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Analyzing High-risk Fertility Behaviors among the Women of Childbearing Age in Bangladesh

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Abstract

High-risk-fertility behavior (HRFB) including excessively young or advanced maternal age, narrower birth interval, adhering to higher birth orders, and experiencing an elevated number of live births to a woman often leads to adverse maternal and child health outcomes. The Bangladesh Demographic and Health Survey (BDHS) data was employed to pinpoint the factors motivating high-risk fertility behaviors in women of childbearing age. Pearson's chi-square test was employed to conduct the unadjusted bivariate association and binary logistic regression model had been implemented to observe the adjusted association between covariates and HRFB. Overall, approximately one-third (31.9%) of women of childbearing age showed risky fertility behaviors. Women's education, working status, decision-making autonomy, place of residence, husband's education, husband's age, media exposure, and violence against women were significant predictors of maternal HRFB. The escalating prevalence of HRFB in Bangladesh is a cause for concern. Policymakers should prioritize initiatives such as enhancing parental education, fostering women's autonomy, and implementing knowledge-based healthcare interventions for women. These measures aim to mitigate risky fertility behaviors and contribute to improved reproductive health outcomes.

Keywords: High-risk fertility behavior, Childbearing age, Birth interval, BDHS, Bangladesh

I. Introduction

The global maternal mortality ratio (MMR, deaths per 100,000 live births) declined by 34% over the last two decades, yet the ratio is still high[1]. Low and lower-middle-income countries suffer the most (95% in 2020) from maternal mortality[1]. The prevalence of maternal mortality ratio is too high (123 per 100,000 livebirths in 2020) in Bangladesh which is far away from the sustainable development goal (SDG) 3.1 (2). To achieve SDG 3.1, Bangladesh needs to further reduce the MMR to 70/100,000 live births by 2030. A bio-demographic risk factor, maternal high-risk fertility behavior (HRFB), defined as experiencing pregnancy at excessively young or advanced maternal age (maternal age below 18 years or above 34 years), shorter birth interval (less than 24 months) and birth order of more than 3[3], impedes progress toward reduced maternal and child mortality[3-7]. Younger mothers experienced a greater risk of complications compared to other women[7]. Nearly one-third of women in Bangladesh of reproductive age engaged in at least one high-risk fertility behavior practice[3].

Several studies suggested that high-risk fertility behavior influenced infant deaths, malnutrition, stillbirth, prematurity etc[7-9]. Maternal HRFBs were one of the leading factors of maternal and child mortality and morbidity. Moreover, child malnutrition and adverse birth outcomes were significantly linked with risky fertility behaviors[9,10]. An increase in utilizing family planning, women's education, and economic trends, revealed the degeneration in HRFB over the last decade[9]. Early maternal age was responsible for intrauterine growth restriction, premature birth, under-5 child mortality, and malnutrition[11,12], whereas stillbirths, low birthweight of newborns, amniotic fluid embolism, and chromosomal abnormalities were influenced by late motherhood (maternal age > 34 years)[13]. Components of women's high-risk fertility behaviors had detrimental effects on maternal morbidity and mortality which may hinder achieving the SDGs. Moreover, the components of HRFB also adversely affect essential newborn care practices, infant deaths, and child health-related outcomes[9,14-16].

Maternal high-risk fertility behavior was influenced by various socioeconomic, demographic, and health-related variables[7,8,16]. Mother's education had a beneficial effect on HRFB[6]. It ensures effective family planning, appropriate timing of childbirth, and the optimal utilization of family resources to care for their children[8,12]. In addition to this, an educated husband/partner significantly influenced the maternal HRFB[8]. Recent studies also revealed that household wealth, women's working status, and place of birth of children were substantial predictors of maternal HRFB[6,8,17].

Given that poses a worrisome issue with adverse effects on maternal and child health, very few studies have been carried out in Bangladesh to explore the factors associated with HRFB in women of childbearing age. Using data from the most current Bangladesh Demographic and Health Survey 2017-18, this study aims to explore and identify factors that drive reproductive-age women in Bangladesh to be involved in HRFB practices.

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II. Methods

Data and Participants

This paper assessed the maternal high-risk fertility behavior among childbearing-age women of the country, and for this purpose data wrangled from Bangladesh Demographic and Health Survey (BDHS) 2017-18 had been utilized. BDHS performed a two-stage stratified random sampling procedure where 675 enumeration areas (EAs) were selected in accordance with probability proportionate to EA size at the first stage. In the second stage, a systematic sample of 30 households was selected from each EAs. Due to the enormous flooding in three EAs, the survey was fruitfully completed with 672 EAs.

Women with the most recent live births were included in the study to capture the current scenario of HRFB practices. Thus, ever-married women aged 15-49 years who gave their last birth preceding five years of the survey were taken into consideration. Finally, 7417 mothers were selected for the purpose of analysis after the exclusion of missing values.

Response Measure

Three parameters have been considered for defining maternal HRFB behaviors: maternal age, birth order, and previous birth interval according to BDHS[3].

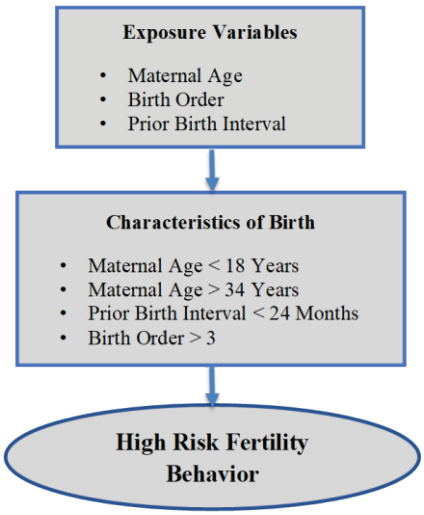

Fig. 1. High-risk fertility behavior of childbearing aged women.

The existence of any of the conditions such as younger mother (given birth before 18 years), elderly mother (given birth at or after 34 years), the latest birth happened less than 24 months from a previous birth, and birth order of indexed child was more than 3 elucidated maternal[3,7,8].

Covariates

Several socioeconomic and demographic indicators were considered as predictors in this study. Covariates were encompassed based on an extensive review of previous pieces of literature such as place of living or residence (Rural, Urban), administrative division (Barisal, Chittagong, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, Sylhet), mother's education (No, Primary, Secondary, Higher), husband's/partner's education (No, Primary, Secondary, Higher), husband's/partner's age (Below 25 years, 25-40 years, Above 40 years) wealth index (Rich, Middle, Poor), working status (Yes, No), religion (Muslim, Non-Muslim), Migration status (Migrant, Non-migrant), media exposure (Yes, No), women's autonomy (Low, High), and violence against women (Yes, No)[6,7,8,13,16,17].

Statistical Analysis

The exploratory data analysis of the selected variables was performed considering the information obtained from sample observations of the study. The measures of association between HRFB and predictor variables were assessed through Pearson's chi-square test for measures of association. To assess the adjusted and unadjusted effects of covariates on maternal HRFB, binary logistic regression model was fitted. The analyses were carried out with Stata 14.

III. Results

Exploratory Data Analysis

The percentage distribution of maternal HRFB is presented in Figure 2. It can be observed that nearly one-third (31.9%) of the mothers were in at least one high-risk category.

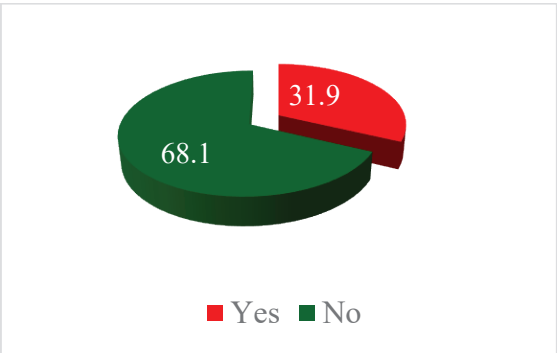

Fig. 2. Prevalence of high-risk fertility behavior in Bangladesh.

Table 1 represents the percentage distribution along with the prevalence of risky fertility habits for different categories of the selected socioeconomic, demographic, and health-related characteristics of the study participants. It was reported in Table 1 that most of the respondents (71.97%) were from rural areas and the majority of them (91.55%) were Muslim. It was also observed that around half of the respondents had secondary education (49.18%) whereas only 6.98% were illiterate. Moreover, 15.20% of women's husbands had no formal education, however, more than half of them had secondary or higher education. The majority of women's husbands (80.81%) were aged between 25 and 40 years, while 13.32% were above 40 years and 5.87% were below 25 years. Around two-fifths (40.33%) of women were from poor households and 40.87% of the individuals were working mothers.

Table 1 also depicts that approximately two-thirds (66.43%) of the mothers were exposed to media and 77.62% had migrated from their own place. Furthermore, nearly two-thirds (65.32%) of women belong to high autonomy and only 18.84% had experienced violence against them. More than one-fourth of respondents were from Dhaka (26.20%) division and only a few were from Barishal (5.53%) division.

Table 1 also reported the bivariate distribution of selected covariates through maternal HRFB. The measures of association between the covariates and HRFB were assessed through Pearson's Chi-square test and the corresponding p-values were depicted also in the table.

Place of residence was confirmed to pose a significant impact on maternal HRFB as rural (33.54%) mothers had a higher prevalence of HRFB compared to the urban (27.69%). The rate of risky fertility behavior declines with mother's level of education as mothers with no education had 57.55% chance of HRFB, whereas the prevalence of HRFB for higher educated mother was only 15.70%. Besides, husband's educational attainment played a vital role on HRFB. The pattern was similar to maternal education with the prevalence of maternal HRFB was 45.74% whose husbands were illiterate, on the contrary, this prevalence was 19.22% for the women having higher educated husbands. Furthermore, the rate of high-risk fertility behavior is more than twice for women with husbands under 25 years old (58.29%) compared to those with husbands aged 25 to 40 years (26.59.), while this rate is almost twice as high for women whose husbands are over 40 years old (52.48%).

It can be observed from the table that the wealth index of the household also inversely influenced the HRFB. For example, poor mothers had 39.03% prevalence of HRFB, whereas rich mothers had 24.96%. Again, the maternal HRFB rate was higher for working mothers (33.81%), but relatively lower (28.24%) for media-exposed mothers. Moreover, Muslim women had a high prevalence of HRFB compared to non-Muslims (32.64% vs 23.92%). Women of Khulna division had least percentage (29.01%) of practicing HRFB followed by Dhaka (29.08%). Among the divisions in Bangladesh, women of Sylhet division had the highest rate (38.54%) of maternal HRFB. Furthermore, Women with higher participation in decision-making had a lower prevalence of HRFB compared to the women with lower autonomy (30.77% vs 34.03%). Again, violence against women also had a significant association with HRFB. Maternal HRFB was more common in women who experienced horrible torment than in those who did not (35.07% vs. 31.17%)

Table 1. Percentage distribution of socioeconomic and demographic features along with the prevalence of HRFB among the women of childbearing age in Bangladesh, BDHS 2017-18

Covariates	n (%)	High-risk Fertility Behaviors
Place of Residence ***(p-value)***		***<0.001***
Rural	5337 (71.97)	33.54
Urban	2079 (28.03)	27.69
Women's Education ***(p-value)***		***<0.001***
No	518 (6.98)	57.55
Primary	2071 (27.92)	38.55
Secondary	3647 (49.18)	29.73
Higher	1181 (15.92)	15.70
Husband's/Partner's Education ***(p-value)***		***<0.001***
No	1127 (15.20)	45.74
Primary	2483 (33.47)	35.35
Secondary	2476 (33.38)	28.96
Higher	1331 (17.95)	19.22
Husband's/Partner's Age ***(p-value)***		***<0.001***
Below 25 years	436 (5.87)	58.29
25-40 years	5993 (80.81)	26.59
Above 40 years	988 (13.32)	52.48
Wealth Index ***(p-value)***		***<0.001***
Poor	2991 (40.33)	39.03
Middle	1409 (19.00)	31.61
Rich	3017 (40.67)	24.96

Mother's Working Status ***(p-value)***		***0.015***
No	4386 (59.13)	30.58
Yes	3031 (40.87)	33.81
Media Exposure ***(p-value)***		***<0.001***
No	2489 (33.57)	39.14
Yes	4927 (66.43)	28.24
Religion ***(p-value)***		***<0.001***
Non-Muslim	627 (8.45)	23.92
Muslim	6790 (91.55)	32.64
Migration ***(p-value)***		***0.404***
Non-migrant	1660 (22.38)	30.97
Migrant	5757 (77.62)	32.17
Women's Autonomy ***(p-value)***		***0.010***
Low	2565 (34.58)	34.03
High	4852 (65.42)	30.77
Division ***(p-value)***		***0.020***
Barishal	410 (5.53)	31.03
Chittagong	1507 (20.32)	33.16
Dhaka	1943 (26.20)	29.08
Khulna	717 (9.67)	29.01
Mymensingh	603 (8.12)	31.92
Rajshahi	897 (12.10)	33.62
Rangpur	807 (10.88)	33.02
Sylhet	533 (7.19)	38.54
Violence Against Women ***(p-value)***		***0.014***
No	6019 (81.16)	31.17
Yes	13.98 (18.84)	35.07
Total	**7417**	**31.9**

Binary Logistic Regression Analysis

Table 2 represents the estimated unadjusted odds ratios (UOR) and adjusted odds ratios (AOR) along with the 95% confidence intervals (CI) obtained on maternal HRFB, respectively.

Respondents from urban regions had 24.1% lower odds (UOR=0.759) of HRFB than the rural individuals without altering the effects of other covariates. After adjusting the effects of the selected demographic and socioeconomic factors, place of residence did not exhibit a significant impact on maternal HRFB. Women's education had a significant influence on high-risk fertility behaviors as odds of showing HRFB were 44.3% lower for primary (AOR=0.557), 55.6% lower for secondary (AOR=0.444) and 75.1% less likely for higher (AOR=0.249) educated mothers, respectively, compared to the illiterates. Moreover, women with primary educated partners had 12.0% lower odds (AOR=0.880) of exhibiting maternal HRFB compared to the mothers with uneducated partners. Moreover, the odds of maternal HRFB were 16.8% lower for the women with husbands of secondary education level (AOR= 0.832), and 30.8% less for women with higher (AOR= 0.692) educated husbands. Furthermore, women with husbands under 25 years old had 3.606 times higher odds of HRFB compared to those with husbands aged 25 to 40 years. Additionally, women with husbands over 40 years old had 2.892 times higher odds of HRFB compared to women with husbands aged 25 to 40 years. Again, the odds of HRFB were 1.38 times for poor mothers, whereas the odds for HRFB of rich mothers was 0.719 times compared to the middle. These effects were nullified when the effects of other covariates were adjusted.

Working mothers were more likely to experience risky fertility (UOR=1.159) habits. Mothers having media exposure

were less likely to show HRFB (AOR=0.881) and Muslim mothers had 55.5% higher odds of HRFB. Additionally, mothers with high participation in decision-making had a positive significant influence on maternal HRFB as the odds of HRFB was 15.8% lower for the high autonomous women compared to the low. Moreover, respondents who suffered from violence against them had 19.3% more odds of exhibiting HRFB. The effects of administrative division and individuals' migration were insignificant in this study after adjusting for the effects of other covariates.

Table 2. Unadjusted odds ratios and adjusted odds ratios for HRFB by selected socioeconomic and demographic factors among the women in Bangladesh, BDHS 2017-18

Covariates	High-Risk Fertility Behaviors			
	UOR	95% CI	AOR	95% CI
Place of Residence				
Rural	-	-	-	-
Urban	0.759***	(0.67, 0.86)	0.941	(0.81, 1.10)
Women's Education				
No	-	-	-	-
Primary	0.463***	(0.37, 0.57)	0.557***	(0.45, 0.69)
Secondary	0.312***	(0.25, 0.38)	0.444***	(0.35, 0.56)
Higher	0.137***	(0.11, 0.18)	0.249***	(0.19, 0.34)
Husband's Education				
No	-	-	-	-
Primary	0.649***	(0.55, 0.76)	0.880	(0.74, 1.05)
Secondary	0.483***	(0.41, 0.57)	0.832*	(0.68, 1.01)
Higher	0.282***	(0.23, 0.35)	0.692***	(0.54, 0.89)
Husband's Age				
Below 25 years	3.858***	(3.15, 4.73)	3.606***	(2.92, 4.45)
25-40 years	-	-	-	-
Above 40 years	3.048***	(2.62, 3.55)	2.892***	(2.45, 3.41)
Wealth Index				
Poor	1.385***	(1.17, 1.64)	1.112	(0.92, 1.34)
Middle	-	-	-	-
Rich	0.719***	(0.61, 0.84)	0.846*	(0.70, 1.02)
Mother's Working Status				
No	-	-	-	-
Yes	1.159**	(1.03, 1.31)	0.995	(0.88, 1.13)
Media Exposure				
No	-	-	-	-
Yes	0.612***	(0.55, 0.67)	0.881*	(0.77, 1.01)
Religion				
Non-Muslim	-	-	-	-
Muslim	1.541***	(1.26, 1.89)	1.555***	(1.26, 1.92)
Migration				
Non-migrant	-	-	-	-
Migrant	1.057	(0.93, 1.21)	0.999	(0.87, 1.15)
Women's Autonomy				
Low	-	-	-	-
High	0.862**	(0.77, 0.97)	0.842***	(0.75, 0.95)

Division				
Barishal	1.097	(0.86, 1.41)	0.916	(0.71, 1.18)
Chittagong	1.210*	(0.98, 1.49)	1.171	(0.94, 1.45)
Dhaka	-	-	-	-
Khulna	0.997	(0.79, 1.25)	1.045	(0.83, 1.32)
Mymensingh	1.144	(0.91, 1.43)	0.959	(0.76, 1.22)
Rajshahi	1.235*	(0.97, 1.58)	1.126	(0.88, 1.43)
Rangpur	1.202	(0.95, 1.52)	1.058	(0.83, 1.34)
Sylhet	1.529***	(1.21, 1.93)	1.194	(0.94, 1.51)
Violence Against Women				
No	-	-	-	-
Yes	1.193**	(1.04, 1.37)	1.017	(0.88, 1.17)

**** p-value<0.01; **p-value<0.05, *p-value < 0.10*

In this study, we conducted an analysis to detect potential multicollinearity in the model using variance inflation factors (VIF). The results presented in Table 3 show that all covariates have VIF values below 5, indicating that the model does not suffer from multicollinearity.

IV. Discussion

The focus of this study is to analyze and delve into the potential determinants of maternal high-risk fertility behavior of women in Bangladesh. For this purpose, data extracted from Bangladesh Demographic and Health Survey (BDHS), 2017-18 has been utilized. The obtained results revealed that nearly 32% of the ever-married women had at least one high-risk fertility behavior. High-risk fertility behavior had a significant contribution to childhood morbidity and mortality as well as maternal health[3,8,18]. Mothers with the most recent live births who gave their birth preceding five years of the survey were considered in this study. The potential determinants of maternal HRFB were identified using a binary logistic regression model and this research work represented the results regarding high-risk fertility behavior in Bangladesh.

The results demonstrated that around one-third of women of childbearing age belong to at least one high-risk category which was homologous to other studies[8,17]. This study portrayed that maternal HRFB was significantly influenced by mother's education. Educated mothers had lower odds of belonging to any high-risk category. Previous works on maternal HRF behavior also support the findings[7,17]. Moreover, husband's education enacted a vigorous impact on women's high-risk fertility behavior, and it showed an analogous pattern like maternal education. Thus, educated partners reduced the women's risk of belonging to high-risk group. Other studies propounded that parental education positively influenced maternal HRF behavior[19-21]. The study revealed a significant effect of household wealth index on high-risk fertility behavior when the other factors were not controlled, however, the adjusted effect was trivial. Household wealth is also a crucial factor of HRF behavior in sub-Saharan regions of Africa[19]. Working mothers had the privilege to contribute directly to family expenditure, however, the study findings showed that they had a higher prevalence of HRFB. Outcomes of recent studies had homologous evidence on working women[6,19].

Table 3. Variance Inflation Factor (VIF) for Checking Possible Multicollinearity

Covariates	DF	VIF
Place of Residence	1	1.259
Women's Education	3	1.833
Husband's/Partner's Education	3	1.921
Husband's/Partner's Age	2	1.101
Wealth Index	2	1.885
Mother's Working Status	1	1.146
Media Exposure	1	1.332
Religion	1	1.040
Migration	1	1.031
Women's Autonomy	1	1.061
Division	7	1.390
Violence against women	1	1.030

Results obtained from the statistical analysis of this study suggest that the adjusted effects of geographical factors such as administrative divisions of Bangladesh were nugatory. However, religion had a significant impact on high-risk fertility as Muslim women tend to be riskier to exhibit fertility behavior compared to non-Muslims. This outcome was in line with the research conducted in India[22]. It is possible that Muslim women were more likely to have HRFB because they chose temporary techniques over sterilization and were less likely to use family planning and contraceptive methods[22]. In addition to these, migration did not influence the fertility behaviors of women. An important finding from the study was media exposure to women had a positive impact on fertility behavior. Women exposed to media were less likely to show high-risk fertility behavior compared to the mothers who had no media exposure. The findings supported by the analogous study conducted in the African region[8,23]. Attitude toward wife beating causes violence against women and the consequences of this violence lead women to inappropriate healthcare[24] followed by risky fertility behavior. This research depicted a similar pattern as the attitude towards wife beating increases the odds of maternal HRFB.

Women's autonomy influenced the fertility behavior with autonomous or the women who had more involvement in decision-making had lower odds of showing maternal high-risk fertility behaviors. More participation in individual's health care, household purchases, family visits, and spending self and husband's earnings will reduce risky fertility behavior and vice versa. Participation in decision-making triggers women to utilize the health facility to improve maternal and child health and thereby contribute to decreasing maternal and child mortality by reducing maternal HRFB[15].

The study aims to identify the potential determinants of maternal risky fertility behaviors by analyzing nationally representative cross-sectional data of Bangladesh. However, there exist some limitations. Some important factors of HRFB were not explored due to the scarcity of variables for using secondary dataset. Moreover, causal inference cannot be drawn. In addition to this, information collected from individuals five years preceding the survey may lead to recall bias.

V. Conclusion

This study emphasized the prevalence of maternal HRFB and explored its associated features among Bangladeshi reproductive-aged women. The finding underscores that education of women, and their husbands was fundamental to improving high-risk fertility behavior. Awareness about high-risk fertility behavior is needed for Muslim mothers. In addition to educational attainment, mothers need to acquire proper knowledge of their healthcare and childcare through media exposure. To enhance the condition of maternal HRFB, interventions are required to engage women more in household and healthcare decision-making or maintain a high level of women's autonomy to utilize the proper healthcare system and lessen the risky fertility behavior.

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