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Unintended Birth and Its Effect on Child Nutrition in Bangladesh

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Abstract

This study aimed at examining the effect of unintended birth on child nutrition in Bangladesh. The data was obtained from Bangladesh Demographic and Health Survey 2014. A total of 4,986 under-five children were included for this analysis. A multiple linear regression model (based on a hierarchical approach) was applied to examine the effect of unintended birth on one indicator of child nutritional status –– weight-for-age z-score (WAZ). This study found that children from unintended births were significantly more malnourished (i.e., lower WAZ) than those reported as intended, but mistimed birth had no significant effect on child nutrition. The results from this study provided important evidence on the association between unintended birth and child malnutrition. Therefore, necessary steps should be taken to prevent unintended birth, such as ensuring access to family planning methods after marriage, postpartum, and post-abortion, which may help reduce the prevalence of child malnutrition in Bangladesh.

Keywords: Unintended birth, Child nutrition, Hierarchical regression, Family planning methods

Introduction

The nutritional status of under-five children is considered an important indicator of health for any country. Adequate nutrition is one of the principal aspects of health, but today, malnutrition is a significant health concern and remains the single largest cause of child mortality worldwide (Messelu and Trueha, 2016). According to Gandhi et al. (2014), globally, malnutrition is responsible, directly or indirectly, for 60 percent of the 10.9 million deaths annually among children under five.

Malnutrition refers to both undernutrition and overnutrition. In a developing country like Bangladesh, the undernutrition level is acute than overnutrition. Undernutrition encompasses protein-energy malnutrition, deficiency of micronutrients including essential vitamins and minerals (Ahmed et al., 2012), and micronutrient deficiency, which is characterized by stunting (low height-for-age), wasting (low weight-for-height), and underweight (low weight-for-age) (Rahman, 2015). Globally, an estimated 155 million children

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under age five (22.9%) were stunted, 52 million (7.7%) were wasted (UNICEF et al., 2017), and 99 million children (15%) were underweight (UNICEF et al., 2014).

In many previous studies, several characteristics had been identified as risk factors of child malnutrition. In this paper, the effect of unintended birth on child nutrition is examined. Unintended pregnancies resulting in live births are considered unintended births, while unintended births include mistimed births (the birth occurred earlier than desired) and unwanted (at the time of pregnancy, the woman did not want to have any more births). Unintended pregnancy is one of the most severe health problems globally (Singh et al., 2015). Worldwide, an estimated 85 million pregnancies, representing 40 percent of all pregnancies, were unintended; of these, 50 percent ended in abortion, 13 percent ended in miscarriage, and 38 percent resulted in an unintended birth (Sedgh et al., 2014). Several previous studies reported that unintended birth is associated with child nutrition (Shapiro-Mendoza et al., 2005; Rahman, 2015; Upadhyay and Srivastava, 2016; Singh et al., 2017).

According to Chalasani et al. (2007), unwanted childbearing is assumed to have mischievous outcomes for the child, its family, and the larger community that are distinguishable, substantial, and potentially long-term. When an unwanted baby is born, both mother and baby are at risk of complications, such as nutritional ones (Anbaran et al., 2016). Most of the negative relationships between planning status and health outcomes were concentrated among women with births mistimed by two or more years or unwanted births (Lindberg et al., 2015). So, preventing unintended birth may help to reduce the prevalence of child malnutrition in Bangladesh. This study chose weight-for-age (underweight) as the key outcome because it is the most widely used indicator of child nutritional status in developing countries.

Materials and methods

The analysis was mainly based on secondary data obtained from the Bangladesh Demographic and Health Survey (BDHS) 2014. This survey was a two-stage stratified sample of households. In the first stage, 600 enumeration areas (EAs) were selected with probability proportional to the EA size, with 207 in urban areas and 393 in rural areas. A household listing operation was carried out in all the selected EAs, and the resulting list of households was served as the sampling frame for the selection of households in the second stage. In the second stage of sampling, a systematic sample of 30 households on average was selected per EA to provide statistically reliable estimates of key demographic and health variables for the country as a whole, urban and rural areas separately, and for each division. A total of 17,863 ever-married women aged 15-49 were interviewed in the survey. For the current study, 8,092 children under five years of age were extracted to analyze. However, due to missing data on planning status and the outcome variable (weight-for-age), an analytical sample of 4,986 children in the data set resulted. Data were weighted to represent the structure of the Bangladesh population using weighting factors provided by BDHS.

The dependent variable of this study is the weight-for-age z-score (WAZ). Weight-for-age is an overall indicator of a population's nutritional health. It is expressed as a Z-score of individual weight to the median of the international population references (NIPORT et al., 2016) is generally considered as one of the underweight indicators. Children whose weight-for-age is below two standard deviations from the median of the reference population are classified as underweight. Children whose weight-for-age is below three standard deviations from the median of the reference population are considered severely underweight. Underweight reflects a child who is too thin for his or her age and results from chronic and acute malnutrition.

The key independent variable of interest is the planning status of birth. The planning status of birth is based on women's response to a question as to whether each birth in the five years preceding the survey was intended, mistimed, or unwanted. A birth is defined as intended if the mother planned or one that she did not plan at the time of pregnancy but wanted. Unintended births include those births that are mistimed and unwanted. A mistimed birth occurred earlier than desired, and birth is defined as unintended if the mother did not want to have any more birth before pregnancy.

Many previous studies on child nutrition have found an association between child nutrition and other socio-economic, demographic, and residence-related variables (Kanjilal et al., 2010; Alom et al., 2012; Rahman, 2015; Upadhyay and Srivastava, 2016). Therefore, the anthropometric variable, height-for-age z-score (HAZ) was used in this study as an independent variable. Height-for-age is expressed as a Z-score of individual height to the median of the international population references (NIPORT et al., 2016). This study also included the child's size at birth, sex of the child, maternal body mass index (BMI), mother's age at birth, maternal education level, maternal working status, wealth status, place of residence, and region.

Univariate analysis was done by computing mean, standard deviation (SD), and creating percentage distribution for all variables. In the bivariate analysis, one-way ANOVA was applied to examine the association between WAZ and planning status of birth (other socio-economic and demographic variables). Further, multiple linear regression analysis (based on a hierarchical approach) was applied to examine the effect of birth planning on child nutrition (WAZ) after adjusting theoretically relevant variables. Variables were included in the multivariate model based on their association with child nutrition in bivariate analysis. In this study, hierarchical multiple regression analysis was conducted in two stages. All the variables were tested for multicollinearity using the variance inflation factor (VIF) before being included in the regression models.

The multiple linear regression model with p explanatory variables is,

$$y = \beta_0 + \beta_1 x1 + \beta_2 x_2 + \dots\dots\dots + \beta_p x_p + \varepsilon$$

where, y is WAZ, the parameter β_j (j=0, 1, 2, ..., p) called the regression coefficients. The parameter βj represents the expected amount change in response y per unit change in x_j when all of the remaining regressors xi ($i \neq j = 0, 1, 2, \dots, p$) are held constant.

Results

Table 1 shows the average weight-for-age z-score (WAZ) of the sample by selected background characteristics. The average WAZ score was less among unintended children than intended, suggesting a negative relationship between unintended birth and child nutrition. So the higher score reveals better nutritional status among the intended children. Children with uneducated (no formal education) mothers were more likely to be underweight than children with mothers who had completed primary or higher education. Children of working mothers had lower mean WAZ than children of non-working mothers (-1.62 versus -1.35). The economic status of the household had a significant influence on the child's WAZ score. Poor children were more likely to have lower WAZ, as is true for children residing in rural areas. Children in the central region were more likely to have higher mean WAZ than their comparison group, while children of thin mothers were more likely to have lower mean WAZ than their respective counterparts. At birth, children with smaller or medium size had lower mean WAZ than children with a larger size.

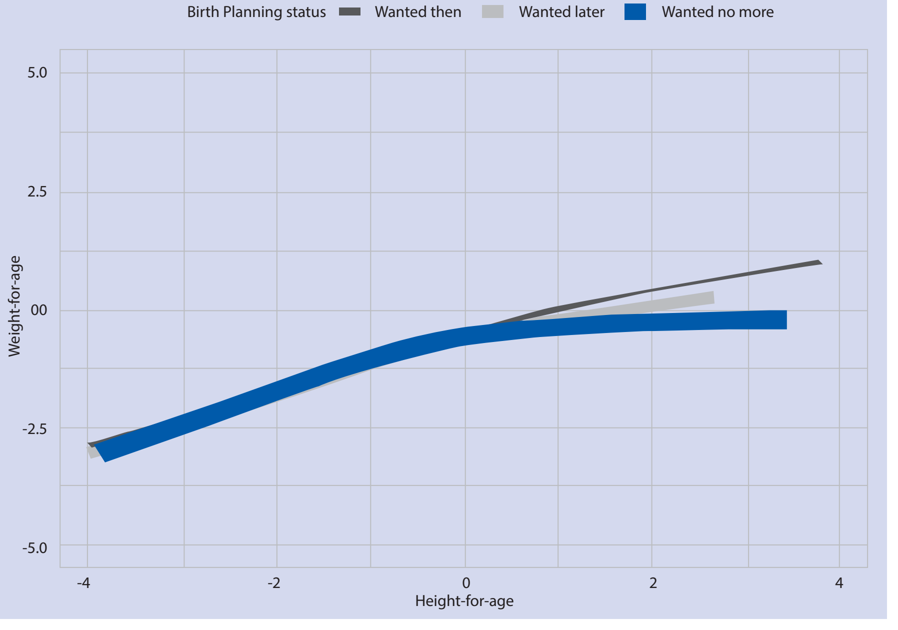
Table 1. Mean weight-for-age z-score (WAZ) of the sample of children under-five by selected background characteristics

Characteristics	%	WAZ		
		Mean	SD	p-value[a]
Planning status of birth				
Intended	70.4	−1.37	1.17	<0.001
Mistimed	17.7	−1.51	1.09	
Unwanted	11.9	−1.55	1.13	
Maternal education level				
No education	15.2	−1.75	1.12	<0.001
Primary	28.4	−1.65	1.04	
Secondary	46.9	−1.29	1.15	
Higher	9.6	−0.81	1.21	
Maternal working status				
No	76.3	−1.35	1.16	<0.001
Yes	23.7	−1.62	1.13	
Wealth status of the household				
Poor	42.6	−1.75	1.05	<0.001
Middle	39.1	−1.31	1.11	
Rich	18.4	−0.88	1.22	
Region				
Central	40.6	−1.31	1.17	<0.001
East	32.3	−1.54	1.17	
West	27.1	−1.44	1.10	
Place of residence				
Rural	75.2	−1.50	1.12	<0.001
Urban	24.8	−1.18	1.23	
Sex of child				
Male	51.6	−1.41	1.16	0.791
Female	48.4	−1.42	1.14	
Size of the child at birth				
Small	17.1	−1.85	1.14	<0.001
Average	59.5	−1.30	1.13	
Large	11.1	−0.93	1.19	
Missing	12.4	−1.81	0.96	
Maternal BMI				
Thin	24.2	−1.76	1.06	<0.001
Normal	59.8	−1.40	1.14	
Overweight	15.6	−0.93	1.17	
Mother's age at birth				
<20	33.0	−1.46	1.16	0.247
20-24	31.9	−1.41	1.11	
25-29	22.3	−1.39	1.14	
30+	12.9	−1.38	1.26	
Total	100.0	−1.42	1.15	

[a] *p*-value based on F-test

Figure 1 shows the differences in weight-for-age z-scores (WAZs) among the three categories of birth planning status after adjusting for differences in height-for-age z-scores (HAZs). The intended children were better nourished than mistimed or unwanted children because the scatter plot confirms that the intended birth line is above the unwanted birth lines.

Figure 1. Differences in weight-for-age z-scores (WAZs) among the three categories of birth planning status after adjusting for differences in height-for-age z-scores (HAZs)



Multiple linear regression analysis results to examine the effect of birth planning on child nutrition (WAZ) are shown in Table 2. A two-stage hierarchical multiple regression was conducted with WAZ as the dependent variable. Except for maternal education level and wealth status, all other variables were entered in Model I. Finally, maternal education level and wealth status were added in Model II. Model II confirmed that children from unwanted birth were statistically more likely to have lower WAZ than children from intended birth (Coefficient: –0.09, SE: 0.06), but mistimed birth had no significant effect on children's WAZ. Moreover, children's HAZ in Model II was significantly associated with WAZ. Children who reside in the east or west regions were significantly more likely to be underweight than children in the central region. Besides, children of working mothers were more likely to have lower WAZ than children whose mothers were not working (Coefficient: –0.11, SE: 0.03).

Table 2. Multiple regression results (based on a hierarchical approach) showing the effect of birth planning on child nutrition (WAZ)

Characteristics	Model I		Model II	
	Coefficient (β)	SE	Coefficient (β)	SE
Planning status of birth				
Intended (ref.)				
Mistimed	−0.05	0.05	−0.04	0.05
Unwanted	−0.13**	0.06	−0.09*	0.06
Height-for-age	0.54***	0.01	0.53***	0.01
Region				
Central (ref.)				
East	−0.10***	0.03	−0.10***	0.03
West	−0.15***	0.03	−0.14***	0.03
Place of residence				
Rural (ref.)				
Urban	0.10***	0.03	0.04	0.03
Maternal working status				
No (ref.)				
Yes	−0.11***	0.03	−0.11***	0.03
Maternal BMI				
Thin (ref.)				
Normal	0.25***	0.03	0.23***	0.03
Overweight	0.44***	0.04	0.39***	0.04
Size of child at birth				
Small (ref.)				
Average	0.28***	0.03	0.28***	0.03
Large	0.46***	0.05	0.45***	0.05
Maternal education level				
No education (ref.)				
Higher			0.13***	0.04
Wealth status				
Poor (ref.)				
Middle			0.05	0.06
Rich			0.16***	0.04
Interaction terms				
HAZ*mistimed	−0.03	0.02	−0.03	0.02
HAZ*unwanted	−0.04	0.03	−0.03	0.03
R-square	0.49		0.50	
R-square change	0.49***		0.01***	

Significance levels: ***p<0.01, **p<0.05, *p<0.10; (ref.) = Reference category; SE = Standard error.

Children whose mothers' BMI were normal or overweight were more likely to have higher WAZ than children of thin mothers. Likewise, children who had been average or large at birth were more likely to have higher WAZ than children of smaller birth sizes. In addition, children of higher educated mothers were statistically more likely to have higher WAZ than children of uneducated mothers (Coefficient: 0.13, SE: 0.04). Further, children who belong to affluent families had higher WAZ than those from low-income families (Coefficient: 0.16, SE: 0.04).

Discussion and conclusions

The findings of this study suggest that children who were reported as unintended were statistically more likely to be malnourished compared to children who were reported as intended. These results hold even after adjustment of the well-known determinants of child nutritional status in Bangladesh. This finding is consistent with numerous earlier studies (Shapiro-Mendoza et al., 2005; Rahman, 2015; Upadhyay and Srivastava, 2016). A key finding of this study is that children of higher-educated mothers were more likely to have lower WAZ than uneducated mothers. Several other studies also suggest that maternal education level is significantly associated with child nutrition (Abuya et al., 2012; Alom et al., 2012; Rahman, 2015). Thus, the education of the mother helps to reduce child malnutrition. Another finding of this study is that children who belong to rich families were more likely to have better nutritional status than children from low-income families. This is because children who belong to rich families have better facilities such as a sound environment, well sanitation, proper child health care than children from low-income families. Again, this finding is similar to other studies (Das et al., 2008; Kanjilal et al., 2010; Rahman, 2015; Upadhyay and Srivastava, 2016).

An interesting finding of this study is that children of working mothers were significantly more likely to have lower WAZ than children whose mothers were not working. It could be because working mothers have insufficient time to properly care for their children, so their children are more malnourished than non-working mothers. This finding is consistent with the findings of several other studies (Islam et al., 1994; Upadhyay and Srivastava, 2016; Ahsan et al., 2017) but not with the findings of Das et al. (2008), which did not find any effect of maternal working status on child nutrition. Moreover, this study found that children in the central region had better nutritional status (i.e., higher WAZ) than those in the east or west regions. Findings from other studies also indicate a consistent association between region and child nutrition (Das et al., 2008; Kanjilal et al., 2010; Alom et al., 2012). Interestingly, in this study, the place of residence was not significantly associated with child nutrition.

Another finding of this study is that children of thin mothers were more likely to have lower WAZ than children of average or overweight mothers. Several previous studies also reported that maternal BMI is significantly associated with child nutrition (Rayhan et al., 2006; Kanjilal et al., 2010; Rahman, 2015). According to Rayhan et al. (2006), malnourished mothers cannot provide sufficient breast milk to their children because of their nutritional deficiency.

So, improving the nutritional status of mothers can help to reduce the prevalence of child malnutrition. Further, this study found that children who had been large or average in size at birth were well nourished (i.e., higher WAZ) than children who had been small in size at birth. This is because children with larger sizes may have a stronger immunity to fight against various childhood diseases than children with smaller sizes. Findings from other studies also suggest that the size of a child at birth is significantly associated with child nutrition (Das and Rahman, 2011; Abuya et al., 2012; Rahman, 2015).

The limitations of this study must also be noted. One of the potential limitations of this study is that it used the retrospective assessment of pregnancy intention at the time of conception. Women underreport unintended pregnancy when asked about intendedness retrospectively; a woman who did not intend to become pregnant at the time of conception may report that the pregnancy had been intended after giving birth. In addition, experiences may influence women's recall of pregnancy intention at the time of conception during pregnancy, delivery, and the postpartum period (Mohllajee et al., 2007). Another limitation in this study is that there are many missing values in the variables of our interest in the data, consequently reducing sample sizes. Here, many children were excluded from the data set because of missing values in birth planning status. Furthermore, since the sample consists of members from households spread out all over the country, it has to be kept in mind, and significant parts are unaware of giving the correct information. As a result, some data errors might be beyond our control as we handle secondary data.

In conclusion, this study provides significant evidence on the relationship between birth and child malnutrition planning status. This study indicated that children from unintended birth were more malnourished (i.e., lower WAZ) than intended births. Therefore, necessary measures should be taken into account to prevent unintended births that may help to reduce the prevalence of child malnutrition in Bangladesh. The policy-makers and program managers should pay particular attention to factors that may reduce unwanted births, such as ensuring access to family planning methods after marriage, postpartum, and post-abortion.

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