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Trend and Determinants of 4+ Antenatal Care Visits by Rural Women in Bangladesh: An Analysis from Bangladesh Demographic and Health Survey 2004-2014

Gaylan Peyari Tarannum Dana[1], Sanjit Roy[2]

ABSTRACT

Antenatal Care (ANC) is one of the four pillars of Safe Motherhood. Maternal Mortality Rate (MMR) is high in rural areas of Bangladesh, so to reduce MMR, it is important to increase ANC visits from the trained provider. The objective of this study was to see the trends and determinants of 4+ ANC visits and identify the causes related to the number of ANC visits in rural areas. This study used the data generated from the Bangladesh Demographic and Health Survey (BDHS) 2004, 2007, 2011 and 2014 to observe the trends and causes related to 4+ ANC visits. The statistical analysis results confirm that divisions, wealth, education, and media exposure had a strong influence on rural women's 4+ ANC visits. The logistic regression model results show that poor and less educated women of rural areas were less likely to seek 4+ ANC visits than urban areas. This paper's outcome suggests that rural women's economic status and education significantly affect 4+ ANC visits. The findings will help design appropriate strategies, programs and policies for the advancement of rural women's maternal healthcare-seeking behaviour.

Keywords: Antenatal Care, Trained Persons, 4+ Visits, Factor, Socioeconomic, Bangladesh.

INTRODUCTION

Antenatal care means regular checkups of pregnant women by a trained midwife or doctors to make sure healthy pregnancy and safe delivery. These ANC visits provide information and possible remedies to pregnant women about early detection and management related to pregnancy complications (Myer & Harrison, 2003). In Bangladesh, per year, pregnancy-related complications kill about 12,000 pregnant women (Amrin, 2016). A study found that women who took 4+ ANC checkups have increasingly higher infant survival rates than women who did not receive 4+ ANC checkups (Hong & Ruiz-Beltran,

[1] Associate Professor, Department of Population Sciences, University of Dhaka. Email: tarannum_dps@du.ac.bd

[2] Assistant Professor, Department of Population Sciences, University of Dhaka

2007). Therefore, regular ANC visit is important for every pregnant woman. According to World Health Organization (WHO), 2018), each woman must receive a minimum of four ANC visits. Among the four recommended visits, the first visit should be before 16 weeks of pregnancy, then the second visit should be between 24-26 weeks, the third visit around 30-32 weeks, and the fourth visit after 36 weeks ((WHO), 2018). However, studies confirm a tendency towards delayed first ANC visits in developing countries (Van Eijk et al., 2006).

In developing countries, the practice of having checkups during pregnancy is deficient compared to developed countries. In Bangladesh, during pregnancy, women receive at least one ANC visit from a trained provider has risen notably from 51 per cent in 2011 to 74 per cent in 2016 (BDHS, 2011; BMMS, 2016). However, till now, Bangladesh is far behind the set goal that was announced by the international community (80% by 2005, 85% by 2010, and 90% by 2015) to make sure trained provider at birth for all women (Adegoke & Van Den Broek, 2009). However, the target was not achieved due to skilled human resources in the healthcare system (Ahmed, Hossain, RajaChowdhury, & Bhuiya, 2011). Major barriers to ANC services access continue, particularly in rural areas, due to poor infrastructure and low resource availability (Yaya, Bishwajit, & Ekholuenetale, 2017). There are fewer studies on antenatal care explored the factors of use by frequency of ANC visits, reasonably and through inferential analyses (Beeckman, Louckx, & Putman, 2010; Gayawan, 2014; Guliani, Sepehri, & Serieux, 2013; Magadi, Madise, & Rodrigues, 2000; Sepehri, Sarma, Simpson, & Moshiri, 2008; Shrestha, 2013). In Bangladesh, antenatal care visits are lower for women belonging to low-income families, having no education and living in rural areas (Halim, Bohara, & Ruan, 2010; Saad–Haddad et al., 2016). Different studies have focused on antenatal care in Bangladesh (Finlayson & Downe, 2013; Simkhada, Teijlingen, Porter, & Simkhada, 2008), but only a few of them showing the association of the number of antenatal visits with different socio-economic factors (Amrin, 2016; Halim et al., 2010; Pervin et al., 2012). This study aims to identify the trend and determinants of 4+ antenatal visits by the rural women of Bangladesh. The findings will bestow valuable understanding concerning how best to improve the usage of current interventions by implementing new strategies to increase antenatal visits.

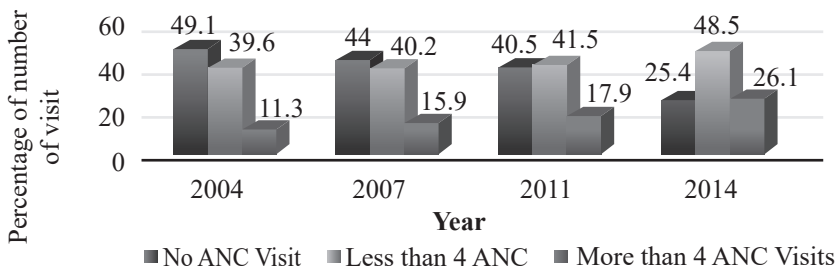
DATA AND METHODOLOGY

In this study, the Bangladesh Demographic and Health Survey (BDHS) data ranging from 2004, 2007, 2011 and 2014 were used to estimate the statistical association between 4+ ANC visits and the possible enabling factors. The dependent variable of the study was 4+ ANC visits (where ANC visits 1 for 4+ANC visits and 0 for fewer ANC visits), and the possible independent variables were divided into three groups such as individual-level variables (age, birth order, education, working status, information on pregnancy complications); household-level variables (religion, wealth and media exposure); spatial level variables (administrative divisions). Both bivariate and multivariate analyses were used to identify the trend and determinants of 4+ ANC visits by rural women. Bivariate

level, chi-square tests have been used to find out statistical association at a 5 per cent level of significance. These tests were performed into four waves of BDHS data (2004, 2007, 2011 and 2014) to show the trends over a decade. The variables found significant at a 95 per cent level of significance were considered for multivariate analyses. A binary logistic regression model is a common option to analyse the effects of the possible independent variables on the dichotomous dependent variable. The dichotomous nature of the dependent variable directed running a series of binary logistic regression models to assess the effect of confounding variables in increasing the 4+ ANC visit in a rural setting after adjusting for other selected control variables. The outcomes of the binary logistic regression analyses are explained as odds ratios (OR) with 95 per cent confidence intervals and corresponding p-values. All statistical analyses were done by using STATA 14.

RESULTS

The results of the study were presented based on descriptive, bivariate, and multivariate analyses. First, the description of the study subjects was the overall trend of ANC visits by the women from 2004-2014. Then, a significant association between predictor variables and response variables was described at the bivariate level. Lastly, the Adjusted Odd Ratio (AOR) was determined by multivariate analysis. In Bangladesh, receiving ANC has increased to 31 per cent from 17 per cent in 2004 (BDHS, 2014). However, the trend of 4+ visits in rural Bangladesh was still low compared to the overall trend. It had increased from 3.1 per cent in 1993 to 26.1 per cent in 2014, but the number of no ANC visits was almost the same as the number of 4+ visits (see Figure 1).



Source: Analyses of BDHS Data: 2004-2014

Figure 1: Over trend of ANC Visits in Rural Areas of Bangladesh

There was a rising trend in receiving 4+ ANC service at the individual level among the educated younger women but not working than their counterparts. The trend was also higher in first birth and women who knew pregnancy complications. Then again, 4+ ANC visits were high among non-Muslim women, women in the richest wealth quintile, and those with more media exposure. There was also a significant difference at the divisional level (Table 1).

Table 1: Trends of 4+ ANC Services by Background Characteristics

	BDHS 2004	BDHS 2007	BDHS 2011	BDHS 2014
Individual Level Variables				
Age				
15-19	11.0	15.9	21.0	27.1
20-24	13.4	20.0	20.0	27.9
25-29	12.7	15.0	18.4	24.0
30 or more	7.5	11.0	12.4	24.9
Birth Order				
1	16.9	23.5	26.0	30.9
2	15.0	18.1	18.8	27.5
3 or more	6.2	8.9	11.0	19.2
Education				
No education	3.8	5.4	5.7	12.0
Primary	9.3	10.4	12.1	18.2
Secondary or more	22.7	27.3	27.3	34.3
Working Status				
Working	11.5	14.1	17.6	24.5
Not-working	11.2	16.6	18.0	26.7
Pregnancy Complications Knowledge				
Yes	26.8	36.3	35.1	43.8
No	5.4	23.6	21.4	27.7
Household Level Variables				
Religion				
Muslim	10.3	15.4	17.2	26.1
Non-Muslim	21.7	20.3	25.9	25.7
Wealth				
Poorest	3.6	8.3	8.7	14.5
Poorer	6.8	9.5	12.5	19.6
Middle	11.6	15.5	18.3	26.5
Richer	17.6	25.5	27.1	40.7
Richest	32.7	35.6	41.8	46.5

	BDHS 2004	BDHS 2007	BDHS 2011	BDHS 2014
Media Exposer				
No	7.1	12.5	14.6	21.0
Yes	15.9	23.4	25.4	39.7
Spatial Level Variables				
Division				
Barishal	11.3	13.3	22.1	19.6
Chattogram	10.7	14.8	13.9	22.0
Dhaka	10.6	11.2	13.7	28.6
Khulna	12.3	20.2	22.3	33.2
Rajshahi	12.8	22.7	18.3	20.8
Sylhet	8.7	10.7	12.6	17.0
Rangpur	0.0	0.0	31.2	38.9

Source: Analyses of BDHS data: 2004-2014

Multivariate Analysis

Table 2 below depicts the results acquired from binary logistic regression analyses. The outcome of various covariates categorising as individual level, household level, and spatial level in receipt of 4+ANC visits for 2004, 2007, 2011 and 2014 has been discussed below in Table 2. After controlling all individual-level variables for (Model 1), the likelihood of receipt of 4+ ANC decreased among the aged women (OR 1.60, 3.07, and 2.62 respectively). The result was not similar in all the survey years. In 2011, only the 25-29 age group was significant, whereas in 2014, women age 30 or more were significant. Women with three or more children were significantly less likely to have 4+ ANC visits than those who delivered their first child (OR 0.36 for third or higher-order birth). This was found to be identical from 2004 to 2014 in terms of models. However, in 2014 birth order became insignificant in model 3. Although women's work status irrespective of survey years did not significantly affect 4+ ANC visits, women with primary and secondary education had higher probabilities of 4+ ANC visits than their counterparts (OR 2.07 and 4.35 respectively). However, across the years, it was found that women having secondary education had higher chances of 4+ ANC visits than their counterparts. Model 1 also suggests that pregnancy complications knowledge significantly facilitate 4+ ANC visits (OR 4.83). This finding was similar in all survey years. Model 2 shows that after modification for household-level variables, namely, religion, wealth quintiles, and exposure to media, the importance of individual-level variables of Model 1 still prevails in all survey years. Findings of Model 2 propose that additionally to individual-level factors, women belonging to the middle, richer

and richest had higher odds to 4+ ANC visits (OR 1.95, 2.44, and 4.21 respectively). Regardless of all survey years, it was found that the wealth index was notably connected with 4+ ANC visits. Further, Muslims are significantly less likely to have 4+ ANC visits compared to Non-Muslims (OR 0.57). However, the effects of religion were insignificant across the survey years. Although media exposure did not significantly affect the 4+ ANC visits in the survey years 2004 to

Table 2: Odds Ratios of Selected Explanatory Variables to Predict Receiving 4+ ANC Visits

	BDHS 2004			BDHS 2007			BDHS 2011			BDHS 2014		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Individual Level Variables												
Age												
15-19	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
20-24	1.60**	1.30	1.32	1.50**	1.43*	1.55**	1.14	1.06	1.14	1.22	1.11	1.18
25-29	3.07***	2.22***	2.22***	1.72**	1.48*	1.59*	1.44**	1.19	1.27	1.19	1.02	1.05
30 or more	2.62***	1.86**	1.89**	2.13***	1.79**	1.93**	1.38	1.08	1.14	1.70**	1.33	1.44
Birth Order												
1	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
2	0.86	0.87	0.88	0.80	0.85	0.86	0.75**	0.80*	0.77*	0.89	0.96	0.93
3 or more	0.36***	0.42***	0.43***	0.53***	0.58**	0.62**	0.58***	0.64**	0.65**	0.64**	0.73*	0.75
Education												
No education	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Primary	2.07***	1.66**	1.66**	1.34	1.29	1.27	1.48*	1.35	1.36	1.28	1.22	1.29
Secondary or more	4.35***	2.54***	2.51***	2.65**	2.26***	2.19***	2.50***	1.82***	1.83***	2.15***	1.67**	1.74**
Working Status												
Not-working	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Working	1.23	1.3	1.28	0.92	0.98	0.85	0.84	0.89	0.88	0.96	1.01	0.94
Pregnancy Complications Knowledge												

	BDHS 2004			BDHS 2007			BDHS 2011			BDHS 2014		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
No	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Yes	4.83***	4.39***	4.30***	1.71***	1.66***	1.69***	1.90***	1.88***	1.89***	2.03***	1.93***	1.95***
Household Level Variables												
Religion												
Non-Muslim	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Muslim	Na	0.57***	0.53***		0.74	0.70*		0.76*	0.79		0.72	0.76
Wealth												
Poorest	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Poorer		1.41	1.42		0.87	0.93		1.18	1.23		1.01	1.08
Middle		1.95**	2.01**		1.06	1.20		1.22	1.45**		1.08	1.21
Richer		2.44***	2.65***		1.44*	1.71**		1.62***	2.13***		1.77***	1.98***
Richest		4.21***	5.05***		1.70**	2.18***		2.38***	3.35***		1.64**	1.82**
Media Exposer												
No	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Yes		1.20	1.19		0.89	0.85		1.11	1.09		1.61***	1.60***
Spatial Level Variables												
Divisions												
Barishal			0.88			1.22			1.61**			0.75
Chattogram			0.78			0.88			0.69**			0.74*
Dhaka	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**

	BDHS 2004			BDHS 2007			BDHS 2011			BDHS 2014		
	Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Khulna			0.65*			1.24			1.10			1.15
Rajshahi			1.15			2.03***			1.06			0.82
Sylhet			0.65			0.73			0.84			0.76
Rangpur									2.53***			1.95***
Chi-square	**556.52**	**629.81**	**643.88**	**141.32**	**161.96**	**208.61**	**180.89**	**233.38**	**336.14**	**136.00**	**203.87**	**250.34**
Prob>chi2	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

Source: Analyses of BDHS Data: 2004-2014. (** p<0.001; ** p<0.01; * p<0.05)

2011, media exposure increases the odds of 4+ ANC visits significantly in 2014 (OR 1.61). After adding a spatial level variable in the regression (Model 3), the important consequence of individual and household level variables continues in the survey year 2004 only. This trend was not identical for the survey years 2011 and 2014. It was also found that age, birth order, and religion were not significantly associated with 4+ANC visits. Additionally, all divisions were not significantly associated with 4+ ANC visits except the Khulna division (OR 0.65). However, the result was not constant in all the survey years. In 2007, the Sylhet division had higher odds of 4+ ANC visits (OR 2.03). In 2011, Barisal and Rangpur divisions had the higher odds of 4+ ANC visits (OR 1.61 and 2.53 respectively). In contrast, the Chattogram division was significantly less likely to have 4+ ANC visits (OR 0.69 and 0.74 respectively) in both the survey years 2011 and 2014. In 2014, the Rangpur division had the higher odds of 4+ ANC visits (OR 1.95).

DISCUSSIONS

In Bangladesh, wide-ranging research has been executed to identify the actual situation of seeking ANC service. However, little focus has been given to identifying the factors behind the low level of 4+ ANC visits among rural women. The present study tried to identify the reasons behind the low 4+ ANC visits among the rural women of Bangladesh by using data from BDHS. The study found five factors positively linked with the utilisation of 4+ANC visits: birth order, women's age, women's education, pregnancy complication knowledge, and wealth. It was found that, as consistent with other studies, higher-order births decreased the likelihoods of 4+ ANC visits (Gabrysch & Campbell, 2009; Ghosh, Siddiqui, Barik, & Bhaumik, 2015; Ha, Tac, Duc, Duong, & Thi, 2015; Shahjahan et al., 2012). The study reconfirms that uptake of 4+ ANC visits was higher among educated women than their counterparts. This finding was in line with the results of different studies where it was shown that education of mother has a strong influence in up taking the 4+ ANC visits (Kishowar Hossain, 2010; Kumar, Rai, Singh, & Singh, 2013; Trinh, Dibley, & Byles, 2007). Another finding of the study was that pregnancy complication knowledge increases the utilisation of 4+ ANC visits among rural women. This finding echoes with the findings of other studies that highlighted that sufficient knowledge and advice regarding pregnancy complications increases the accessibility to 4+ ANC services (Gabrysch & Campbell, 2009; Ghosh et al., 2015; Gupta et al., 2014; Ha et al., 2015). The likelihood of 4+ ANC visits increases among the rural women with the economic status of the women, which corresponds with the results of other researches (Ghosh et al., 2015; Ha et al., 2015; Kishowar Hossain, 2010; Shahjahan et al., 2012). Surprisingly, working status at the individual level and media exposure at the household level were not significant in increasing the likelihood of 4+ ANC visits. This outcome was in line with the finding of other research (Ghosh et al., 2015). Finally, the religion of women and divisions were less likely to utilise 4+ ANC visits even after controlling for a number of confounding factors, confirming earlier findings (Obermeyer & Potter, 1991).

CONCLUSION

4+ANC visits were not satisfactory as they showed low coverage in rural areas of Bangladesh. The study confirms that a majority of pregnant rural women did not receive 4+ ANC visits as recommended by WHO. The inadequacy of 4+ ANC visits was related to education, pregnancy complication knowledge, birth order, and wealth. Despite having a number of programs and policies to increase the utilisation of ANC services is low in rural areas of Bangladesh. Therefore, the government needs to ensure the implementation of the policies and programs. More research needs to focus on the program implementations that will be identifying the causes behind the low 4+ ANC visits by rural women. The findings of this study will support the researchers, policymakers, and government of Bangladesh to formulate a plan and redesign the programs to increase 4+ ANC visits that will help reduce maternal mortality in Bangladesh. The limitation of the study was that the respondents and boundary of divisions were not the same across all waves of BDHS data.

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