An Analysis of the Status of Antenatal Care in Bangladesh

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ABSTRACT

The care a pregnant woman needs to prevent pregnancy related complications and have safe childbirth is known as antenatal care. In this paper, we have analyzed the status of antenatal care among pregnant mothers in Bangladesh using BDHS 2011 data. We have found that place of residence, financial status, religion, age, number of children, academic qualification of the pregnant woman play significant role on the number of antenatal visits. Exposure to mass media also has strong influence on a pregnant woman's access to antenatal care.

1. INTRODUCTION

Antenatal care is the care a pregnant woman requires in order to ensure a healthy pregnancy and safe childbirth. A pregnant woman is supposed to have regular check-ups with a midwife or a doctor who specializes in pregnancy and birth. These check-ups are called antenatal visits. According to World Health Organization(WHO), to achieve the full life-saving potential that antenatal care (ANC) promises for women and babies, four visits providing essential evidence based interventions – a package often called focused antenatal care – are required. The ANC visits persuade pregnant mothers to opt for skilled attendance at birth and encourage them to have some healthy behaviors such as early breastfeeding, early postnatal care, and planning for optimal pregnancy spacing.[1] Among the four recommended visits, the first one is advised at 8-12 weeks, the second one at 24-26 weeks, the third one at 32 weeks, and the fourth one at 36-38 weeks of the pregnancy. [2]

The practice of having checkups during pregnancy is very low in developing countries compared to developed countries. In developed countries, majority (97%) of pregnant mothers have access to ANC. In Bangladesh, there has been an increase in the percentage of women receiving at least 1 ANC, but the percentage is still very low compared to developed countries. [3-4] The percentage of women receiving at least 1 ANC rose from 51% to 79% during the years 2011 and 2014.

Pregnancy related complications kills a large percentage of pregnant mothers in Bangladesh. About 12,000 pregnant women die each year in Bangladesh due to pregnancy related complications. Thus, proper care during pregnancy and delivery is extremely necessary for Bangladesh. [5-6] To address these serious issues the National Strategy for Maternal Health has been formulated. This strategy emphasizes the provision of ANC and is predicted the framework of factors that affect safe motherhood service utilization. [7-8]

Studies conducted on antenatal care in Bangladesh reveals, the frequency of antenatal care visits is lower for women belonging to poor families. Since majority of the poor people are uneducated, they do not have a knowledge of safe pregnancy and childbirth. They consider pregnancy an everyday occurrence, so husbands of the pregnant women do not make any effort to access the next clinic for antenatal care. Academic qualifications of the mother and father also play a pivotal role in the number of ANC visits. Studies revealed, mothers who are educated have more access to antenatal care. Educated men are much more willing to take their pregnant wives for treatment compared to uneducated men. Some studies showed that

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rural mothers have lower access to safe childbirth. Since in villages there is scarce of good hospitals, women often have no proper treatment during pregnancy complications. [9-12]

Though a number of studies have been conducted on antenatal care in Bangladesh, only a few of them involve statistical estimation of the relationship between number of antenatal visits and different socio-economic factors. In this study, our aim is to identify the factors associated with the number of ante-natal visits. The findings can be helpful for organizations working for improving maternal and neonatal health to implement new strategies to increase the frequency of antenatal visits.

2. DATA AND VARIABLES

The data for this study has been obtained from Bangladesh Demographic and Health Survey for the year 2011, which is the sixth nationally representative survey designed to provide information on basic national indicators of social progress. Detailed information about this survey can be found in BDHS report 2011. A total of 17,842 ever-married women were surveyed. Among these women, 8,793 women had children aged 0-5 years at the time of the survey. Our study focuses on the antenatal care of these 8793 women.

The response variable is the number of antenatal care visits of these 8793 mothers.

A set of predictor variables has been selected from the BDHS data to estimate the statistical relationship between the number of antenatal care visits and the predictor variables. The predictor variables include- Region, place of residence, financial status, academic qualifications, husband's academic qualifications, religion, number of living children of the respondent, and also the respondent's exposure to mass media.

3. METHODOLOGY OF THE STUDY

Cameron et al (1998) first introduced Poisson regression to model count data.[13]

$$\log[E(Y|x)] = \alpha + \beta'x \qquad (1)$$

Where, Y represents the dependent variable, x is a realization of the independent variable X, α is the intercept term and β represents the vector of regression coefficients.

The likelihood function of equation 1 is:

$$l_1 = l(\beta|xX,Y) = \sum\{y_i(\beta'x_i) - e^{\beta'x_i}\} \qquad (2)$$

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But there exists a serious problem with the Poisson regression model. The Poisson distribution assumes equality of its mean and variance, which is a rare event for real data. Most often the variance is larger than the mean resulting in overdispersion. Hilbe (2007) adopted the negative binomial model for overdispersed count data. [14]

$$log[Var(Y|x)] = \alpha + \beta'x \tag{3}$$

The likelihood function of equation 3 is:

$$l_2 = \sum\sum[\ln(j + \alpha^{-1}) - \ln(y_i) - \ln(y_i + \alpha^{-1})\ln(1 + \alpha$$

$$exp(x_i'\beta)) + y_i \ln \alpha + y_i\, x_i'\, \beta] \tag{4}$$

To detect overdispersion in a count data, a statistical test of hypothesis is performed for the overdispersion parameter.

The null hypothesis is H_0: α and the alternative hypothesis is H_1: $\alpha > 0$.

The test statistic is: $-2(\log(l_1) - \log(l_2))$, where l_1 is the likelihood function of the Poisson model and l_2 is the likelihood function of the negative binomial model.

If the statistical test is significant, then overdispersion is present in the data. If overdispersion is identified in the data, a negative binomial model will be used to model the count data.

The iterative maximum likelihood method is used to estimate the parameters of the negative binomial model.

4. RESULTS AND DISCUSSION
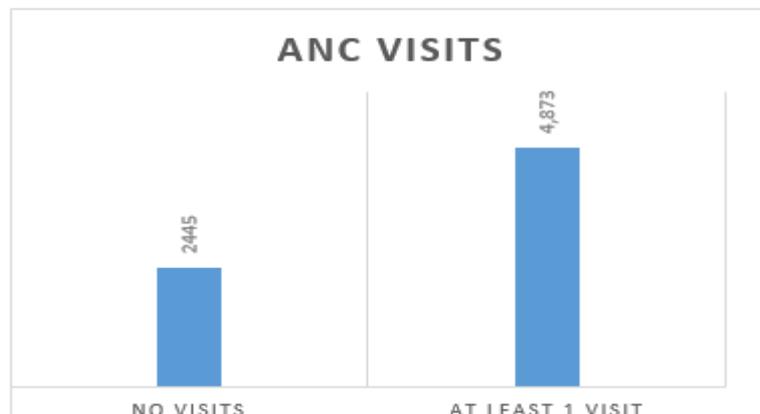
From the above graph, we can see 2445 (33.41%) women did not pay any visit for antenatal care and 4873 (66.59%) women paid at least 1 visit.

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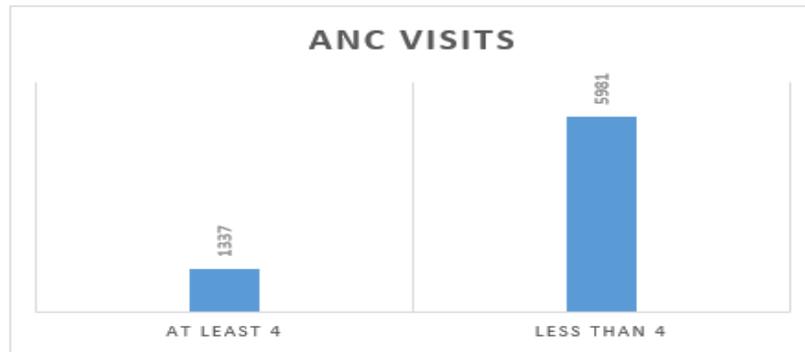
From figure we can see that only 1337 (18.27%) women had access to WHO recommended at least 4 antenatal visits.

Table 1.1: Status of antenatal visits by different socio-economic factors

		At Least 1	At Least 4
Region	Dhaka	64.82%	19.30%
	Chittagong	62.47%	15.53%
	Barisal	66.08%	18.25%
	Khulna	74.91%	22.69%
	Rajshahi	72.08%	16.23%
	Rangpur	75.81%	24.30%
	Sylhet	54.30%	13.41%
Place of Residence	Urban	80.98%	31.58%
	Rural	59.89%	12.07%
Financial Status	Poor	49.42%	7.42%
	Middle Class	65.63%	12.64%
	Rich	83.86%	31.55%
Academic Qualification of Respondent	No Education	39.94%	5.33%
	Primary/Secondary	69.75%	17.21%
	Higher Education	96.31%	54.97%
Husband's Academic Qualifications	No Education	42.96%	5.77%
	Primary/Secondary	69.78%	16.50%
	Higher Education	90.64%	44.79%
Working Status	Working	68.76%	20.52%
	Not Working	66.34%	18.01%
Number of Children	More Than 2	53.17%	10.47%
	2 or Less	46.83%	22.74%
TV	Do Not Watch	51.03%	8.31%
	Watch	75.38%	24.62%
Newspaper	Do Not Read	76.89%	61.39%
	Read	23.11%	38.61%
Radio	Do Not Listen	66.14%	17.91%
	Listen	70.81%	21.93%

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The above table illustrates the status of ANC visits by different socio-economic factors. This table highlights that the percentage of women receiving minimum 4 ANC is very low for all of the above mentioned socio-demographic factors. The percentage of women receiving antenatal care is the highest for Rangpur and the lowest for Sylhet compared with the other districts. In Rangpur, 75.80% women received at least 1 ANC and 24.30% women received at least 4 ANC. In Sylhet, 54.30% women received at least 1 ANC and 13.41% women received at least 4 ANC. While 80.98% of urban mothers receive at least 1 ANC, only 59.89% rural women receive at least 1 ANC. Financial disparity plays a vital role in the number of ANC visits. Mothers from poor households are less likely to receive any ANC compared to middle class and rich mothers. The likelihood of receiving ANC increases with increase in the level of education of the mothers and their husbands. Mothers who work are more likely to receive at least 4 ANC than mothers who do not work. Only 10.74% of mothers with more than two children receive a minimum of 4 ANC while 22.74% of mothers with at most 2 children receive a minimum of 4 ANC. Mothers with exposure to mass media are more likely to receive ANC than mothers who lack this exposure.

Our next step is to find the factors which are significantly associated with the number of ANC visits. We first fit a Poisson model and then a negative binomial model. Then we test for overdispersion.

The log likelihood function for Poisson model is=-13780.311

The log likelihood function for negative binomial model=-12580.116

The estimated value of the dispersion parameter is=.58

The likelihood ratio test statistic is=-2(-13780.311+12580.116) = 2400.39 and the associated p-value is 0.00. So the test is significant and overdispersion is present in the data. We should then adopt the negative binomial regression model.

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Table 1.2: Negative binomial regression model for number of antenatal care visits

		β	exp(β)
Region	Dhaka		
	Chittagong	-.11***	.89***
	Barisal	.14***	1.15***
	Khulna	.16***	1.17***
	Rajshahi	.15***	1.16***
	Rangpur	.48***	1.62***
	Sylhet	-.08***	0.92***
Place of Residence	Rural		
	Urban	.26***	1.30***
Financial Status	Poor		
	Middle Class	.18***	1.20***
	Rich	.49***	1.63***
Religion	Islam		
	Others	.20***	1.22***
Academic Qualification of Respondent	No Education		
	Primary/Secondary	.34***	1.41***
	Higher Education	.55***	1.73***
Husband's Academic Qualifications	No Education		
	Primary/Secondary	.25***	1.29***
	Higher Education	.45***	1.57***
Working Status	Working		
	Not Working	.03	1.03
Number of Children	2 or Less		
	More Than 2	-.17***	0.84***
TV	Do Not Watch		
	Watch	.18***	1.20***
Newspaper	Do Not Read		
	Read	.01***	1.01***
Radio	Do Not Listen		
	Listen	.21	1.23
Mother Age		-.01***	0.99***
Constant Term		-.39***	2.33***

Note: ***, **, * indicates p-value is 0.01, 0.05 and 0.10 respectively.

All 7 districts have been found to have significant effects on the expected count of antenatal visits. The expected count of antenatal visits is 11% lower for women of Chittagong compared with women of Dhaka while holding all other variables constant. In Rangpur, the

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expected count of antenatal visits among pregnant mothers is 62% higher compared with Dhaka, while holding all other variables constant. The expected count of antenatal visits is 30% higher for urban mother compared with rural mothers, while holding all other variables constant. Financial status has a significant effect on antenatal care. The expected count of antenatal visits is 20% higher for middle-class mothers and 63% higher for rich mothers compared with poor mothers while holding all other variables constant. Religion has a key effect on antenatal care. Mothers belonging to religions other than Islam have 22% higher chance of receiving antenatal care than Muslim mothers while holding all other variables constant. Academic background of both pregnant mothers and their husbands have significant effect on antenatal care. Mothers with higher education have 73% more antenatal care visits than uneducated mothers. Whereas the expected count of antenatal care visits is 57% higher for highly educated father compared with uneducated fathers, while holding all other variables constant. The expected counts of ANC visit is 17% lower for mothers with more than two children compared with mothers with at least two children while holding all other variables constant. Exposure to TV and newspaper significantly increase the expected count of ANC visits. The expected counts of ANC visits is 20% higher for mothers who watch TV compared with mothers who do not watch TV while holding all other variables constant. The expected counts of ANC visits is 1% higher for mothers who read newspaper compared with mothers who do not read while holding all other variables constant. Mother's age has a negative effect on ANC visits. It means with each unit increase in mother's age, the expected counts of ANC visits decreases, while holding all other variables constant. The constant term indicates that in the absence of all predictor variables, the expected number of antenatal visits is 2.33.

5. CONCLUSION

Antenatal care is mandatory for every pregnant woman. From this study, we can see that the status of antenatal care visit is not very satisfactory. Still, a large portion of pregnant mothers does not have access to WHO recommended minimum 4 antenatal care visits. The study shows that urban mothers have higher chance in getting more antenatal visits than rural mothers. In poor families, the number of antenatal visits is much lower compared with middle class and rich families. Muslim women are found to have fewer antenatal visits than non-Muslim women. In educated families, pregnant women receive more care than in uneducated families. Exposure to mass media leads to a higher number of antenatal visits.

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From this study, we can conclude that government of Bangladesh need to promote the necessity of antenatal care among pregnant mothers. Hopefully, the findings of this study will help the health ministry of Bangladesh to formulate a plan in order to improve maternal and neonatal health.

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