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Study of Associated Factors to Low Birth Weight, Preterm Birth and Registration to Delivery Care System

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Abstract: ***Introduction: Globally LBW is a major challenge to the survival of new born. In India, LBW babies are nearly 30% of which more than 80% die during neonate period. LBW is the major obstacle to achieve the MDG-4 target. The major cause of LBW identified is preterm and IUGR babies which can be reduced through appropriate antenatal care. The present analysis assessed the quantum of LBW, preterm babies and unregistered mothers along with their associated characteristics. Material and methods: The data relates to mothers attending SS hospital, a tertiary care hospital of eastern UP during April - June, 2017. Characteristics recorded were age, parity, abortion history, registration status, gestational age, mode of delivery, sex of born and birth weight. Out of a total of 507 new born, the analysis was subjected to only 467 mothers by including singleton births and recorded characteristics. Statistical Analysis: Uni-variate and multiple logistic regression analysis were performed. The statistical significance was judged at α = 5%. Observation and results: Nearly one third (32.8%) babies were LBW, 29.8% preterm and 28.3% unregistered. Only gestational age was found an independent significant predictor of LBW; the likelihood of LBW was 6.83 times higher if the birth was preterm than full term. Independent significant predictors of preterm babies were non-registration, parity and previous history of abortion; while for non-registration predictors identified were parity and previous abortion history. Conclusion: To reduce the problem of LBW, mothers especially of higher order should be advised for the registration of pregnancy to their nearest health care system for monitoring and interventions.***

Keywords: Low Birth Weight, Preterm, Full Term, Abortion, Antenatal Care

1. Introduction

As per Million Development Goal-4, India had to achieve IMR to the level of 27 per 1000 live births by 2015.[1] But far from the target as by the end of 2016 it was 36.[2] The main reason behind is consistently slower reduction of neonatal mortality rate (NMR). It has been reported that LBW neonates "a born with less than 2500 gm" have more than 20 times risk of death than normal birth weight born.[3, 4] India, with nearly 30% (7.5 million) LBW babies accounts more than two fifth (42%) of the global burden of which 60% are term with foetal growth restriction and 40% are preterm. Indeed, >80% of total neonatal deaths occur among LBW/preterm neonates.[5, 6] As per SRS 2013 report, nearly 0.75 million neonates died (28/1000 live births) in India which is the highest in the world. Out of all infants dying before completing 29 days of life, 48.1% suffered from LBW and premature birth.[7] though, weighing in low and middle income countries including India is grossly deficient mainly, but of those weighted nearly thirty percent (28%) are LBW. The major cause of LBW has been identified as the preterm delivery which was estimated 15 million across the world each year and India with 3.5 million preterm babies is on the top followed by 1.17 million in China and 0.77 million in Nigeria.[8,9]

It has been pointed out that the risk of death of LBW baby's is 11-13 folds than normal birth weight (NBW). [10, 11] National health policy (2017) indicated to reduce IMR to 28 by 2019 and to 16 by 2025, hence if the target has to be achieved, the burden of low birth weight for which main culprits are the IUGR and preterm should be on the target. In India, still ANC services is being availed not by all or if availed not fully what so ever is the reason and such mothers are likely to increase the magnitude of low birth weight babies and many are also to face pregnancy related complications during the time of delivery which may cause maternal deaths. Such complicated cases, once unmanageable are referred to speciality hospitals. The present analysis was carried with the aim to assess the quantum of LBW and preterm babies and status of registration as well along with their associated characteristics attending SS hospital which is a tertiary care hospital of eastern UP.

2. Material and Methods

The data was gathered from the record of delivery register corresponding to the month of April - June of the recent year 2017. The characteristics on record were age of the mother, parity, history of abortion preceding the present delivery, status of registration to health care agency, gestational age, mode of delivery, sex of born and birth weight (gm). Out of total 507 new born, 14 were twins, 11 were not recorded of birth weight and 15 were unrecorded for any other variables. Thus, analysis was subjected only to 467 mothers giving singleton births. The analysis was to be performed on categorical data, hence quantitative variables e.g. age was categorized as < 20 years, 20-35 years and ≥ 35 years; parity as primi, 2-3 and ≥ 4; gestational age as preterm if delivered below 37 weeks and full term if ≥ 37 weeks; and the birth weight < 2500 gm (low birth weight) and ≥ 2500 gm (normal birth weight). Initially, the data was presented in

proportions for each of the variables as the background. The three outcome variables e.g. low birth weight, preterm birth and non-registration to health care delivery system were considered as the outcome variables in the present analysis.

Statistical Analysis:
Uni-variable logistic regression analysis followed by multiple logistic regression analysis was performed to identify the significant predictors and to assess their strength of association. The statistical significance was judged at 5% level of significance.

3. Observation and Results

Out of 467 mothers and new born of whom all the information was recorded, 71.7% mothers were registered and rest 28.3% were unregistered. Mostly (88.0%) were of age group 20-35 years, while 4.7% and 7.3% were also of age group < 20 years and ≥ 35 years. Nearly three fourth of the mothers (72.6%) were either of 2nd or 3rd parity; while 12.8% and 14.6% were Primi and of parity ≥ were 4 respectively; nearly quarter of the mothers had abortion history in the past. Out of all deliveries, 29.8% were preterm and 43.0% were LSCS. Sex ratio at birth was nearly half and half; and substantial proportion of new born babies (32.8%) was under weight i.e. less than 2500 gm (Table-1)

Table-2 indicates the magnitude of LBW by the characteristics of mothers and new born e.g. registration status, age and parity of mother, previous history of abortion, mode of delivery and sex of new born. Univariate logistic regression analysis indicated that out of all considered predictors of low birth weight, only registration status during pregnancy and gestational age emerged as the significant predictors and the strength of association to LBW was predominated by gestational age. But in multiple logistic regression analysis only gestational age was found to be significantly associated with LBW; not the registration status. The adjusted risk of LBW was 6.83 times (95% CI: 4.35 – 10.72) higher if the birth was preterm compared to the full term babies.

For, preterm babies, identified associated predictors in univariate logistic regression analysis were only registration status and parity; but in multiple logistic regression analysis, in addition to registration status and parity, previous history of abortion also emerged as the significant predictor of preterm babies. The adjusted risk of preterm birth was 2.55 times (95% CI: 1.39 – 4.69) higher if mother was not registered compared to those who were registered. Further, compared to mothers of 4th and higher order parity, the risk of preterm was lesser by about 80% (AOR = 0.19; 95% CI: 0.07 – 0.47) and by about 50% (AOR = 0.52; 95% CI: 0.29 – 0.94). The risk of preterm birth was also lesser by half (AOR = 0.51: 95% CI: 0.26 – 0.98) among mothers who had past history of abortion than those who had not (Table-3)

Table-4 identified parity and previous history of abortion as the associated characteristics in both univariate as well as in multiple logistic regressions. Compared to mothers of parity 4th and higher order, the likelihood of no registration during pregnancy was lesser by 65% (AOR = 0.35; 95% CI: 0.16 – 0.76) if the parity was 2nd or 3rd, while statistically almost similar if the mothers were primi. The likelihood of no registration was 35.35 times higher if the woman had past history of abortion than those who had not.

4. Discussion

Infant mortality is a major challenge to almost all of the developing nations; higher IMR leads to continuum of reproduction to replace the loss of child and consequently resulting to poor health of mothers as well as new born. As per MDG-4, India with very high IMR (80/1000 live births during nineties) had to reduce it to the level of 27 by the year 2015. [1] Continued efforts, though made by government of India to strengthen ANC program but the achievement of goal remained far away from the target and by the end of 2016 it was 36/1000 live births. [2] The main identified reason behind was consistently slower reduction of neonatal mortality rate (NMR) which was in fact due to consistently no change in the proportion of LBW born who are more than 20 times at higher risk of death compared to normal birth weight born. [3, 4] India, with nearly 30% (7.5 million) LBW births accounts more than two fifth (42%) of the global burden of which 60% are term with foetal growth restriction and 40% are preterm. Indeed, >80% of total neonatal deaths occur among LBW/preterm neonates. [5, 6] out of 15 million preterm babies each year across the world India is on the top with 3.5 million preterm babies followed by 1.17 million in China. [8, 9] In India, still ANC services are either not availed or poorly availed and are then likely to give birth to LBW babies which may be preterm and with pregnancy related complications. Once the complication arises, mostly attend the nursing homes or nursing institutions. But if more complicated, these are referred to tertiary care hospitals. The present data set indicated that nearly one third (32.8%) born babies were under weight i.e. less than 2500 gm, 29.8% were preterm and 28.3% mothers were unregistered. About one in 10 (12.0%) were high risk pregnancy i.e. among age < 20 years and ≥ 35 years. In univariate logistic regression analysis, though status of registration for the present pregnancy and gestational age were significantly associated with LBW; but in multiple logistic regression analysis only gestational age emerged as the significant predictor of LBW, not the registration status. The likelihood of LBW was 6.83 times (95% CI: 4.35 – 10.72) higher if the birth was below 37 weeks i.e. preterm compared to the full term babies. Significantly associated predictors of preterm were status of registration and parity in univariate logistic regression analysis; while in multiple logistic regression analysis, in addition to status of registration and parity, previous history of abortion also emerged as the significant predictor of preterm birth. The likelihood of preterm babies was 2.55 times higher among unregistered mothers compared to registered mothers; while lesser by about 80% (AOR = 0.19) and 50% (AOR = 0.52) if the mothers were of primi and 2nd or 3rd parity respectively compared to mothers of 4th and higher order parity. The likelihood of preterm babies was also lesser by half (AOR = 0.51) among mothers who had past history of abortion than those who had not. Women of 2nd or 3rd parity were less likely to be not registered (AOR = 0.35) compared to 4th & higher order, while primi mothers were almost similar to those of 4th & higher order. But, the likelihood of non registration during pregnancy was 35.35 times higher if the

woman had experienced any previous history of abortion than those who had not. In fact mothers having history of abortions are of higher age and parity and of low socio economic profile that is least cared of pregnancy outcome.

5. Conclusion

To reduce the problem of LBW, mothers especially of higher order need to be advised for the registration of pregnancy to their nearest health care system for monitoring and intervention if required.

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Table 1: Recorded characteristics of mothers and new born

Characteristics	No. (467)	%	Characteristics	No. (467)	%
Registration			Gestational age		
No	132	28.3	Pre term	139	29.8
Yes	335	71.7	Full term	328	70.2
Age (yrs.)			Mode of delivery		
< 20	22	4.7	LSCS	266	57.0
20-35	411	88.0	SVD	201	43.0
≥35	34	7.3			
Parity			Sex of born		
Primi	60	12.8	Male	229	49.0
2-3	339	72.6	Female	238	51.0
≥ 4	68	14.6			
Abortion history			Birth weight (gm)		
Yes	111	23.8	< 2500	153	32.8
No	356	76.2	≥ 2500	314	67.2

Table 2: Associated characteristics with LBW: Result of uni-variable and multiple logistic regression analysis

Characteristics	No. of women	% with LBW	COR	P value	95% CI	AOR	P value	95% CI
Registration								
No	132	40.2	1.58	0.033	1.04 – 2.40	1.47	0.228	0.79 – 2.75
Yes	335	29.9	1.00			1.00		
Age (yrs.)								
< 20	22	27.3	0.61	0.399	0.19 – 1.94	0.56	0.377	0.15 – 2.04
20-35	411	32.6	0.78	0.503	0.38 – 1.61	0.80	0.601	0.36 – 1.82
≥ 35	34	38.2	1.00			1.00		
Parity								
Primi	60	26.7	0.55	0.121	0.26 – 1.17	0.97	0.952	0.39 – 2.42
2-3	339	32.4	0.73	0.249	0.43 – 1.25	1.07	0.832	0.56 – 2.04
≥ 4	68	39.7	1.00			1.00		
Abortion history								
Yes	111	35.1	1.15	0.542	0.73 – 1.80	0.79	0.510	0.40 – 1.58
No	356	32.0	1.00			1.00		
Gestational age								
Pre term	139	63.3	6.98	0.000	4.50 – 10.83	6.83	.000	4.35 – 10.72
Full term	328	19.8	1.00			1.00		
Mode of delivery								
LSCS	266	33.8	1.12	0.570	0.76 – 1.66	1.18	0.456	0.76 – 1.84
SVD	201	31.3	1.00			1.00		
Sex of born								
Male	229	31.5	1.12	0.558	0.76 – 1.65	1.08	0.729	0.70 – 1.67
Female	238	34.1	1.00			1.00		

Table 3: Associated characteristics with PTB: Result of uni-variable and multi-variable logistic regression analysis

Characteristics	No. of women	% Pre term	COR	P value	95% CI	AOR	P value	95% CI
Registration								
No	132	39.4	1.85	0.005	1.21 – 2.84	2.55	0.002	1.39 – 4.69
Yes	335	26.0	1.00			1.00		
Age (yrs.)								
< 20	22	31.8	0.98	0.967	0.31 – 3.08	1.28	0.681	0.39 – 4.21
20-35	411	29.4	0.87	0.721	0.41 – 1.85	1.16	0.711	0.53 – 2.56
≥ 35	34	32.4	1.00			1.00		
Parity								
Primi	60	16.7	0.24	0.001	0.10 – 0.55	0.19	0.000	0.07 – 0.47
2-3	339	28.9	0.49	0.008	0.29 – 0.83	0.52	0.030	0.29 – 0.94
≥ 4	68	45.6	1.00			1.00		
Abortion history								

Yes No	111 356	34.2 28.4	1.31 1.00	0.239	0.83 – 2.07	0.51 1.00	0.044	0.26 – 0.98
Mode of delivery								
LSCS SVD	266 201	28.9 30.8	0.91 1.00	0.657	0.61 – 1.36	0.90 1.00	0.617	0.59 – 1.36
Sex of born								
Male Female	229 238	28.2 31.4	1.17 1.00	0.437	0.79 – 1.74	1.12 1.00	0.586	0.74 – 1.69

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Table 4: Associated characteristics with non-registration: Result of uni-variable and multi-variable logistic regression analysis

Characteristics	No. of women	% not registered	COR	P value	95% CI	AOR	P value	95% CI
Age (yrs.)								
< 20 20-35 ≥ 35	22 411 34	31.8 28.0 29.4	1.12 0.93 1.00	0.848 0.858	0.35 – 3.58 0.43 – 2.01	1.16 0.76 1.00	0.850 0.623	0.24 – 5.64 0.26 – 2.26
Parity								
Primi 2-3 ≥ 4	60 339 68	33.3 21.5 57.4	0.37 0.20 1.00	0.007 0.000	0.18 – 0.76 0.12 – 0.35	0.37 0.35 1.00	0.076 0.008	0.92 – 6.14 0.16 – 0.76
Abortion history								
Yes No	111 356	78.4 12.0	25.05 1.00	0.000	14.46 – 43.4	35.37 1.00	0.000	18.88 –66.24
Sex of born								
Male Female	229 238	30.1 26.5	1.19 1.00	0.380	0.80 – 1.79	1.27 1.00	0.385	0.74 – 2.20

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