

**Original Article****Relationship of Antenatal Care of the Pregnant Mothers with Birth Weight of the Newborn**Md. Golam Mostafa<sup>1</sup>, A.K.M. Enamul Haque<sup>2</sup>, M.M.H. Ansari<sup>3</sup>

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**Abstract**

**Introduction:** Birth weight is the single most important determinant of infant survival, healthy growth and development. Low Birth Weight babies carry relatively higher risk of perinatal and neonatal mortality and substandard growth and development subsequently.

**Methods:** This was a cross-sectional study carried out at Rajshahi Medical College Hospital for a period of one year to explore the relationship between the utilization of antenatal care (ANC) and the birth weight of the newborn. A total 301 pregnant mothers were selected purposively and data were collected with a pre- tested questionnaire.

**Results:** Among the respondents, 84.6% mother had received antenatal care. The prevalence of low birth weight (LBW) was 6.1% among the ANC recipient mothers and 43.9% were non ANC recipients. The association between birth weight and ANC was statistically significant [complete, incomplete or no antenatal care] [ $\chi^2 = 45.014$ ,  $p < 0.001$ ]. Most of the literate respondents (90.0%) received ANC. On the other hand majority of illiterate mothers (52.0%) did not receive ANC in last pregnancy. The relationship between education and ANC was statistically highly significant ( $P = 0.000$ ). About Thirty Nine percent respondents with gestational age  $\geq 37$  weeks and 61.1% women with gestational age less than 37 weeks had delivered LBW babies respectively. The association between the gestational age and birth weight was statistically highly significant.

**Conclusion:** The study revealed that ANC has remarkable influence on birth weight of the newborn. Pregnant mothers should be motivated to utilize ANC properly for the promotion of reproductive health and reduction of LBW incidence in the country.

**Key words:** ANC, Birth Weight, Gestational age

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## Introduction

According to UNICEF, about 18 million infants are born with low birth weight (LBW) globally every year. Morbidity and mortality rates among such neonates are very high.<sup>1</sup> Birth weight less than 2.5 kg (up to and including 2499 gm), the measurement being taken preferably within first hour of life, before significant weight loss has occurred is termed as LBW.<sup>2</sup> LBW is a major public reproductive health problem in many developing countries. It is around 20%-30 % or even higher as compared to 3% - 5% in developed country.<sup>3</sup>

ANC refers to the care of the women during pregnancy. Ideally mother should receive antenatal visit once a month for 7 months, twice a month during the next month; and thereafter, once a week, if everything is normal. A high proportion of mothers in Bangladesh are working women. In these case, minimum 3 visits -1<sup>st</sup> visit at 20 weeks, 2<sup>nd</sup> at 32 weeks and 3<sup>rd</sup> at 36 weeks are required.<sup>3-5</sup>

Maternal malnutrition, obstetric and medical complications, associated with pregnancy, heavy work during pregnancy, high parity and very close birth spacing, intrauterine infection, pregnancy in very young age, body built of

mother are regarded as maternal factor of LBW. A study in rural Bangladesh revealed that 24% babies were born with LBW and mean birth weight was 2961 g. It also showed that LBW was associated with mother's age, weight, parity, and Hb level, weight gain and health problems during pregnancy, tobacco consumption, and gestational age.<sup>4-14</sup>

Studies showed that mother's age, education, occupation, yearly income, gravid status, gestational age at first visit, number of antenatal care visit attended, quality of antenatal care received and pre-delivery body mass index had significantly associated with the incidence of LBW.<sup>5,10,12,14</sup> Oruamabo RS and John CT found that at birth, 8.9% of the singleton babies and 70% of those of multiple birth weighed less than 2500 g. Maternal factors significantly associated with increased incidence of LBW were antepartum haemorrhage, short stature, age and parity.<sup>6, 10</sup> A hospital based study in India revealed that proportion of LBW was 23.8%. Proportion of LBW was higher among babies born to mothers aged < 20 yrs of age (50.0%), poorly educated (32.6%), family income < Rs. 2000 per capita, (28.9%), poorly nourished with pre-pregnancy weight < 45 kg (50.0%), as compared to others. Primi mothers were comparatively at lower risk of delivering

LBW babies as compared to multi-gravida mothers. Low literacy level, low per capita income, birth order two and above and maternal age above 30 years were found to be significant risk factors of LBW.<sup>1,11</sup> A study in Rajshahi Medical college Hospital showed LBW is more prone to develop asphyxia, intracranial birth injury, infection and hypothermia. Death of LBW infants is 30 times more frequent than death of new born of normal birth weight.<sup>7</sup> In another study in a periurban setting in Bangladesh revealed that LBW is an important cause of perinatal, neonatal and post neonatal mortality and morbidity.<sup>7,8</sup> The present study was carried out to explore the utilization of antenatal care by the pregnant mothers delivered at Rajshahi Medical College Hospital and to observe the relationship between antenatal care and birth weight of the newborn.

### **Materials and methods**

This was a cross-sectional type of descriptive study carried out at Rajshahi Medical College Hospital for the period of one year. All the pregnant mothers admitted at Obstetric ward in Rajshahi Medical College Hospital (RMCH) constituted the study population for the present study. Mothers delivered baby in RMCH and birth weight of the newborn

recorded within first hour were included in the study. On the other hand, mothers with toxemia of pregnancy, suffering from medical problems and unconscious were excluded from the study. Purposive sampling technique was applied to select 301 mothers from the study population. Data were collected by face to face formal interview on socio-demographic, economic information as well as current pregnancy, Antenatal care with its different elements of the research participants using a pre-tested questionnaire. The aim and purpose of the study was explained to every participant before obtaining informed written consent. Thorough clinical examination of new born with prior permission of the mothers was carried out. The researcher himself measured the weight of the new born within 1<sup>st</sup> hour of life using Baby Weight Machine (Yamato, Manufactured by Japan). Hospital records such as patient's register, treatment files were reviewed to collect data for the present study. Document review for the current study was providing data to analyze and make internal comparison between study variables.

### **Results**

The results have been described in the following sections with tables.

**Table I: Socio-demographic characteristics of the study subjects (N= 301)**

Variable	N (%)	Mean±SD
<b>Age in years</b>		
<18	12(4.0)	23.34±4.71
18-23	164(54.5)	
24-29	83(27.6)	
30-35	38(12.6)	
>35	4(1.3)	
<b>Religion</b>		
Islam	284(94.4)	
Hinduism	17(5.6)	
<b>Education</b>		
Illiterate	25(8.3)	
Primary	72(23.9)	
High school	112(37.2)	
SSC and HSC	68(22.6)	
Graduate and above	24(8.0)	
<b>Occupation</b>		
House wife	291(96.7)	
Doing job outside	9(3.3)	
<b>Monthly family income(Taka)</b>		
Tk. ≤3000	67(22.3)	
Tk.3001- Tk. 4500	47(15.6)	
Tk.4501- Tk. 7500	94(31.2)	
Tk.7501- Tk. 10000	49(16.3)	
Tk. >10000	44(14.6)	
<b>Number of children in the family</b>		
1	175 (58.1)	
2	90(29.9)	
>2	36(12.0)	

The study revealed that 54.5% respondents were in the age group of 18-23 years. Respondents from extreme age group were few. The mean age of the respondents was 23.34 years and standard deviation  $\pm 4.71$ . Most of the respondents [284 (94.4%)] were Muslim. About education, 91.7% respondents were literate. Regarding monthly family income, 31.2% mothers had family income Taka (4501 – 7500) and 22.3% respondents had monthly income Taka 3000 and below. It was reported that majority of the respondents [175 (58.1%)] had one child and only 12.0% respondents had more than 2 children.

**Table II: ANC Status of the respondents in last pregnancy**

Antenatal care (ANC)	Frequency		
	N	%	
Not received ANC	41	13.6	
Received	Incomplete	53	17.6
	Complete	207	68.8
<b>Total</b>	301	100.0	

It was found that majority 207 (68.8%) received complete ANC and about 53 (18) % had incomplete ANC from health care facilities (Table II).

**Table III: Minimal pathological test during last pregnancy ANC visit (n = 260)**

Minimal pathological test		Frequency	
		N	%
Hb%	Done	209	80.4
	Not done	51	19.6
Urine test	Done	200	76.9
	Not done	60	23.1

It was revealed that most of the respondents 209 (80.4%) had estimated their Hb% and 76.9% had done their urine test during last pregnancy (Table III).

**Table IV: ANC advices received during last pregnancy (n = 260)**

ANC advices	Frequency	
	Received N (%)	Not received N (%)
Diet	248(95.4)	12(4.6)
Drugs	255(98.1)	5(1.9)
Family planning advice	104(40.0)	156(60.0)
Immunization(TT)	297(98.7)	4(1.3)
Personal hygiene	242(93.1)	18(6.9)

It was found that most of the respondents received advice about diet, drugs, immunization (TT) and personal hygiene (95.4%, 98.1%, 98.7% and 93.1% respectively) but family planning advice received only 104(40%) in the last pregnancy (Table IV).

**Table V: Birth weight of the new born.**

Birth weight		Frequency	
		N	Total (%)
Low birth wt.	< 2 Kg	10	<b>36(12.0)</b>
	2-<2.5 Kg	26	
	<b>Total</b>	<b>36</b>	
Normal birth weight	2.5-<3.00 Kg	77	<b>265(88.0)</b>
	3.0 - <3.5 Kg	125	
	3.5-<4.0 Kg	51	
	≥ 4.0 kg	12	
	<b>Total</b>	<b>265</b>	
<b>Total</b>		<b>301</b>	<b>301(100.0)</b>

Mean=2.95 Median=3.0 SD=0.517 Range=2.75

Table V shows that most of the women [265 (80.0%)] delivered normal birth weight baby and 12.0% mothers delivered LBW baby. The mean birth weight was 2.95 kg and standard deviation 0.517. Regarding the gestational age, majority of the mothers (66.1%) delivered at and beyond 37 weeks of gestation.

**Table VI: Relationship between birth weight and some selected variables**

Independent variable	Dependent variable		P value
	Birth weight		
Antenatal care (ANC)	Low birth weight (< 2.5 kg)	Normal birth weight (≥ 2.5 kg)	P =
	N (%)	N (%)	
No ANC	18(43.9)	23(56.1)	0.00
Received ANC	Incomplete (<3 visits)	10(18.9)	43(81.1)
	Complete (≥ 3 visits)	8(3.9)	199(96.1)
<b>Received advice on diet, n = 260</b>			
Received	16(6.5)	232(93.5)	P = 0.173
Not received	2(16.7)	10(83.3)	
<b>Received advice on drugs, n = 260</b>			
Received	17(6.7)	238(93.3)	P = 0.173
Not received	1	4(80.0)	
<b>Received advice on FP</b>			
Received	7(6.7)	97(93.3)	P > 0.05
Not received	11(7.1)	145(92.9)	
<b>TT immunization</b>			
Received	17(6.6)	242(93.4)	P = 0.000
Not received	1(100.0)	0(0.0)	
<b>Advice on personal hygiene</b>			
Received	16(6.6)	226(93.4)	P = 0.468
Not Received	2(11.1)	16(88.9)	
<b>Hb% estimation</b>			
Done	15(7.2)	194(92.8)	P > 0.05
Not done	3(5.9)	48(94.1)	

<b>Urine examination</b>			
Done	13(6.5)	187(93.5)	P > 0.05
Not done	5(8.3)	55(91.7)	
<b>Educational status</b>			
Illiterate	8(32.0)	17(68.0)	P = 0.001
Literate	28(10.1)	248(89.9)	
<b>Monthly income in Taka</b>			
< 4500	15(13.5)	96(86.5)	P = 0.526
≥ 4500	21(11.1)	169(88.9)	
<b>Gravid status</b>			
Primigravida	14(9.1)	140(90.9)	P = 0.116
Multigravida	22(15.0)	169(88.9)	
<b>Mother's gestational age</b>			
< 37 wks	22(61.1)	80(30.2)	P = 0.000
≥ 37 wks	14(38.9)	185(69.8)	

It was revealed that among the complete and incomplete ANC recipient mothers, 3.9% and 18.9% delivered LBW babies respectively. Among the ANC non recipient mothers, 43.9% had LBW. The prevalence of normal birth weight babies was higher among the mothers with complete ANC (96.1%) than that of mothers received incomplete ANC. The association between receive of ANC and birth weight of new born was highly significant statistically ( $\chi^2 = 45.014$ ,  $df = 2$ ,  $P = 0.000$ ) [Table-VI].

It was found that 6.5% women received advice on diet who delivered LBW babies while 16.7% mothers did not receive advice on diet delivered LBW babies. The relationship between birth weight and advice on diet was not significant statistically

( $\chi^2 = 1.854$ ,  $df = 1$ ,  $P = 0.173$ ). Among the TT vaccinated women, 6.6% of the new born had LBW and the association between TT vaccination and LBW was statistically highly significant ( $\chi^2 = 13.496$ ,  $df = 1$ ,  $P = 0.000$ ). The relationship between advice on personal hygiene and birth weight of new born was not significant statistically ( $\chi^2 = 0.526$ ,  $df = 1$ ,  $P = 0.468$ ).

The study showed that higher proportion (32.0%) of illiterate mothers delivered LBW than that of literate mothers (10.1%). The association between educational level and birth weight of the new born was statistically highly significant ( $\chi^2 = 10.399$ ,  $P = 0.001$ ,  $df = 1$ ). On the other hand the relationship between birth weight of the new born and monthly income was statistically not significant ( $\chi^2 = 0.403$ ,  $P = 0.526$ ,  $df = 1$ ). The proportion of multi gravida mothers (15.0%) was higher than that of primi mothers (9.1%) delivered LBW babies. The relationship between gravida and birth weight of the new born was statistically not significant ( $\chi^2 = 2.465$ ,  $P = 0.116$ ,  $df = 1$ ). About 61.0% of the respondents had LBW baby with gestation age below 37 weeks and 39.0% mothers delivered LBW baby with complete gestational age ( $\geq 37$  weeks). The association between gestational age and birth weight was statistically highly significant ( $\chi^2 = 28.211$ ,  $P = 0.000$ ,  $df = 2$ ).

## Discussion

Regarding age distribution, majority (54.5%) of the respondents was in the age group of 18-23 years. Mothers within 18-23 years was

higher because of women are more fertile in this age group in our country. Most of the respondents (94.4%) were Muslim that indicates the Muslims are predominant in Bangladesh population but the data are not consistent with religion distribution published by Bureau of statistics.<sup>16</sup> The monthly family income of the majority of the respondents (31.2%) was Taka 4501 - 7500. About 22.3% mothers had monthly income Taka 3000 and less. The mean monthly income was Taka 7623.26. The results showed that majority of the mothers belonged to low income family.

Most of the mothers (86.4%) received ANC in last pregnancy. But the result is not similar with other studies carried out by UNICEF.<sup>16</sup> It was due to people's awareness about the importance of antenatal care for safe delivery and healthy baby with optimum birth weight.

It is highly encouraging that most of the mothers (95.4%) received advice about diet from their ANC providers. A good proportion of pregnant women (60.0%) did not receive advice on FM methods during ANC visit. It indicates ANC providers are reluctant about giving advice on FM. Most of the respondents (98.7%) received TT vaccine which is quite satisfactory. Most of the new born (88.0%) had normal birth weight (2.5-4.0 kg) and about 12.0% babies had LBW. The prevalence

of LBW is low among the study mothers in comparison to other parts of the country. In Bangladesh the prevalence of LBW is 36%.<sup>14</sup> For the present study majority of the pregnant women received ANC which might help them to maintain optimum nutritional status. About 44.0% ANC non recipient mothers had LBW babies. The findings confirmed that birth weight and ANC status was statistically highly significant. The finding of the present study is in agreement with many similar studies in developing countries.<sup>5, 12, 13, 15</sup>

It was revealed that higher proportion of illiterate mothers (32.0 %) delivered LBW babies than that of literate mothers (10.1 %). The association between education and birth weight was statistically highly significant ( $P = 0.001$ ). The finding is consistent with others similar studies.<sup>1, 5, 13, 14</sup> About monthly family income has no significant relation with birth weight ( $P = 0.911$ ). These findings were not consistent with the other similar studies.<sup>1, 5, 13, 14</sup> The association between the gestational age and birth weight was statistically highly significant ( $P = 0.000$ ). Similar result also observed by Neeraj Agarwal et al and V.P.Reddiash et al at All India Institute of Medical Science , New Delhi.

## Conclusion

The study findings concluded that birth weight and ANC status was statistically significant. The existing MCH programme should be strengthened to cover all the pregnant women.

## Contribution of the authors

First author was the principle researcher. Second and third authors did the statistical analysis of the research.

## References

1. Sharma MK, Kumar D, Huria A, Gupta P. Maternal Risk Factors of Low Birth Weight in Chandigarh India. The Int. J. of Health. 2009; 9: 15.
2. Park K. Park's Textbook of preventive and social Medicine. 19<sup>th</sup> ed. Jabalpur India: M/S Banarsidas Bhanot; 2007: 426-27, 506.
3. Rashid KM, Rahman M, Haider S. Rashid, Khabir Haider's Textbook of community Medicine and public health, 4<sup>th</sup> ed. Bangladesh: RHM Publishers; 2004 :154.
4. Hosain GMM, Chatterjee N, Begum A, Saha SCS, Factors Associated with Low Birthweight in Rural Bangladesh. BML 2006; 52(2): 87-91.

5. Khatun S, Rahman M. ANC in Rural Bangladesh. *BMRC Bull.* 2008; 34(3): 81-86.
6. Oruamabo RS, John CT. Antenatal care and fetal outcome, especially low birth weight, in Port Harcourt, Nigeria. *Ann Trop Paediatr.* 1989; 9(3): 173-7.
7. Yasmin S, Osrin D, Paul E, Costello A, Neonatal mortality of low-birth-weight infants in Bangladesh. *Bull. WHO* 2001; 79: 608-614.
8. Blondel B, Dutilh P, Delour M, Uzan S. Antenatal care and pregnancy outcome. *Eur J Obstet Gynaecol Reprod Biol.* 1993; 50(3): 191-6.
9. Khalid A, Madani M, Hassan A, Nasrat S, Abdulrahman A, Al-Nowaisser, Khashoggi RH, Bahaa A. Low birth weight in the Taif region, Saudi Arabia *Med J.* 1996; 1(1): 13-19.
10. Negi KS, Kandpal SD, Kukreti M. Epidemiological Factors Affecting Low Birth Weight, *AJCN*, 2006; 8(1); 31-34.
11. Mavalankar DV, Gray RH, Trivedi CR. Risk Factors for Preterm and Term Low Birth weight in Ahmedabad, India. *Int. J Epidemiol.* 1992; 21(2):263-72.
12. Deswal DS, Singh JV, Kumar D. A study of risk factors for low birth weight. *IJCM* 1999; 24(3): 127-131.
13. Anand K, Garg BS. A study of factors affecting low birth weight. *Indian journal of community medicine*, 2006; 25(2): 264=269.
14. Salam AKMA, Haseen F, Yusuf HKM, Torlesse H. National Low Birth-weight Survey of Bangladesh, 2003-2004. [http://www.icddr.org/pub/publication.jsp?classification\\_ID=1and\\_pub\\_ID=6808](http://www.icddr.org/pub/publication.jsp?classification_ID=1and_pub_ID=6808) Accessed on March, 2014.
15. Agarwal N, Reddaish VP. Factors affecting birth weight in a sub-urban community: A study in secondary level hospital in Delhi. *Health and population – Perspectives and issues.* 2005; 28(4): 189 – 196.
16. The state of the world children (Special edition), United Nations Children’s Fund (UNICEF), November 2009.