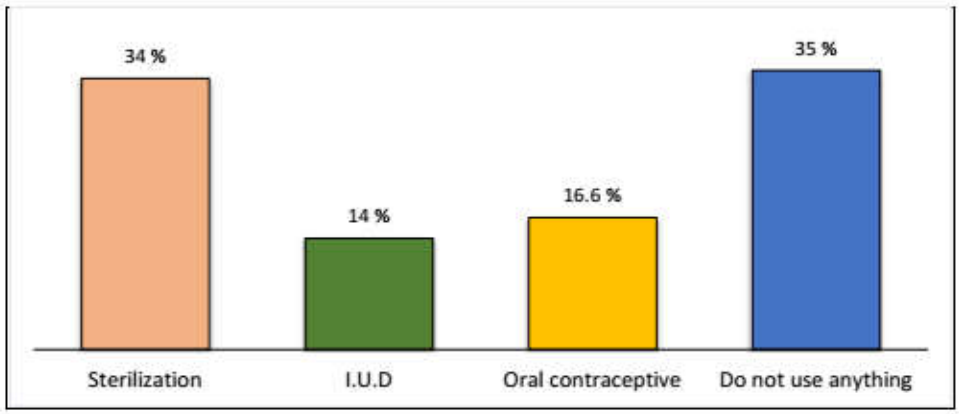

Figure 4. Family Welfare Data of Padui Bhuiyan women

Pregnancies and child survival determine newborn mortality. We calculated the percentages of miscarriage, stillbirth, and newborn deaths. There were a total of 306 occurrences of conception among 120 respondents aged 18–35 years. The percentage of miscarriage is 16.9%, stillbirth is 7.1%, and infant death is 3.9%. The age group is subdivided into three groups: 18–23, 24–29, and 30–35. The findings indicate a higher percentage of infant mortality in the 30–35 age group compared to the other two age groups. Moreover, it shows that though the percentage of infant deaths is low in the 18–23 age group compared to other age groups, the percentage rate will increase with their increasing age and reproductive practices (Table 2).

Table 2. Fertility performance in terms of childbirth of the ever-married women. (major findings: the total number of conceptions and children that survived).

Present age	No. of ever married women	Total no. of conception	No. of miscarriage	%	No. of still birth	%	No. of infant death	%
18-23	59	112	11	9.8	6	5.3	2	1.7
24-29	31	84	20	23.8	6	7.1	3	3.5
30-35	30	111	21	18.9	10	9	7	6.3
total	120	306	52	16.9	22	7.1	12	3.9

Regarding pregnancy, miscarriage, and child mortality according to mothers' age groups, it is observed that the percentage of miscarriage, stillbirth, and infant death is high, at 48%, 31.8%, and 33.3%, respectively, in the age group below 17 years. Similarly, in the age group 18–23, the percentages are 28.8%, 31.8%, and 33.3%, respectively. In addition, the rate of child mortality is lower in the age groups 24–29 and 30–35 compared to the other two age groups. Specifically, the percentage of miscarriages is 13.4% and 9.6% in these age groups, while the percentage of stillbirths is 22.7% and 13.6%, respectively. Lastly, the percentage of infant deaths is 16.6% in both age groups (Table 3).

Table 3. Child mortality rate

Mother's age group	No. of miscarriage	%	No. of still birth	%	No. of infant death	%
>17	25	48	7	31.8	4	33.3
18-23	15	28.8	7	31.8	4	33.3
24-29	7	13.4	5	22.7	2	16.6
30-35	5	9.6	3	13.6	2	16.6
Total /86	52	60	22	25.5	12	13.9

**Respondents who had not experienced any type of child mortality were excluded*

In addition, while calculating, it is important to note that the percentage of miscarriage is high, at 60%, stillbirth is 25.5%, and infant death is 13.9% (Table 3). Moreover, the number of child deaths is high among mothers who married early, i.e., before 17 years. Furthermore, mothers who marry early, i.e., before 17 years, experience a high rate of child mortality. Additionally, cases of child mortality are observed between the ages of 18 and 23, despite the legal marriage age in India being 18 years.

Similarly, the crude birth rate (CBR) is an important metric of fertility since it directly reflects fertility's contribution to population growth. The current population's CBR is 27.5 per 1,000 people. However, the calculated general

fertility rate (GFR) is 386.3, indicating that there were 386.3 births per 1,000 women of childbearing age in the previous year. The computed total fertility rate (TFR) is 6, indicating the total number of children that a Paudi Bhuiyan woman would have during her reproductive span at her current fertility level (Table 4).

While the legal marriage age in India may be 18 years, cultural and societal norms may still play a significant role in influencing when individuals choose to marry. Additionally, the crude birth rate and general fertility rate provide valuable insights into population growth and fertility trends, but they do not necessarily reflect individual choices or behaviors. It is crucial to keep in mind that individual decisions and actions can affect the actual fertility rate of Paudi Bhuiyan women, potentially producing a different result from what the TFR predicts. Furthermore, factors such as access to education and healthcare can also play a significant role in determining fertility rates among this population.

Table 4. Age specific fertility rate and total fertility rate (current fertility)

Present age group	No. of women	boys	girls	total	ASFR
18-23	21	5	3	8	380.9
24-29	10	4	2	6	600
30-35	13	3	0	3	230.7
Total	44	9	5	17	1211.6

TFR=1211 × 6/1000 = 6

To conduct an in-depth bivariate analysis of the relationship between age and marriage, we observe a positive correlation between age at marriage and hemoglobin level ($r = 0.340$, $p < 0.01$), age at first pregnancy ($r = 0.844$, $p < 0.01$), women's weight during the first pregnancy ($r = 0.407$, $p < 0.01$), and weight of the child after birth ($r = 0.258$, $p < 0.01$). There is a strong negative relationship between the total number of children a woman has during her reproductive years and the occurrence of miscarriage and stillbirth. The correlation coefficients for the number of children and miscarriage, as well as the number of children and stillbirth, are statistically significant at $p < 0.01$. This indicates that an increase in the age at which individuals get married leads to a significant reduction in the occurrence of miscarriages, stillbirths, and infant mortality. Additionally, the negative correlation between women's marriage age and their fertility rate indicates that as the marriage age increases, the fertility rate of women decreases (Table 5).

Table 5. Simple correlation coefficient analysis among different variables related to respondent and post pregnancy

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14
X1	1													
X2	0.148	1												
X3	0.027	.340**	1											
X4	0.065	.844**	.397**	1										
X5	0.045	.407**	.545**	.344**	1									
X6	0.043	-0.09	0.008	-0.115	-0.125	1								
X7	0.07	.258**	.508**	.243**	.356**	-0.14	1							
X8	0.02	.305**	-0.013	.306**	0.179	0.012	0.144	1						
X9	-.318**	-0.143	-0.041	-0.137	-0.016	-0.144	0.005	-0.051	1					
X10	-.342**	-.213*	-0.138	-.206*	-.248**	-0.13	-0.081	-0.175	.677**	1				
X11	-0.101	-0.116	-.211*	-0.171	-0.169	0.135	-0.15	-0.102	0.16	0.159	1			
X12	.234**	-0.091	-.366**	-0.071	-.298**	0.125	-.208*	-0.004	0.009	0.105	0.162	1		
X13	0.018	-.366**	-.542**	-.390**	-.297**	0.047	-.440**	-.235**	0.03	0.026	.227*	.264**	1	
X14	0.175	-.253**	-.432**	-.296**	-.297**	0.099	-.440**	-0.056	-0.018	-0.016	0.13	.261**	.356**	1

***Correlation is significant p < 0.01, * Correlation is significant p< 0.05 (2 tailed tests); Xi (I = 1 - 14) stands for X1 = Age at menarche, X2 = Age at marriage, X3 = Hemoglobin level, X4 = Age at first pregnancy, X5 = Weight during 1st pregnancy, X6 = contraceptive, X7 = Weight of the infant right after birth, X8 = Delivery, X9 = Duration between two live birth, X10 = Total number of children, X11 = Decision making, X12 = Infant Death, X13 = Miscarriage, X14 = Still Birth.*

Discussion

The present study investigated the impact of marriage age on the reproductive health of Paudi Bhuiyan women in the Deogarh district of Odisha. Our findings reveal that early marriage significantly affects both the social and physical aspects of Paudi Bhuiyan women's lives. This observation aligns with earlier research by Kamal & Ulas (2015) and Amzat (2020), which similarly indicates that early marriage has adverse effects on reproductive health. Various factors, including socioeconomic conditions, educational status, and women's participation in decision-making, are crucial in shaping reproductive outcomes (Karri *et al.*, 2022).

Although the legal marriage age in India is 18 years (CRC, 1989; Prohibition of Child Marriage Act, 2006), the Paudi Bhuiyan community continues to practice early marriage. The government has introduced policies aimed at reducing child marriage, such as offering incentives for marrying daughters after the age of 18. Nonetheless, early marriage remains prevalent within this community.

Early marriage is associated with a higher likelihood of unintended pregnancies and compromised physical growth (Singh and Sharma, 1996; Raj *et al.*, 2009; Santhya & Jejeebhoy, 2015). Young mothers often face severe health complications, including higher rates of anemia and being underweight during pregnancy, compared to older mothers. This situation contributes to higher incidences of underweight mothers and children, as well as increased risks of prolonged labor, miscarriage, infant mortality, and stillbirth among the tribal people. A community-based survey in the Baleswar district of Odisha corroborates these findings, showing that early marriage impacts maternal and child health significantly, including prenatal reproductive loss (Goswami *et al.*, 2009). This is further supported by Acharya (2010) and Godha & Hotchkiss (2022), who note the detrimental effects of early marriage, such as elevated risks of stillbirth, miscarriage, stunted growth, and underweight children.

Although younger-married women have higher fertility rates due to their longer reproductive period, early marriages are also associated with higher rates of miscarriage and stillbirth, which contribute to a declining birth rate within the Paudi Bhuiyan community. This decline affects population momentum, as discussed by Singh and Sharma (1996), Raj *et al.* (2009), and Solanke (2015). Furthermore, Dixit *et al.* (2017) highlight that despite various policies to improve access to family planning, there remains significant unmet demand for contraceptive services in India. This unmet need is evident among the Paudi Bhuiyan tribe, reflecting in the low contraceptive use and the consequential issues with sexually transmitted diseases and unintended pregnancies.

Spousal control over fertility-related matters, including contraception and induced abortion, often results in significant restrictions on women's reproductive autonomy (Campbell, 2002; Dunkle *et al.*, 2004; Rahman *et al.*, 2014; Stephenson *et al.*, 2006). Research by Biswal *et al.* (2017) emphasizes that women's autonomy is a critical socio-cultural factor influencing their control over reproductive rights. Women should have the autonomy to make fertility decisions free from prejudice or violence (Jat *et al.*, 2011). Despite numerous government programs aimed at increasing awareness and improving women's development in tribal regions, cultural barriers continue to impede progress.

Our study also identifies a significant relationship between maternal education and employment, which are key factors affecting the risk of early-age fertility. Higher educational attainment reduces the likelihood of early marriage and subsequent fertility. Sabar's (2010) study among the Chuktia Bhunjia tribe in Odisha further explores the connections between puberty, early marriage, and education. Tribal culture contributes to lower educational attainment among girls, leading to limited economic opportunities and poor quality of life. To address these issues, the government has implemented measures such as monetary rewards and free education for families who support higher education for their daughters.

Women often find themselves and their descendants trapped in a cycle of early pregnancies due to low educational status, limited awareness, young age, and poverty (Oyortey & Pobi, 2003; Geetha *et al.*, 2015). Gender-based barriers also play a significant role in hindering women's social and physical development. Studies by Campbell & Graham (2006) and Rahman (2011) explain that outdated patriarchal norms obstruct women's access to healthcare and maternal health services until they secure their husbands' consent. Our findings indicate that young women frequently enter into sexual relationships with insufficient information, limiting their control over reproductive rights, sexual union decisions, household responsibilities, and freedom of movement. These limitations contribute to their vulnerability to early pregnancies, maternal and child health complications, lower nutritional status, and difficulties in accessing maternal health care services. Addressing these systemic barriers is essential for improving women's health outcomes and overall well-being.

The study indicate that the supplementary food provided for mothers and children under policies such as the National Health Mission, Integrated Child Development Services (ICDS), Janani Suraksha Yojana (JSY), and Pradhan Mantri Safe Motherhood Scheme is inadequate among Paudi Bhuiyan tribe. This inadequacy is particularly pronounced in vulnerable communities with low socio-economic status, where the provided resources are insufficient to meet the nutritional needs of both mothers and children. Additionally, larger family sizes exacerbate the problem by stretching limited resources even further. In a patriarchal society, women are often assigned subordinate roles, which can further contribute to the issue. They are frequently expected to prioritize the nutritional needs of their husbands and children over their own, which can lead to insufficient nourishment for themselves. Therefore, addressing these systemic and socio-cultural issues is essential for improving the effectiveness of existing policies and ensuring that the nutritional needs of all family members are adequately met.

Furthermore, our study demonstrates that early marriage has adverse effects on both maternal and child health. The analysis identifies a negative correlation between marriage age and child mortality and morbidity, indicating that lower marriage age is associated with increased rates of child deaths and morbidities, such as miscarriage, infant death, and stillbirth. This finding aligns with research by Raj *et al.* (2009) and Santhya *et al.* (2010), which shows that adolescent women face higher risks of having infants with low birth weight, multiple abortions, and complications during pregnancy and childbirth. Bharali & Mondal (2021) further highlight a substantial relationship between poor maternal health and neonatal deaths. Early pregnancy is associated with increased maternal mortality and morbidity, as younger mothers are more likely to experience health complications that negatively affect infant health outcomes.Top of Form

Conclusion

This study investigated the impact of early marriage on the reproductive health of women belonging tothe Paudi Bhuiyan community in the Deogarh region of Odisha. The Paudi Bhuiyan tribe, a particularly vulnerable tribal group in Odisha, faces significant socio-demographic challenges, including lower literacy rates, inadequate maternal and child healthcare practices, and a high prevalence of anemia and under-nourished mothers and children. Our findings show that early marriage leads to increased fertility rates, higher rates of miscarriage and stillbirth, and significant health complications for both mothers and infants. These results highlight the urgent need for targeted interventions to address early marriage and improve reproductive health services in this community.

Additionally, we also found that, the Puadi Bhuyan women and children in research area experience severe health and nutritional deficiencies. There are government programs for child survival and safe motherhood for the wellbeing of Paudi Bhuyan women. However, it is crucial to enhance and advocate for locally sourced nutritious food through tailored food supplementation initiatives for the Paudi Bhuiyan tribe. Considering the impoverished conditions, it is essential for the government to evaluate if the supplementary food given to mothers and children is sufficient. Furthermore, our results indicate the necessity for more extensive studies on gender dynamics in this patriarchal society and the creation of targeted awareness initiatives to address social and health concerns. It is imperative to tackle these issues to improve the health of women and children in this community and beyond.

References

Acharya, A. K. (2010). The Influence of Female Age at Marriage on Fertility and Child Loss in India, *Trayectorias*, 12 (31), 61-80.

Amzat, J. (2020). Faith Effect and Voice on Early Marriage in a Nigerian State. *SAGE Open*, *10*(2), 215824402091951; https://doi.org/10.1177/2158244020919513

Agrawal, S. (2013). Disadvantageous situation of tribal women and children of Orissa, India: special reference to their health and nutritional status. *Journal of community nutrition and health,* 2(1) https://www.researchgate.net/publication/260230312

Bharali, N., & Mondal, N. (2021). Association of Age at Marriage, Early Childbearing, Use of Contraceptive Methods and Reproductive Health Consequences among Mishing Tribal Women of Assam, Northeast India. *Online J Health Allied Scs*, *20*(3), 2.

Bhardwaj, S., &Tungdim, M.G. (2010). Reproductive health profile of the scheduled caste and scheduled tribe women of Rajasthan, India. *The Open Anthropology Journal, 3*, 181-187.

Biswal, A. K., Shovo, T. E. A., Aich, M., & Mondal, S. (2017). Women's Autonomy and Control to Exercise Reproductive Rights: A Sociological Study from Rural Bangladesh. *SAGE Open*, *7*(2), 215824401770986; https://doi.org/10.1177/2158244017709862

Bramhankar, M., & Reshmi, R. S. (2021). Spousal violence against women and its consequences on pregnancy outcomes and reproductive health of women in India. *BMC Women's Health*, *21*(1); https://doi.org/10.1186/s12905-021-01515-x

Cairo + 25: The UN Population Commission on Population Change since the 1994 ICPD. (2019). *Population and Development Review*, *45*(2), 445-448; https://doi.org/10.1111/padr.12258

Campbell, J. C. (2002). Health consequences of intimate partner violence. *The Lancet*, *359*(9314), 1331–1336; https://doi.org/10.1016/s0140-6736(02)08336-8

Campbell, O. M., & Graham, W. J. (2006). Strategies for reducing maternal mortality: getting on with what works. *The Lancet*, *368*(9543), 1284–1299; https://doi.org/10.1016/s0140-6736 (06)69381-1

Choi, Y., Khanna, A., Zimmerman, L., Radloff, S., Zachary, B., & Ahmad, D. (2019). Reporting sterilization as a current contraceptive method among sterilized women: lessons learned from a population with high sterilization rates, Rajasthan, India. *Contraception*, *99*(2), 131–136; https://doi.org/10.1016/j.contraception.2018.10.006

Dixit, P., Dwivedi, L. K., & Gupta, A. (2017). Role of Maternal and Child Health Care Services on Postpartum Contraceptive Adoption in India. *SAGE Open*, *7*(3), 215824401773351; https://doi.org/10.1177/2158244017733515

Dunkle, K. L., Jewkes, R. K., Brown, H. C., Gray, G. E., McIntryre, J. A., & Harlow, S. D. (2004). Transactional sex among women in Soweto, South Africa: prevalence, risk factors and association with HIV infection. *Social Science & Medicine*, *59*(8), 1581–1592; https://doi.org/10.1016/j.socscimed.2004.02.003

Geetha, P., Chenchuprasad, C., Sathyavathi, R.B., Surendranadha, R. K. & Reddy, K.K. (2015). Reproductive Health Status of Sugali Tribal Women: A Field Based Study. *Studies of Tribes and Tribals*, 13:1, 73-78, https://doi.org/10.1080/09726 39X.2015.11886714

Godha, D., & Hotchkiss, D. R. (2022). A decade of conditional cash transfer programs for reproductive health in India: How did equality fare? *BMC Public Health*, *22*(1); https://doi.org/10.1186/s12889-022-12563-9

Goswami, M., Dash, B., & Dash, N. (2009). Reproductive Performance of the Bhumija Women: An Empirical Study of a Tribal Village, Baleswar, Orissa. *Studies of Tribes and Tribals*, *7*(2), 91–96; https://doi.org/10.1080/0972639x.2009.11886598

Glasier, A., Gülmezoglu, A. M., Schmid, G. P., Moreno, C. G., & Van Look, P. F. (2006). Sexual and reproductive health: a matter of life and death. *The Lancet*, *368*(9547), 1595–1607; https://doi.org/10.1016/s0140-6736(06)69478-6

Grace, K. T., Holliday, C. N., Bevilacqua, K., Kaur, A., Miller, J., & Decker, M. R. (2022, March 8). Sexual and Reproductive Health and Reproductive Coercion in Women Victim/Survivors Receiving Housing Support. *Journal of Family Violence*, *38*(4), 713–722; https://doi.org/10.1007/s10896-022-00362-0

Gupta, M.D. (2011). Impact of Early Marriage in Fertility among SC, ST and Tea-Tribe Communities of Dibrugarh District, Assam, India: An Analysis through Logistic Regression. *International Journal of Educational Planning & Administration, 1(3),* 211-215.

International Institute for Population Sciences (IIPS) and ICF. National Family Health Survey NFHS-5, 2019–21: India. [Dataset]. IABR74FL.DTA. Mumbai, India: IIPS and ICF [Producers]. ICF [Distributor]; 2023. https://main.mohfw.gov.in/sites/default/files/NFHS-5_Phase-II

International Institute for Population Sciences and Macro International. *National Family Health Survey (NFHS-5), 2019-21: Odisha, vol.-II*. Mumbai, India: IIPS 2023. https://main.mohfw.gov.in/sites/default/files/NFHS-5_Phase-II_

Jat, T. R., Ng, N., & San Sebastian, M. (2011). Factors affecting the use of maternal health services in Madhya Pradesh state of India: a multilevel analysis. *International Journal for Equity in Health*, *10*(1), 59; https://doi.org/10.1186/1475-9276-10-59

Jesmin, S., & Salway, S. (2000). Marriage among the urban poor of Dhaka: instability and uncertainty. *Journal of International Development*, *12*(5), 689–705. http://dx.doi.org/10.1002/1099-1328(200007)12:5<689: aid-jid704>3.0.co;2-2

Kamal, S. M., & Ulas, E. (2020). Child marriage and its impact on fertility and fertility-related outcomes in South Asian countries. *International Sociology*, *36*(3), 362–377; https://doi.org/10.1177/0268580920961316

Kanrar, P., & Goswami, M. (2020). Sociodemographic Profile, Reproductive Health and Nutritional Status among the Juangs—A Particularly Vulnerable Tribal Group of Odisha, India. *Oriental Anthropologist*, *20*(1), 135–149; https://doi.org/10.1177/0972558x20913730

Karri, B., & Mathew, G. S. (2022). A comparative analysis of reproductive measures and predictor variables among three tribes of Bilaspur, Chhattisgarh, India, *Cogent Social Sciences*, 8:1, 2106649, https://doi.org/10.1080/23311886.2022.2106649

Khan, M. E., Townsend, J. W., & D'Costa, S. (2002). Behind closed doors: A qualitative study of sexual behaviour of married women in Bangladesh. *Culture, Health & Sexuality*, *4*(2), 237–256; https://doi.org/10.1080/13691050110102253

Kozuki, N., Lee, A. C., & Katz, J. (2012). Moderate to Severe, but Not Mild, Maternal Anemia Is Associated with Increased Risk of Small-for-Gestational-Age Outcomes 3. *The Journal of Nutrition*, *142*(2), 358–362; https://doi.org/10.3945/jn.111.149237

Lawn, J. E., Cousens, S., & Zupan, J. (2005). 4 million neonatal deaths: When? Where? Why? *The Lancet*, *365*(9462), 891–900; https://doi.org/10.1016/s0140-6736(05)71048-5

Otoo-Oyortey, N., & Pobi, S. (2003). Early marriage and poverty: exploring links and key policy issues. *Gender & Development*, 11(2), 42–51; https://doi.org/10.1080/741954315

Price, N. L., & Hawkins, K. (2007). A conceptual framework for the social analysis of reproductive health. *PubMed*, *25*(1), 24–36. https://pubmed.ncbi.nlm.nih.gov/17615901

Rahman, M. (2011). Women's Autonomy and Unintended Pregnancy among Currently Pregnant Women in Bangladesh. *Maternal and Child Health Journal*, *16*(6), 1206–1214; https://doi.org/10.1007/s10995-011-0897-3

Rahman, M. M., Mostofa, M. G., & Hoque, M. A. (2014). Women's household decision-making autonomy and contraceptive behavior among Bangladeshi women. *Sexual & Reproductive Healthcare*, *5*(1), 9–15; https://doi.org/10.1016/j.srhc.2013.12.003

Raj, A., Saggurti, N., Balaiah, D., & Silverman, J. G. (2009). Prevalence of child marriage and its effect on fertility and fertility-control outcomes of young women in India: a cross-sectional, observational study. *The Lancet*, *373*(9678), 1883–1889; https://doi.org/10.1016/s0140-6736(09)60246-4

Ross, J. A., & Winfrey, W. L. (2002). Unmet Need for Contraception in the Developing World and the Former Soviet Union: An Updated Estimate. *International Family Planning Perspectives*, *28*(3), 138; https://doi.org/10.2307/3088256

Sabar, B. (2010). Education as Culture Mapping. *Social Change*, 40(3), 257–273; https://doi.org/10.1177/004908571004000302

Santhya, K., & Jejeebhoy, S. J. (2015). Sexual and reproductive health and rights of adolescent girls: Evidence from low- and middle-income countries. *Global Public Health*, *10*(2), 189–221; https://doi.org/10.1080/17441692.2014.986169

Santhya, K., Ram, U., Acharya, R., Jejeebhoy, S. J., Ram, F., & Singh, A. (2010). Associations between Early Marriage and Young Women's Marital and Reproductive Health Outcomes: Evidence from India. *International Perspectives on Sexual and Reproductive Health*, 36(03), 132–139; https://doi.org/10.1363/3613210

Say, L., Chou, D., Gemmill, A., Tunçalp, Z., Moller, A. B., Daniels, J., Gülmezoglu, A. M., Temmerman, M., & Alkema, L. (2014). Global causes of maternal death: a WHO systematic analysis. *The Lancet. Global Health/the Lancet. Global Health*, *2*(6), e323–e333; https://doi.org/10.1016/s2214-109x(14)70227-x

Siddiqui, M. Z., Goli, S., Reja, T., Doshi, R., Chakravorty, S., Tiwari, C., Kumar, N. P., & Singh, D. (2017). Prevalence of Anemia and Its Determinants among Pregnant, Lactating, and Nonpregnant Nonlactating Women in India. *SAGE Open*, *7*(3), 215824401772555; https://doi.org/10.1177/2158244017725555

Singh, S., & Samara, R. (1996). Early Marriage among Women in Developing Countries. *International Family Planning Perspectives*, 22(4), 148; https://doi.org/10.2307/2950812

Singh, S. K., Kashyap, G. C., Sharma, H., Mondal, S., & Legare, C. H. (2023). Changes in discourse on unmet need for family planning among married women in India: evidence from NFHS-5 (2019–2021). *Scientific Reports*, *13*(1); https://doi.org/10.1038/s41598-023-47191-9

Solanke, B. L. (2015). Marriage Age, Fertility Behavior, and Women's Empowerment in Nigeria. *SAGE Open*, *5*(4), 215824401561798.https://doi.org/10.1177/2158244015617989

Stephenson, R., Koenig, M. A., & Ahmed, S. (2006). Domestic Violence and Symptoms of Gynecologic Morbidity among Women in North India. *International Family Planning Perspectives*, *32*(04), 201–208; https://doi.org/10.1363/3220106

Tesema, G. A., Worku, M. G., & Teshale, A. B. (2021). Duration of birth interval and its predictors among reproductive-age women in Ethiopia: Gompertz gamma shared frailty modeling. *PLOS ONE*, *16*(2), e0247091; https://doi.org/10.1371/journal.pone.0247091

United Nations Population Fund. (2020). *Sexual & reproductive health*. https://www.unfpa.org/sexual-reproductive-health

United Nations Inter-Agency Group for Child Mortality Estimation (UN IGME). (2023). *Levels & trends in child mortality: Report 2023*. United Nations Children's Fund (UNICEF).
https://data.unicef.org/resources/levels-and-trends-in-child-mortality

World Health Organization. (2011). *The sexual and reproductive health of younger adolescents: Research issues in developing countries: Background paper for a consultation.* Geneva. https://www.who.int/publications-detail-redirect/9789241501552

World Health Organization (WHO). (2023). Violence against women. Intimate partner and sexual violence against women. Geneva. https://www.who.int/news-room/fact-sheets/detail/violence-against-women