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RISK FACTORS OF UNPLANNED PREGNANCY FOR REPRODUCTIVE HEALTH IN BANGLADESH: A CASE STUDY

TAPAN KUMAR ROY[*1], DHANESWAR CHANDRO SARKAR[2] and BRIJESH PRATAP SINGH[3]

[1]Department of Population Science and Human Resource Development, Rajshahi University, Rajshahi-6205, [2]Department of Statistics, Mawlana Bhashani Science and Technology University, Tangail-1902, [3]Faculty of Commerce, Banaras Hindu University, Varanasi-221005, India

Abstract

Unplanned pregnancy is a serious health concern which affects the reproductive health of a woman in Bangladesh and thus needs to be addressed. This is a fundamental indicator of the state of women's reproductive health in Bangladesh and of the degree of autonomy women have in determining whether and when to bear children. In this study, an attempt has been made to identify the risk factors affecting unplanned pregnancy in Bangladesh utilizing data from Bangladesh Demographic and Health Survey 2007. Bivariate and multivariate analysis was conducted using a sub-sample of women whose current pregnancy occurred at the survey time. In bivariate analysis, the chi-square test of independence was implemented. For multivariate analysis, the logistic regression method was used to assess the factors associated with unplanned pregnancy of Bangladesh. The results provide that one-third (33%) of the recent pregnancies are unplanned in Bangladesh. The multivariate analysis indicates that the several socio-economic and demographic indicators were assessed for women's influence on the probability that a woman has an unplanned pregnancy. The significant predictors of unplanned pregnancy in Bangladesh are parity, education, modern contraceptive methods use, age of women, wealth index, residence and religion. This study will help policy makers to address the reproductive health services to those women who were identified in the analysis as being at increased risk for unplanned pregnancy in Bangladesh especially for higher parity, older women and rural vulnerable poor women.

Keywords: Reproductive health, Pregnancy, Contraceptive methods, Bivariate and Multivariate analysis

Introduction

Unplanned pregnancy is one of the most important components of reproductive health in Bangladesh (BDHS, 2007). Unplanned pregnancies are consisted of those pregnancies that are unwanted either at that time or at any time in the future and those pregnancies that come sooner than desired. These unplanned pregnancies are a common feature of human reproduction. Unplanned pregnancy including both unwanted and mistimed pregnancies has long been used as a primary indicator of the state of reproductive health (Santelli J. *et al.,* 2003). Unwanted pregnancies are those which occurred when the women did not want to have any further pregnancies at all. This pregnancy occurs due to the fact that the growing desires to have smaller families, the unmet need for family planning, ineffectiveness of contraceptive methods, and unwanted sexual relations.

[*] Author for correspondence: roy.tapan@gmail.com

In Asia, about 20 per cent of live births were unwanted by the mother at the time of conception and a similar proportion occurred sooner than desired (Adetunji 1998; Bankole and Westoff 1998). The consequences of unplanned pregnancy are serious, imposing appreciable burdens on children, women, men, families, and their societies (Grossman *et al.,* 1990). Studies conducted in developing countries indicate that women's age, level of education, number of children, and social and economic deprivation are the major determinants of unplanned pregnancy (Bongaarts J. 1997). Unplanned pregnancies tend to increase the average completed-family size, a sociological change that could increase rates of population and often stressing pressure on national resource availability and their distribution for use (Petro-Nustas and Al-Qutob, 2002). This research evidence suggests that women having unplanned pregnancies adopt poorer health behaviors and are at selectively higher risk of adverse pregnancy outcomes than are women with planned pregnancies (Joyce and Grossman, 1990 and Eggleston 1998).

In developing countries like as Bangladesh unplanned pregnancies are frequently considered to pose social or economic problems but their association with specific negative consequences has rarely been assessed. As a result it is treated as an important public health concern due to the association with adverse social and health outcomes, for both mothers and children. Those pregnancies are harmful for the health and well-being of women and their families (William, 1999). The BDHS 2007 presented that the proportion of unplanned pregnancies was high, at 29%, but differently distributed: 14% of births were considered unwanted, and 15% were considered mistimed or wanted later. In this context, it is to identify the risk factors for unplanned pregnancy of reproductive health among women in Bangladesh who are currently pregnant. In this study, an attempt has been also made to investigate the trends of unplanned pregnancy in Bangladesh.

Materials and Methods

For this study, the data were drawn from the nationally representative 2007 Bangladesh Demographic and Health Survey (BDHS). The survey was conducted between March to August 2007 and employed a two-stage sample design to collect information on fertility, family planning, maternal and child health. In this survey, all ever married women of age 15-49 who were members of the households or visitors present at the time of interview and had slept in the sample households the night prior to the interview were selected and interviewed. For this purpose, women were identified as eligible for the individual interview and interviews were completed for 10,996 of them.

The response variable, woman's intention to produce the last pregnancy, is a retrospective measure of a woman's reproductive intentions. The respondents were asked about their pregnancy status that was pregnant at the time of survey. In this way, women were selected in this study on the basis of having been pregnant at the time of the interview. The analysis comprises 716 women who had a current pregnancy at the survey date.

In this study, bivariate tables were constructed to explore the relationship between unplanned pregnancy and some selected socioeconomic and demographic variables. Chi-square test was used to detect the influential factors within unplanned pregnancy from the constructed bivariate tables. Multivariate analysis such as, logistic regression was used to assess the factors associated with the odds of a pregnancy being unplanned considering responses on pregnancy intention as distinct motivations. Logistic regression analysis is similar to a linear regression model where the dependent variable is a dichotomous one, coded as 1 (event occurring) and 0 (event does not occurring). The independent variables can be ratio scale or interval level or categorical variables. The logistic regression calculates the probability or success over the probability of failure; the results of the analysis are in the form of an odds ratio. In this study, the probability of success is defined when unplanned pregnancy occurs.

The logistic regression model be described as follows:

Let, Y_i denote the dichotomous dependent variable for the i-th observation and

$Y_i = 1$, if the i-th individual is a success, i.e. unplanned pregnancy occurs and

$Y_i = 0$, if the i-th individual is a failure

$p_i = E(Y_i = 1 | X_i) = \frac{1}{1+e^{-(\beta_0+\theta_i X_i)}}$ *where*, X_i is explanatory variable and

$$1-p_i = E\left(Y_i = 0 \middle| X_i\right) = 1 - \frac{1}{1+e^{-(\beta_0+\beta_1 X_i)}} = \frac{1}{1+e^{-(\beta_0+\beta_i X_i)}}$$

Therefore, we can write

$$\frac{p_i}{1-p_i} = e^{(\beta_0+\beta_i X_i)} \tag{1}$$

Now if we take natural log of the equation (1) we obtain

$$L_i = \log_e\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_i X_i \tag{2}$$

Here, $p_i/(1-p_i)$ given in (1) is simply the odds ratio and L_i given in (2) is known as log-odds. Let X_{i1}, X_{i2}, ..., X_{ik} be the vector of k independent explanatory variables for the ith response. The logarithm of the ratio p_i and $(1-\rho_i)$ gives the linear function of X_{ij} and the model (2) becomes,

$$L_i = \log_e\left(\frac{p_i}{1-p_i}\right) = \sum_{j=0}^{k} \beta_j X_{ij} \tag{3}$$

The function (3) is a linear function of both the variables X and the parameter β. L is called the logit and hence the model (3) is called logistic regression model.

To estimate parameter of the above model, Cox suggested the maximum likelihood estimation method in place of standard OLS method and proposed the following function:

$$L(\beta_0,\beta_1,....\beta_k) = \frac{\prod_{i=1}^{n}\exp(Y_i\sum_{j=0}^{k}\beta_j X_{ij})}{\prod_{i=1}^{n}\{1+\exp(Y_i\sum_{j=0}^{k}\beta_j X_{ij})\}}$$

$$= \frac{\exp\{\sum_{i=1}^{n}\beta_j t_j\}}{\prod_{i=1}^{n}\{1+\exp(Y_i\sum_{j=0}^{k}\beta_j X_{ij})\}} \text{ where, } t_j = \sum_{i=1}^{n} X_{ij}Y_j \text{ , j = 0, 1,…,k}$$

The log-likelihood function is given by

$$\text{Log}_e\, L(\beta_0, \beta_1,….., \beta_k) = \sum_{j=0}^{k}\beta_j t_j - \sum_{i=1}^{n}\log_e\{1+\exp(Y_i\sum_{j=0}^{k}\beta_j X_{ij})\}$$

The solution of the above problem for the logistic model was employed by using SPSS packages.

Results

Figure-1 shows the trends in percentage of unwanted and unplanned births of five BDHS surveys. The result shows that the proportions of unwanted births slightly decreased from 1993 to 1996 and then increased from 1999. The unwanted births are plateaued during a decade. It was a stagnant situation during three DHS surveys from 1999 to 2007. Figure-1 also indicates that unplanned births increased in 1999 but it has started to reduce in 2004 and it has decreased to 4 points in 2007. However, the decrease was entirely a result of the large percentage reduce in mistiming combined with small increases in unwanted pregnancy though the proportions of unplanned births in Bangladesh are very high.

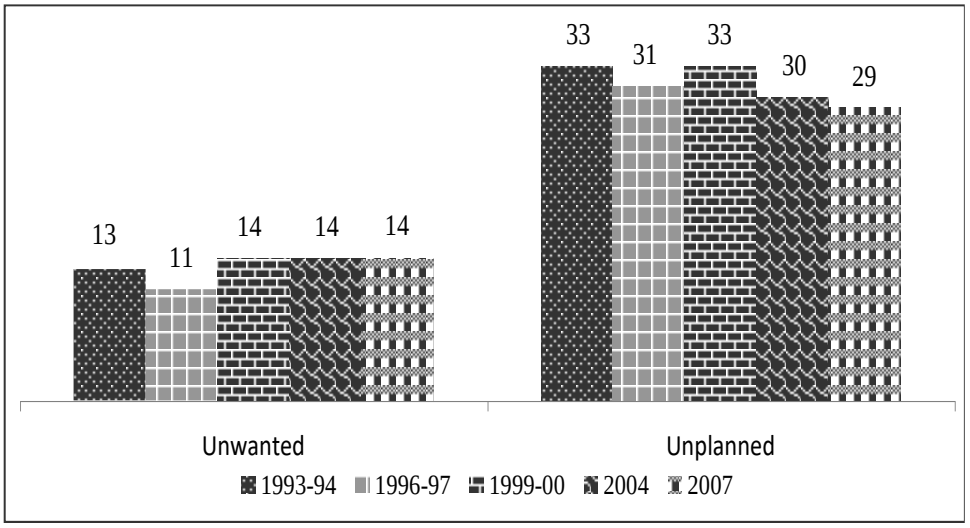

Fig. 1. Trends in proportion of unwanted and unplanned births in Bangladesh.

The current fertility (TFR) rates were also stagnant during a decade from 1994 to 2004 and then it has decreased in 2007. It is interesting to note that if all unplanned births are removed from the total fertility rate, then the total fertility rate would below replacement level of fertility, as total wanted fertility rate is approximately 2.1 for all DHS surveys. The total unwanted fertility rates were increasing since 1996.

Table 1 represents the socioeconomic and demographic characteristics of women with unplanned and planned pregnancies. It shows that women who had recently been pregnant, 66.3% lived in rural area, while the remainder lived in urban area. Over half of the women had formal education either primary or secondary and over (30.0% from primary and 50.4% from secondary and higher). The 16.3% women came from poorest wealth index and 73.6% women married early ages i.e., before 18 years, the legal minimum age at marriage in Bangladesh. Most of the women (91.1%) follow Muslim religion.

Over two-thirds (68.9%) of the women had exposed to mass media and about sixty percent women (60.3%) ever used any modern contraceptive methods. One-third of them (32.3%) were form adolescent aged less than 20 years. Majority (81.3%) of the women had 0-2 births prior to the pregnancy.

Table 2 presents the bivariate analysis of the socioeconomic and demographic characteristics among ever married women who are currently pregnant by their current pregnancy intention status. Bivariate analysis indicates the distinction between women with unplanned pregnancies. In this study pregnancy intention status varied significantly with some of the socio-demographic variables. The result exhibits that unplanned pregnancies vary with urban-rural residence and unplanned pregnancy is higher in rural area than urban area in Bangladesh. Women education has a monotonic relationship with pregnancy intention status. Women with no formal education (37.1%) are more likely to have had an unplanned pregnancy than women with secondary or higher level of education (33.0%). This shows that unplanned pregnancy decreases monotonically with education.

Wealth index has an impact on pregnancy intention status. Women belong to poorest wealth quintile (41.9%) have more likely to have unplanned pregnancy than women belong to richest wealth quintile (30.1%). Whereas, socioeconomic variable with positively related with intended pregnancy status.

Unplanned pregnancies are more common among those women who had ever used any modern contraceptive methods than those women who didn't use any modern contraceptive methods of family planning. It shows highly significant relation with unplanned pregnancy and modern contraceptive method use. Unplanned pregnancies are higher among Muslim women as compared to their non-Muslim counterparts, 36.8% women have unplanned pregnancy, whereas, 25.0% women reported their pregnancy is unplanned. Women who

exposed to mass media reported that those women are less likely to say that their pregnancy is unplanned than those women who are not exposed to mass media.

Table 1. Percent distribution of married women aged 15-49 who are currently pregnant, by selected socioeconomic and demographic characteristics, Bangladesh 2004.

Socioeconomic and demographic characteristics	N	Percent (%)
Residence		
Urban	241	33.7
Rural	475	66.3
Woman's education		
No education	140	19.6
Primary	215	30.0
Secondary[+]	361	50.4
Wealth Index		
Poorest	117	16.3
Poorer	143	20.0
Middle	160	22.3
Richer	130	18.2
Richest	166	23.2
Ever used modern contraceptive method		
No	284	39.7
Yes	432	60.3
Age at marriage		
< 18 years	527	73.6
≥ 18 years	189	26.4
Religion		
Muslim	652	91.1
Non-Muslim	64	8.9
Mass media exposed		
No	493	68.9
Yes	223	31.1
Women's age		
<20 years	231	32.3
20-49 years	485	67.7
Parity		
<=2 children	582	81.3
>2 children	134	18.7

Women age is significantly related to pregnancy intention status. The proportion of women reporting their unplanned pregnancy increases as age increases. Women who marry at early ages (before 18 years) had the higher unplanned pregnancies than those whose marriage occurred at the ages after 18 years (legal age at marriage in Bangladesh). Increased parity has significant positive relation with unplanned pregnancies. The higher parity women (61.2%) reported more unplanned pregnancies than lower parity (29.9%).

Table 2. Percent distribution of married women aged 15-49 who are currently pregnant, by intention status, according to selected socio-demographic characteristics.

Characteristics	Planned	Unplanned	Total
Residence			
Urban	65.1	34.9	100.0
Rural	63.8	36.2	100.0
Woman's education			
No education	62.9	37.1	100.0
Primary	60.5	39.5	100.0
Secondary+	67.0	33.0	100.0
Wealth index			
Poorest	58.1	41.9	100.0
Poorer	58.0	42.0	100.0
Middle	65.0	35.0	100.0
Richer	68.5	31.5	100.0
Richest	69.9	30.1	100.0
Ever used modern contraceptive method			
No	73.6	26.4	100.0
Yes	58.1	41.9	100.0
Religion			
Muslim	63.2	36.8	100.0
Non-Muslim	75.0	25.0	100.0
Exposed to mass-media			
No	63.3	36.7	100.0
Yes	66.4	33.6	100.0
Woman's age			
<20 years	68.8	31.2	100.0
20-49 years	62.1	37.9	100.0
Age at marriage			
<18 years	61.9	38.1	100.0
≥18 years	70.9	29.1	100.0
Parity			
0-2	70.1	29.9	100.0
>2	38.8	61.2	100.0

In multivariate analysis, the relative importance of all the variables has to be examined simultaneously by prominent multivariate technique such as logistic regression. It can provide information of how important each variable is by itself. The variables which were used in the bivariate analysis all are included in the logistic model except division to control multicolinearity. The results of logistic regression analysis show that once all explanatory variables had been controlled for the covariates were associated with pregnancy intention status. Many of the variables that showed significance in the bivariate analysis failed to show a significant overall relationship to the dependent variable in the multivariate analysis. In this section, only significant variables in logistic regression are discussed.

Table 3. Results of logistic regression model showing likelihood that a woman's pregnancy was unplanned by selected socio-demographic characteristics.

Characteristics	Coefficient	S.E.	Odds ratio	95% C.I.	
				Lower	Upper
Residence					
Rural	0.319	0.101	1.376**	1.182	1.754
Urban®	-	-	1.000	-	-
Woman's education					
No education	0.580	0.137	1.346***	1.115	1.537
Primary	0.418	0.131	1.219**	1.175	1.962
Secondary+ ®	-	-	1.000	-	-
Wealth index					
Poorest	0.423	0.122	1.531*	1.508	1.869
Poorer	0.720	0.178	1.489**	1.142	2.658
Middle	0.253	0.233	1.288	0.748	2.220
Richer	0.147	0.277	1.158	0.673	1.993
Richest®	-	-	1.000	-	-
Modern contraceptive method use					
No	-0.740	0.183	0.477****	0.333	0.682
Yes®	-	-	1.000	-	-
Religion					
Muslim	0.541	0.315	1.717*	1.604	1.865
Non-Muslim®	-	-	1.000	-	-
Mass-media exposure					
No	0.048	0.185	1.049	0.731	1.507
Yes®	-	-	1.000	-	-
Woman's age					
<=20 years®	-	-	1.000	-	-
20-49 years	0.238	0.149	1.368**	1.178	1.503
Age at marriage					
<18 years®	0.108	0.207	1.114	0.742	1.672
≥18 years	-	-	1.000	-	-
Parity					
0-2	-0. 456	0.237	0.233****	0.147	0.371
>2	-	-	1.000	-	-

Note: *P<0.10, **P<0.05, ***P<0.01, ****P<0.001

Table 3 also shows that once all explanatory variables had been controlled for residences are significantly associated with pregnancy intention status. The result exhibits that rural women are 1.4 times more likely than urban women to say that their pregnancy is unplanned. The similar pattern is exhibited in bivariate analysis. Education has a significant effect on the likelihood of an unplanned pregnancy. Women with no education and women with primary education have the 1.3 times higher and 1.2 times higher respectively than women with secondary and more education to report that their most recent current pregnancy is unplanned. As the women's economic condition increases, the unplanned pregnancy status of women decreases. Women with poorest wealth quintal have 1.5 times higher odds of being unplanned pregnancy than women belong to richest wealth quintal. Women who are not using modern contraceptive methods of family planning are 53percent less likely to have unplanned births than women who are using

any modern contraceptive methods. Muslim women have 1.7 times more likely to give unplanned births than non-Muslim women. Woman age and parity are the most important demographic covariates influence unplanned pregnancies. Older women are 1.4 times more likely than younger women to have classified their most recent pregnancy as unplanned. Unplanned pregnancies monotonically increase with parity. Women with less than 2 children are 77% lower chances of being unplanned pregnancies than women with more than 2 children. It shows highly significant relationship.

Discussions

In this study, the risk factors of unplanned pregnancy in Bangladesh have been observed by using BDHS 2007 data. The results indicate that the prevalence of unplanned pregnancy has slightly reduced in the recent survey although the unwanted pregnancy in Bangladesh is still high and it declines little bit.

Socioeconomic conditions affecting unplanned pregnancies have been investigated using logistic regression analysis to find out the effects of each of the factors net of the effects of other covariates in this analysis. Several study findings provide that some socioeconomic characteristics such as education, socioeconomic status, place of residence, and demographic characteristics- women's age, parity are significant associated with pregnancy intention status (Marston and Clelend 2003). The significant differences in pregnancy intention status in Bangladesh that emerged by residence suggest that family planning services need to be expanded or improved in urban. Such regional disparities may be due to cultural factors as well as to differences in the availability and quality of family planning services. Unfortunately, the BDHS data does not collect information on the above cultural factors.

Education has emerged as important predictor for deciding pregnancy intention status. Unplanned pregnancies are available among illiterate and lower educated women compared to women who had higher level of education. Women who had no education or primary education are more likely than those who had secondary and higher education to have had an unplanned pregnancy. This may be due to the fact that illiterate women might have more modest expectations of their ability to control the timing of their pregnancies. Adetunji (1998) observed the similar findings in Egypt, Indonesia, and Morocco.

The result presents that modern contraceptive methods use is highly significant association with the likelihood of unplanned pregnancy. Those who ever used modem contraceptive methods are more likely than nonusers to report that their pregnancy had been unplanned. There exists a lack of association between contraceptive knowledge and pregnancy intention status. It may indicate that awareness does not always indicate an ability to obtain methods and to use the proper contraceptive methods correctly and effectively (Henshaw 1998). This finding also provides the need for further research in several areas. In addition, the biases inherent in reporting retrospective attitudes toward

pregnancy intention status need to be addressed. The feelings about pregnancy may change throughout the gestation, as well as after the birth. Further research is also needed to identify the cultural and psychosocial factors that differentiate women at high risk of unplanned pregnancy from those who are able to plan their pregnancies.

Conclusions

This study also investigates the important risk factors that affect the unplanned pregnancies. The unwanted pregnancy in Bangladesh is still high and it declines little bit. This study provides the argent need for further research in several areas to identify the cultural and psychosocial factors that differentiate women at high risk of unplanned pregnancy from those who are able to plan their pregnancies. Unwanted pregnancy remains a serious problem for women in Bangladesh. It should strictly follow the legal age at marriage of female in Bangladesh for reduce unplanned pregnancies. The policymakers in Bangladesh would benefit from knowing what proportions of unplanned pregnancies are caused by non-use of contraception and what proportion stem from contraceptive failure or inconsistent or inaccurate use. The quality of care in improving women's ability to achieve their reproductive goals and reduce their number of unplanned pregnancies should also give special attention.

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