Original article

Effect of different maternal factors on birth weight in the Odhav ward of Ahmedabad Municipal Corporation – A Case Control Study

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Abstract

Aims and objectives: To study the effect of various maternal risk factors associated with outcome of LBW

Study Design: Case control study

Methodology: The case-control study was conducted in the Odhav ward of Ahmedabad Municipal Corporation area with the purposive selection of 200 Low Birth Weight (LBW) babies and age and sex matched 200 Normal Birth Weight (NBW) babies from the link workers' served area. Data regarding various maternal and socio-cultural factors were collected by interviewing the mothers and analysed with appropriate statistics.

Results: Average birth weight of the study population was 2.52 ± 0.53 Kg which was slightly higher for male babies than female. Literacy of mother was associated with beneficial effect with the higher birth weight of new born babies. Laborers' occupation had a negative effect on the birth weight as compared to housewives and service class women. Maternal age with less than 25 and more than 30 years had higher proportions of low birth weight babies (63.5%) as compared to normal birth weight babies (56.5%). The birth interval and previous child's birth weight were significantly associated with birth weight of the new born.

Conclusion: Laborer as maternal occupation had significant adverse impact on birth weight and it needs to be targeted for intervention. Improving institutional delivery, higher maternal education and adoption of temporary family planning practices for regulating fertility might improve the birth weight of new born babies.

Key words: low birth weight, maternal occupation, literacy, pre-term

Introduction:

The World Health Organization has defined the term "Low birth weight" as birth weight less than 2500 grams irrespective of the duration of the gestational period.[1,2,3,4] Birth weight (BW) is the single most important criterion for determining the neonatal and infant morbidity and mortality. Low Birth Weight (LBW) is a sensitive indicator of the socio-economic conditions and indirectly measures the health of the mother and the child. Incidence of LBW in India in the year 2008 was 30%.[5] Several studies present a detailed account of factors associated with LBW.[6,7,8,9] Number of factors like maternal, socio-environmental and genetic factors is responsible for the normal health, development and survival of children.[10] During past decade, several interventional programmes including Reproductive and Child Health have been launched all over India to improve the health status of mothers and children.

The study was aimed to find out the effect of various maternal risk factors on the birth weight with the objectives: (1) to study the effect of various factors associated with outcome of LBW and (2) to study which one of the various factors had maximum impact on LBW.

Methodology:

Study design: Case Control Study

Study area: Area served under the link worker of Odhav ward UHC of Ahmedabad Municipal Corporation.

Sampling technique: Purposive sampling

Sample size: By selecting 200 LBW and age and sex matched 200 NBW children born during the period of 1st August 2008 to 31st July 2010 whose birth weight records were available with link workers of the ward.

- Case - Low birth weight (LBW): According to the WHO definition, infants with birth weight less than 2500 gm are low birth weight irrespective of age of gestation.[1]
- Control - Normal birth weight (NBW): Infant birth weight ≥ 2500 gm.[1]
- Case : Control = 1:1 age and sex matched
- Exclusion Criteria (Both for Case and Control): Mothers who did not give consent, babies whose birth record was not available, mother was not available for giving information.

Study period: August 2010 to November 2010

Study Method: Verbal consent was obtained from each mother recruited for this study. A personal interview was carried out with the predesigned questionnaire. Information regarding the maternal factors like maternal age, parity, spacing between pregnancies and birth history like place of delivery, gestational age at delivery and type of delivery was obtained. Also, factors like maternal education and her occupation was noted. Information regarding birth weight was obtained from the available birth records. Data was compiled and analysis was done using computer. Epidemiological and statistical parameters were computed. Multivariate analysis was done adjusting for the effect of maternal age, maternal occupation, education and gestational age at delivery.

Results and discussion:

The study was carried out in the underprivileged area of the Odhav ward. It was the Hindu dominant area, with most of the families residing in one hall kitchen homes or chawls. (Low socio-economic class) Total 400 children below 2 years of age were included in the study; around 30% were between the age group 12 and 18 months. The mean age of LBW babies was 12.4 ± 6.7 months and of NBW babies was 11.6 ± 7.3 months. The difference in age was statistically not significant. In the study, 212(53%) were female children. Average birth weight among the LBW babies was 2.09 ± 0.3 Kg, whereas among the NBW babies it was 2.95 ± 0.32 Kg. Out of total 400 deliveries, 20% were caesarean delivery.

It was observed that 42.25% mothers were illiterate. In LBW cases, 47% mothers were illiterate while in NBW cases, 38% mothers were illiterate, literacy was not significantly associated with LBW (Table 1) (χ^2=2.96, df 1, P= 0.08). Mondal B et el[11] and Anand Kiran et el[12] also found the similar result. Multivariate analysis showed the value of odds ratio 1.6 for illiteracy which indicates that the maternal illiteracy had negative effect on birth weight of baby.

Out of 30 laborer mothers, 90% delivered LBW babies while 10% delivered NBW babies (Table 1). It is not the working status of mother which affects the birth weight (χ^2=0.73, df 1, P>0.05), but type of maternal occupation had significant effect on the birth weight (χ^2=30.18, df 2, P <0.0001). Odds ratio for occupation shows that as compared to housewives, mothers who were involved in the service had much lower risk (Odds ratio 0.2) of having LBW whereas laborer mothers had 10.6 times higher risk of having LBW baby.

Literacy and type of occupation had synergistic effect on birth weight of baby (Table 2). In this study, literacy had some favorable impact on the birth weight of baby as all (100%) illiterate laborer mothers had LBW babies as compared to 85% of literate laborers, whereas 66.7% illiterate but servicing mothers had LBW as compared to only 12% LBW deliveries among literate and servicing mothers.

In our study the range of maternal age was 20 years lo west to 40 years highest.

Table 1: Relationship of various maternal factors with birth weight

Maternal Factors	LBW	NBW		Confidence Interval	
	N=200 (%)	N=200 (%)	OR	Lower	Upper
Maternal Education					
Illiterate	93 (46.5)	76 (38.0)	1.42	0.95	2.11
Literate	107 (53.5)	124 (62.0)			
Maternal Occupation					
Housewife	168 (84.0)	174 (87.0)	1	-	-
Labour	27 (13.5)	3 (1.5)	0.11	0.03	0.36
Service	5 (2.5)	23 (11.5)	4.44	1.65	11.96
Maternal age(Years)					
<25	85 (42.5)	75 (37.5)	1	-	-
25-29	73 (36.5)	87 (43.5)	1.35	0.87	2.1
>30	42 (21.0)	38 (19.0)	1.03	0.6	1.76
Gestational age at delivery					
>=37 weeks (Full Term)	184 (92.0)	196 (98.0)	0.23	0.08	0.72
< 37 weeks (Preterm)	16 (8.0)	4 (2.0)			
Place of delivery					
Hospital delivery	156 (78.0)	175 (87.5)	0.51	0.29	0.87
Home delivery	44 (22.0)	25 (12.5)			
Previous siblings Birth Weight*					
Low	28 (25.5)	17 (14.7)	1.99	1.02	3.89
Normal	82 (74.5)	99 (85.3)			

* Only 226 children were having siblings

Table 2: Association of Occupational categories and Literacy of mother with LBW babies

Occupation	**Literate**	**Illiterate**
Labourer	85.0%	100.0%
Service	12%	66.7%
Housewife	45.7%	53.2%

Table 3: Multivariate analysis with the impact of the variable on birth weight

Variable	Wald Test	df	Significance	Odds ratio (OR)	95% C.I. for OR	
					Lower	Upper
Maternal age <25 Years	3.456	2	0.178	Ref.*		
Maternal age 25-29 years	3.269	1	0.071	0.648	0.405	1.037
Maternal age ≥30 years	0.089	1	0.765	0.915	0.511	1.638
Education - Illiterate	4.102	1	0.043	1.567	1.015	2.421
Occupation – Housewife	22.733	2	.0000116	Ref.*		
Occupation – Labourer	14.289	1	.0001568	10.557	3.111	35.832
Occupation – Service class	7.406	1	0.006	0.242	0.087	0.672
Gestational age - Pre term	8.548	1	0.003	5.489	1.753	17.189

*Ref. – Reference value

proportion of LBW was lowest (21.0%) among the maternal age group >30 years as compared to age groups <25 years (36.5%) and 25-29 years (42.5%) (Table 1). Anand and Garg et el[12] (2000) found no significant relationship between maternal age and LBW. To study effect of maternal age on birth weight, cases and controls were classified into three groups as per maternal age - <25 years, 25-29 years and > 30 years. Babies of mothers with age <25 years were compared with other 2 groups by multivariate analysis (Table 3). Results indicate that maternal age group 25 – 29 years had protective effect on birth weight (Odds ratio 0.6) while maternal age > 30 years (Odds ratio 0.92) had almost equal risk as <25 years maternal age (Odds ratio 1).

Hospital delivery in either government or private hospitals constitutes about 82.75% of total deliveries. Those who had delivered at home had 63.8% of LBW babies as compared to 47.2% LBW babies who had delivered in the hospital. As per interview with trained birth attendants, it is their practice to refer the pregnant women to nearby hospitals for delivery if they found some higher weight gain during pregnancy as well as if they predict any complication at the time of labor. When comparison of LBW babies was done with gestational age at delivery, preterm deliveries (<37 weeks) accounted for 80% as compared to 48.4% in the full term deliveries (Table 1). Place of delivery (χ^2=9.885, df 1, P value 0.007) and gestational age at delivery (χ^2= 6.37, df 1, P value 0.01) was found to be significantly associated with birth weight of new born. Impact of preterm delivery as a single risk factor was 2nd highest in LBW babies (Odds Ratio 5.5) as compared to all other maternal factors (Table 3). Risk for LBW babies was more when illiterate mothers had preterm deliveries as none of the illiterate mother had preterm NBW babies against 20% NBW preterm deliveries by literate mothers.

As the 174 mothers in the study population were primipara, only 226 mothers were considered for study the effect of birth spacing and the previous history of low birth weight baby. Out of 226 mothers, 37.5% had LBW deliveries with average birth spacing less than three years as compared to 56% among those having the birth spacing more than 3 years. The birth interval was found significantly associated with birth weight (χ^2=7.2, df 1, P value 0.007). These findings were supported by Deswal et al[9] and Mavalankar et al.[13]

Out of total 45 mothers who had LBW babies in the previous pregnancy, 62.2% (n=28) had LBW babies currently included in the study. The recurrence of LBW was higher for those having history of previous LBW siblings, which was statistically significant with χ^2 value 4.13 and P value 0.042. Idris et al[14] (2000) studied a total 259 mothers who had previous adverse obstetric history and 44.40% of them had LBW deliveries.

Conclusion:

As a single risk factor maternal occupation laborer, had the highest adverse impact on the birth weight of a baby followed by preterm delivery and was statistically significant. In this study maternal age <25 years, > 30 years and illiteracy were also found as major risk factors responsible for LBW babies. This study indicates that improving female literacy, avoiding close birth interval are essential measures for reducing the prevalence of LBW babies. Government's efforts are ongoing to improve literacy, optimize the age of pregnancy and improvement of antenatal care to decrease preterm delivery. But there is a need for targeted intervention for laborer mothers to improve maternal and child health.

Parikh, Medical Officer and all the link workers of Odhav ward UHC of AMC.

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