

A Cross-Sectional Study on the Relationship of Antenatal Care and Birth Weight of the Baby at a Medical College and Hospital, In Kolkata

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Abstract:

Background-In the developing and under developed countries including in India, LBW which is one of the significant determinants of infant and childhood mortality and morbidity, is one of the major public health problem. Good Antenatal care is one of the important factors that drastically reduce LBW.

Objective -This study tried to focus the relationship between antenatal care and birthweight of the baby.

Methodology- An institution based descriptive cross sectional study conducted by interviewing & reviewing health records of the 317 mother accompanying with their baby selecting by systemic random sampling in immunization clinic at CNMC, Kolkata .The data compilation and analysis was done by IBM SPSS 19 version.

Result – The result shown that majority of study subjects were 20-29yrs age gr.(79.9%), Muslims(78.4%) , resided in urban area(90.9%), belonged to joint family(61.8%), educated up to middle school level(59.6%), lower socio economic strata(75.1%) as per Modified BG Prasad Scale 2017 and homemaker(97.9%) .From this study we found 41.6% mothers had low birth weight babies, 67.8% mothers had <4 antenatal visits, 5.3% mothers did not complete her immunization, 33.8% mothers had not increased diet in her antenatal period, 34.3% mothers taking insufficient rest at her antenatal period, 6.7% mothers had addicted to smoking 12.9% mothers done strenuous activity, 6.6% mothers had danger sign and 30.3% had some types of morbidity in her last antenatal period. The study showed that increased outcome of LBW baby among mother who had lesser ANC visit (Chi sq – difference - 10.0012, df-1, p-.00551), lesser birth spacing (Chi sq-58.45, df-1, p -0.00000), less no of IFA tab intake (Chi sq-30.04, df-1, p-.000000), less amount of food (Chi sq- 68.8, df-1 , p- 0.000000), strenuous activity (Chi sq -10.245 , df-1 , p-0.0014), less amount of rest during antenatal period (Chi sq-52.17, df -1, p -0.00000), had smoked at antenatal period (Chi sq -9.57 , df -1, p-0.002), had danger sign (Chi sq- 6.95, df -1, p-.008), had morbidity (Chi sq- 65.04, df-1, p- 0.00000), not immunized (Chi sq – 1.5, df-1, p- .22) and all difference were statistically significant except immunization status.

Conclusion – From this study we concluded that birth weight was low in case of mothers who had less or no antenatal check up, less rest, less nourishment, more strenuous activity, smoking during antenatal period, had danger signs & morbidity. So good antenatal care is required for minimized or reduced LBW babies and ultimately leads to major reduction of infant & childhood mortality & morbidity.

Key Words – LBW ,ANC , Danger sign .

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I. Introduction

In Indian subcontinent LBW is one of the major public health problem and is a significant determinant factor for infant and childhood morbidity and mortality. At present, globally 22 million or around 16% of the infants are LBW [According to United Nations Children's Emergency Fund, undernourishment in the womb can lead to diminished potential and predispose infants to early death, Oct 2014] and the level of low birth weight in the developing countries (16.5 per cent) is more than double the level in developed regions (7 per cent). More than 95 per cent of low birth weight babies are born in developing countries.^[1]

According to WHO, Low birth weight (LBW) is defined as weight at birth of baby less than 2500g (5.5 lb).^[2]

LBW proportionately increases the risk of mortality of baby. [3]

LBW is considered the single most important predictor of infant mortality, especially of deaths within the first month of life. There are lots of factors contributing to LBW both maternal and fetal.

Weight at birth is directly influenced by maternal factor including general level of health status of the mother, quality of ANC nutritional status & support .family support, educational & occupational status of mother and most of which are modifiable. A multi factorial inter-relationship exists between the environment in which pregnant mothers live and the growth of the fetus. [4]

Studies have found that LBW babies 20 times more susceptible to death in infancy than normal one [5] and survived one faces lots of morbidity problem in their lifetime. Henceforth health expenditure increases and also socioeconomic and disease burden increases in developing & under developed countries. [6][7]

So in the present context we try to find out the socio economic profile and association of quality of Antenatal Check up of with low birth weight of the babies of the mothers attending immunization clinics at Calcutta National Medical College & Hospital.

II. Methodology

The present hospital based cross-sectional observational study was conducted at an Immunization Clinic of Calcutta National Medical College & Hospital run by the Community Medicine Department from March 2018 to May 2018. In the immunization clinics on an average 60 to 70 mothers attend for their baby's immunization . We followed the systemic random sampling in the immunization clinics. On the basis of registration in the clinics randomly selected one number from first 6 no daily and then every 6th registered beneficiary was selected and data were collected from their mother who gave prior consent and satisfied the selection criteria . In any case 6th one not agreed/satisfied the criteria the next one selected .we used predesigned pretested semi structured schedule, health records (including Mother and Child Protection Card, available health records). Schedule was prepared with details of socio demographic profile, antenatal details including health status, nutritional details, anthropometrical details and same was pretested in the same clinics prior to original data collection was made. The permission was taken from respected superior authorities of the CNMC&H and Community Medicine Department. On every clinic day we collected data from about 10 respondents and in two months data collection period we successfully collected from 317 respondents. The data compilation and statistical analysis was done in SPSS 16. Distribution and chi Sq test was done to find out association and significance (hi sq value , df and p value) of statistical analysis .

A high proportion of mothers in India are from lower socio-economic group, and many of them are working women. Attendance at the antenatal clinic may mean loss of daily wages. Consequently, it is difficult for them to attend the antenatal clinic so often. A minimum of 4 visits covering the entire period of pregnancy should be the target. 2 doses of absorbed tetanus toxoid should be given, the first dose at 16-20 weeks and the second dose at 20-24 weeks of the pregnancy and in case more than second pregnancy onwards booster dosage of TT counted if last TT taken within 5yrs . [8] Under National Anaemia Prophylaxis Programme, every pregnant women is given a pack of 100 iron folic acid (IFA) tablets, during second trimester, each tablet containing 100mg of elemental iron and 500µg of folic acid, with an instruction to take one tablet a day, to prevent anaemia in every pregnant woman, which in turn prevents low birth weight newborn [9].

A balanced and adequate diet is of utmost importance during pregnancy and lactation to meet the increased needs of the mother to prevent nutritional stress. About 8 hours of sleep and at least 2 hours rest after mid-day meals should be advised. Smoking should be cut down to a minimum because smoking causes low birth weight to an increased risk of perinatal death of the infant. [8]

Proper antenatal and intranatal care according to the guidelines of Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A) can bring down LBW according to NFHS-3 data. [10]

In the present study following signs& symptoms i.e. excess vomiting, swelling of legs and face, bleeding pv, epigastric pain (upper abdominal pain), blurring of vision, excruciating headache were taken as danger sign and anaemia, hypertension, hepatitis B, syphilis, German measles, hypothyroid are considered as the morbidities. [8]

III. Results

The results of present study showing in table 1 , in which socio demographic profile distribution and in table 2 showing BW according to antenatal care and table3 showing the association between ANC and LBW and statistical analysis (Chi sq., df and p value)

Table: 1 Socio Demographic Profile of the study subjects

N= 317

Socio demographic Profile		Frequency	Percentage
Age(in yrs)	<20	29	9.1
	20-29	253	79.9
	≥30	35	11
	Total	317	100
Religion (H&O clubbed)	Hindu and Others	68	21.4
	Muslims	249	78.4
	Total	317	100
Residence	Rural	29	9.1
	Urban	288	90.9
	Total	317	100
Family Type	Nuclear	121	38.2
	Joint	196	61.8
	Total	317	100
Education	Illiterate	3	0.9
	Just Literate	38	12
	Primary	19	6
	Middle School	189	59.6
	Secondary	24	7.6
	Higher Secondary	18	5.7
	Graduate and above	26	8.2
SES	Total	317	100
	Class-I		
	Class-II	6	1.9
	Class-III	73	23
	Class-IV	157	49.5
	Class-V	81	25.6
Occupation	Total	317	100
	Homemaker	310	97.9
	Unskilled	4	1.2
	Skilled	3	0.9

From the Table 1, the present study shows that majority of study subjects(79.9%) were between age group of 20-29yrs, most of them(78.4%) were Muslims and resided in urban area(90.9%) . In our study we found 60.8% were belong to joint family and 12% just literate , 59.6% completed middle school and 8.2% graduate .Most of their socio economical status are in lower strata as per Modified B.G. Prasad scale2017 i.e. 49.5% in SES-IV and 25.6% in SES –V and 97.9% study subjects were home maker but 1.2 were unskilled worker .

The mean birth weight according to the present study is – 2.79 ± 0.3157 kg.

Table2: Distribution of LBW according different Ante natal cares

N=317

Variables		LBW		
		Normal Birth Weight (%)	Low Birth Weight (%)	Total (%)
ANC visits	<4	103(32.5)	112(35.3)	215(67.8)
	≥4	82(25.9)	20(6.3)	92(32.2)
	Total	185(58.4)	132(41.6)	317(100)
Gravida	Primi & 2 nd	113(35.6)	70(22.1)	183(57.7)
	Multi	72(22.8)	62(19.5)	134(42.3)
	Total	185(58.4)	132(41.6)	317(100)
Birth Spacing	<3yrs	49(15.5)	93(29.3)	142(44.8)
	≥3yrs	136(42.9)	39(12.3)	175(55.2)
	Total	185(58.4)	132(41.6)	317(100)
No of IFA tablet taken	<100	55(17.4)	80(25.2)	135(42.6)
	≥100	130(41)	52(16.4)	182(57.4)
	Total	185(58.4)	132(41.6)	317(100)
TT taken	Y	178(56.2)	122(38.5)	300(94.7)
	N	7(2.2)	10(3.1)	17(5.3)
	Total	185(58.4)	132(41.6)	317(100)
Diet	Increased	157(49.5)	53(16.7)	210(66.2)
	Not increased	28(8.9)	79(24.9)	107(33.8)
	Total	185(58.4)	132(41.6)	317(100)
Rest	Sufficient	152(48)	56(17.7)	208(65.7)

	Insufficient	33(10.4)	76(23.9)	109(34.3)
	Total	185(58.4)	132(41.6)	317(100)
Smoking	Yes	5(1.7)	16(5)	21(6.7)
	No	180(56.7)	116(36.6)	296(93.3)
	Total	185(58.4)	132(41.6)	317(100)
Activity	Normal	171(54)	105(33.1)	276(87.1)
	Strenuous	14(4.4)	27(8.5)	41(12.9)
	Total	185(58.4)	132(41.6)	317(100)
Danger Sign	Present	6(1.9)	15(4.7)	21(6.6)
	Absent	179(56.5)	117(36.9)	296(93.4)
	Total	185(58.4)	132(41.6)	317(100)
Morbidity	Present	23(7.3)	73(23)	96(30.3)
	Absent	162(51.1)	59(18.6)	221(69.7)
	Total	185(58.4)	132(41.6)	317(100)

From table no 2 of this study we found that 41.6% mothers had low birth weight babies, 67.8% mothers had <4 antenatal visits, 57.7% mothers were primi & 2ndgravida, 55.2% mothers had last birth spacing ≥ 3yrs, 5.3% mothers did not complete her immunization, 33.8% mothers had not increased diet in her antenatal period, 34.3% mothers taking insufficient rest at her antenatal period, 6.7% mothers had addicted to smoking, 12.9% mothers did strenuous activity, 6.6% mothers had danger signs during pregnancy and 30.3% had some types of morbidity in her last antenatal period.

Table: 3 Showing association between LBW and Antenatal care

N= 317

Variables		Normal Birth Weight (%)	Low Birth Weight (%)	Total	Chi-square statistic value	Df	p-value
ANC	<4	112(52.1)	103(47.9)	215	10.0012	1	.00551
	≥4	73(71.6)	29(28.4)	102			
Gravida	Primi & 2 nd	113(61.7)	70(38.3)	183	1.73	1	0.188
	Multi	72(53.7)	62(46.3)	134			
Birth Spacing	<3 yrs	49(34.5)	93(65.5)	142	58.45	1	0.000000
	≥3 yrs	136(77.7)	39(22.3)	175			
No of IFA tablet taken	<100	55(42.2)	80(57.8)	135	30.04	1	.000000
	≥100	130(71.4)	52(28.6)	182			
TT* taken	Yes	178(59.3)	122(40.7)	300	1.5	1	.22
	No	7(41.1)	10(58.9)	17			
Diet	Increased	157(74.8)	53(25.2)	210	68.88	1	.000000
	Not Increased	28(26.2)	79(73.8)	107			
Rest	Sufficient	152(73.1)	56(26.9)	208	52.17	1	.000000
	Insufficient	33(30.3)	76(69.7)	109			
Smoking	Yes	5(23.8)	16(76.2)	21	9.57	1	.002
	No	180(60.8)	116(39.2)	296			
Activity	Normal	171(62.0)	105(38.0)	276	10.245	1	.0014
	Strenuous	14(34.1)	27(65.9)	41			
Danger Sign	Present	6(28.6)	15(71.4)	21	6.95	1	.008
	Absent	179(60.5)	117(39.5)	296			
Morbidity	Present	23(24.0)	73(76.0)	96	65.04	1	.00000
	Absent	162(73.3)	59(26.7)	221			

*those who have taken both T₁ and T₂ / Booster dosage of TT(within 3 years from previous one).

From table3 , in the present study we found that there was all the antenatal care factor (i.e. no of ANC visit, IFA tab taking , rest during pregnancy , diet , smoking , activity , danger sign & morbidity) except antenatal immunization significantly associated with LBW .It was seen that there was more LBW babies among mothers who had less than 4 ANC visit than who visited 4 or more and these difference was statistically significant(Chi sq- difference- 10.0012 , df-1 , p-.00551).

The difference between mothers having Primi and 2nd gravida combined and multiple gravida was not found to be a significant predictor of low birth weight (Chi sq-1.73, df-1, p-.188).

The difference between mothers having birth spacing of <3years and ≥3 years was found to be a significant predictor of low birth weight (Chi sq-58.45, df-1, p-.00000).

Those mother who had taken less IFA tab (<100) were found to have more LBW babies than who consumed > 100 IFA Tab and this difference also statistically significant (Chi sq-30.04, df-1, p-.00000). The present study showed that there was more occurrence of LBW babies among mothers who did not received Inj TT than who received but this difference was not statistically significant (Chi sq – 1.5, df-1, p- .22) . This study also found that those mothers taking increased amount of food during their antenatal period had less number of

LBW babies and this difference also statistically highly significant (Chi sq- 59.67, df-1 , p- 0.000000). In the present study we found that mothers having sufficient time of rest during their antenatal period had less LBW babies than those who had not and these difference was statistically highly significant(Chi sq-52.17 , df -1, p - 0.00000) . We also found in this study that mothers who were exposed to or had smoking history , had more LBW babies than who had no such exposure or history and this difference was statistically significant (Chi sq - 9.57 , df -1, p-0.002) . Also, from the above table we found that mothers who history of regular strenuous activity had more LBW babies than those who had normal activity in their antenatal period and this difference was also statistically significant (Chi sq -10.245, df -1, p-0.0014) . Those mothers having danger signs during antenatal period had more LBW babies than who had not and this difference was statistically significant (Chi sq- 6.95, df -1, p-.008). Lastly, it was seen those mothers having history diseases like hypertension , hypothyroids , moderate to severe anaemia or other systemic diseases had more chance of LBW babies than those who had not and this difference was statistically highly significant (chi sq- 65.04, df-1 , p- 0.00000) .

IV. Discussion

The study was conducted on 317 women out of which majority (79.9%) belonged to the age group of 20 to 29 years and 11% study population were ≥ 30 yrs and this is close to PJ Patel et al study done at Mumbai where 30yrs above study population was 11%^[11] . 78.4% of the overall study population comprised of Muslims. Also, majority of the study population composed of urban dwelling women (90.9%) and about 62% of the women belonged to joint families. In the present study 73.6% study population had education level upto secondary level and 12.9% were illiterate & just literate and in a study done by PJ Patel et al at Mumbai , 67.8% and 26.2% study population were educated upto secondary level & illiterate respectively^[11] . In the present study we found that 25.6% , 49.5% & 23% study population were lower ,upper lower & middle socio economic grs respectively and in a study done by PJ Patel et al at Mumbai found 47%, 41.6% & 11.4% study population were lower ,upper lower & middle income groups^[11] .In the present study it was seen 97.9% were homemaker but PJ Patel et al at Mumbai found 73.2% were homemaker & rest were working as daily wagers or as govt servant^[11] .

The present study showed 32.2% mother had 4 or more ANC checkup which was below average than India (56%), Pakistan(53%), Indonesia (77%), Philippines (69%)^[12]but same as the study done by MdShahab Uddin Howlader et al (33.8%)^[13]in Dhaka, Bangladesh on January 2014 to Dec'2016 and more than average of Bangladesh(21%) , as found out by another study by Shahjahan et al (14.2%).^[14]

In the present study we found 94.7% mother immunized with TT closely related to the finding of study in Bangladesh done by Md ShahabUddin Howlader and Md Sabir Hossain (89.6%)^[13]at 2014 -2016 and in India done by Jalina L. et al 2013^[15] but higher than average of Nepal (63%).^[16]

The mean birth weight of the infants attending the immunization clinic was found to be 2.79 \pm 0.3157 kg. This finding resonated with other researches done by Howlader et al.^[12]where the mean birth weight was 2.759 \pm 0.067 kg,Manoj Kumar et al. ^[17], who found the mean birth weight of the infants as 2825.26 \pm 517.908 gms.Megha Sharma et al.^[18](mean birth weight =2.463kgs.), andPriti J. Patale et al.^[11] (mean birth weight =2.463kgs.)also found similar results.

Occurrence of low birth weight babies was influenced by various aspects of antenatal care in this study. According to the present study the difference in frequency of antenatal checkups by the pregnant women was a highly significant reason resulting in the occurrence of low birth weight; those who had more antenatal checkups were less prone to delivering low birth weight babies. Same results were found in two other researches. Rout A.J *et al.*^[19] conducted a study conducted in Kishanganj, Bihar where they had similar findings. Howladeret al.^[13]conducted a similar study in Dhaka city, Bangladesh and came up with the same results. However, a study led by Moorhiet al.^[20]did not find this factor to be statistically significant in resulting to low birth weight.

The number of iron and folic acid tablets intakeby mothers during pregnancy was also a significant factor of low birth weight. Among those who took the course of 100 IFA tablets, 28.6% of the women gave birth to low birth weight babies as opposed to those who did not take the course 57.8% of them gave birth to such babies. This result is supported by similar findings done by Rout A.J *et al.*findings^[19], Howladeret al.^[13], and also by Uche C. Isiugo-Abaniheet al. in Ibadan, Nigeria. ^[21]

Thirdly, the receival of tetanus toxoid versus the non-receival, though causes a difference in the proportion of occurrence of low birth weight cases in this study, this factor was not found to be a statistically significant one. Among those who had taken TT, 40.7% of the women had low birth weight babies whereas among those who had not taken TT, 58.9% of the women gave birth to such babies.

Diet, rest, smoking and danger signs were also significant indicators of low birth weight occurrence and all these factors were supported by the previously mentioned study of Rout A.J *et al.*^[19] in a study conducted on the women of Kishanganj, Bihar. This implied that based on the present study, proper dietary intake, sufficient rest, abstinence from smoking or using tobacco products as well as a healthy pregnancy

without any indicator of danger signs all lead to significantly lower occurrence of low birth weight among babies.

Lastly, the presence of any morbidity factors during pregnancy and also the working activity of the pregnant women i.e. strenuous versus normal working activity are both quite significant factors which result to low birth weight.

V. Conclusion

From this study we conclude that poor antenatal care is one of the major cause of low birth weight baby. If antenatal care improves there is significant chance in the improvement of birth weight. Henceforth it will improve the morbidity and mortality of infant and child and in overall reduce significant disease burden and financial expenditure of the society.

CONFLICT OF INTEREST – There is no conflict of interest.

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