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Original Article

The Effect of Maternal Age, Parity and Heamoglobin Level on Neonatal Birth Weight – A Fru Based Prevalence Study

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Abstract

Low birth weight has an adverse effect on the perinatal life and beyond. Several maternal factors contribute to the birth weight of a neonate. This prevalence study was undertaken to study how various factors modulates the birth weight. A community based cross sectional study on birth weight of newborns was conducted among pregnant women of an urban slum in Guwahati, Assam, India.Out of 378 pregnant women in the study group 200 primigravida and 178 multigravida in the age group of 18-37 yrs. Heamoglobin estimation was done by conventional method. Statistical analysis was performed using SPSS 11.5 software for windows. Data were analysed by Chi-square test. The results were considered as significant if P values were 0.05 or less. In the study, age and hemoglobin level is significant in relation to birth weight (p=.008, p=.005 respectively) but Parity of mother is not significant in relation to birth weight (p=.790). To find out the risk factor of Low Birth Weight the odds ratio has been calculated. It shows 1.15% more chances giving birth to babies having Low Birth Weight in Primipara than multipara.

Introduction

Birth weight is the body weight of a baby at birth (1). From 1960 birth weight has been classified as low birth weight (<2500 grams), very low birth weight (VLBW; <1500 grams), extremely low birth weight (ELBW; <1000 grams), or macrosomia (>4000 grams) (2). Low-birth weight babies are newborns weighing less than 2,500 grams, with the measurement taken within the first hours of life, before significant postnatal weight loss has occurred (3). Globally, an estimated 15 per cent of infants, or more than 1 in 7, weight less than 2,500 grams at birth over 20 million newborns annually (4). A baby born small or large for gestational age (either of the two extremes) is thought to have an increased risk of obesity in later life, (5, 6) but it was also shown that this relationship is fully explained by maternal weight (7).

Birth weight remained an important factor affecting the neonatal and infant mortality and morbidity. Low birth weight (LBW) is a major public health problem in developing countries including India. Low birth weight babies are more likely to have disabilities in form of developmental delay, poor growth and mental disabilities. Maternal hemoglobin is an indirect indicator of overall maternal nutrition and therefore, low maternal hemoglobin can identify undernourished

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mothers whose fetus may suffer ill effects of malnutrition. There was a significant progression of birth weight with advancing age. Birth weight similarly increased from parity 1 to parity 3, but dropped markedly in the higher parity groups (24). Age and parity influence birth weight by affecting fetal growth rather than the length of pregnancy. A community based cross sectional study on birth weight of newborns was conducted among pregnant women of an urban slum in Guwahati, India. The study was carried out to assess the magnitude of low birth weight (LBW) and factors contributing it in a community which was carried out in a First Referral Unit Hospital which is situated in outskirt area of Guwahati where both urban slum and rural people are the patients. A slum is a heavily populated urban informal settlement characterized by substandard housing and squalor (22). The intention for choosing the Hospital is to conduct the study in majority of same category of women attending from vast area.

Objectives:

The study is carried out with the following objectives.

1. Relation of age & parity with birth weight which is an irreversible factor.

2. Effect of Hemoglobin level on birth weight which is a reversible factor.

Materials and Methods

The study was carried out at Maternity &Child Welfare Hospital, Dhirenpara (FRU). Situated in a urban slum area in the outskirts of Guwahati city. The hospital is attended mostly by the antenatal cases from local area and nearby villages.

Sample source:

Term Pregnant women admitted in the Hospital. Patients from both urban and rural community were included.

Study design:

A simple random sampling method was followed because study population is relatively small. Meticulously patients are selected to avoid selection bias. There is no measurement bias but confounder may be present. Measurement bias means any bias regarding the collection of different parameters. In this study age, parity, hemoglobin level and birth weight. Confounder bias may be there because we have taken into account only three factors causing Low birth weight like age, parity and hemoglobin. There may be other factors also.

Method

A careful history was taken to know age & parity of the patient. 378 term pregnant women are selected for the study during the period of June 2013 to December 2013. Infants born between 37 and 42 weeks are classified as term; less than 37 weeks as preterm and greater than 42 weeks, post-term (8). Written consent was taken in the consent form of vernacular language. Proforma of the study was filled up. Under all aseptic & antiseptic measure blood sample was collected & hemoglobin was estimated by cyanmethemoglobin method. There is reliability of the parameters because of validity of measurement.

Ethical Committee clearance:

Before starting the work, permission was obtained from the institutional ethics committee of Gauhati Medical College and Hospital, Guwahati.

Inclusion Criteria:

1. Indoor patient of term pregnancy.

2. Pregnant women of 18-37 age groups

3. Upto third gravid women are taken. (Risk of pregnancy and its outcome increases with the increase of parity. So women only upto 3rd gravid were taken in the study)

4. Patient with normal blood sugar

5. No history of hypertension

6. Normal lipid profile.

Exclusion criteria:

1. Patient with Gestational diabetes mellitus
2. Pre-eclampsia
3. Obese mother
4. Greater than third gravid.
5. Pregnant lady of less than 18 yrs and more than 37 yrs. (Complications of pregnancies are more with the extremes of age. So mothers below 18 years and above 37 years were excluded).

Statistical and data analysis:

Statistical analysis was performed using SPSS 11.5 software for windows. Data were analyzed by Chi-square test. The results were considered as significant if P values were 0.05 or less.

Results

In Table I out of 378 babies delivered during the study, 84 babies were of low birth weight (<2.5 kg). Out of 84 LBW babies, 43 babies were delivered from mothers of 18-22 yrs of age groups. This is 51.2% of total number of this age gr.

Whereas no cases less than 2.5 kg was detected in the age gr. of 33-37 yrs. This difference is statistically significant, because P=.008 (p<.05, CI is 95%).

In Table II, shows out of 378 women, 38 woman having Hb% of 8-9 gm. Out of 38,15 babies (39.5%) were delivered with birth wt less than 2.5 kg. No babies were born <2.5 kg of a mother having Hb% 11-12 gm%. This difference is statistically significant P=.005.

Out of 378 study population total 88 babies were born under 2.5 kg. Out of 88 babies 49 babies (55.7%) were delivered by primipara and 39 babies (44.3%) were delivered by multipara. There is no significant biostatistical relation P=.790. (P>.05, CI is 95%).

From Table IV, it is clear that age, Hb%, p value is greater than expected value, so it is highly significant. The study shows that age and heamoglobin level affect the neonatal birth weight. But parity has no effect on birth weight.

TABLE I : Age and Birthwt Crosstabulation.

Age group	*No. of cases <2.5 kg*	*No. of cases <3 kg*	*No. of cases <3.5 kg*	*No. of cases <4 kg*
18-22 yrs	43	64	23	08
23-27 yrs	30	77	35	11
28-32 yrs	11	47	15	01
33-37 yrs	0	07	06	0
Total No. 378	84	195	79	20

TABLE II : Hb% and Birthwt Crosstabulation.

Hb% of mother	*No. of cases <2.5 kg*	*No. of cases <3 kg*	*No. of cases <3.5 kg*	*No. of cases <4 kg*	*Total 378*
8-9 gm%	15	19	03	01	38
9-10 gm%	39	108	41	05	193
10-11 gm%	31	69	30	10	140
11-12 gm%	0	03	02	02	7

TABLE III : Parity and Birthwt Crosstabulation.

Parity of mother	*Birth weight <2.5 kg*	*Birth weight <3 kg*	*Birth weight <3.5 kg*	*Birth weight <4 kg*
Primipara	49	103	37	11
Multipara	39	89	40	10
Total 378	88	192	77	21

TABLE IV : Shows the chi-square values, degree of freedom and p values.

Parameters	*Pearson Chi-Square*	*Df*	*P*
Age of mother	22.367	9	.008
Hb% of mother	23.371	9	.005
Parity of mother	1.045	3	.790

Odds Ratio:

Parity of mother	*Birth weight < 2.5 kg*	*Birth weight > 2.5 kg*
Primipara	49	151
Multipara	39	139

Odds Ratio = 1.15

The odds ratio shows that there are 1.15% more chances of the baby being underweight in primipara than multi para.

Discussion

There are internal validity of the findings because data collection and analysis were done meticulously, which are not influenced by different bias and chance. There for external validity or generalizability can be ensured. Low birth weight (LBW) is a major public health problem in developing countries including India. The epidemiological observations depicted that infants weighing lesser than 2500 g are approximately 20 times more likely to die than heavier babies, closely associated with the fetal and neonatal mortality and morbidity (9). It also leads to inhibited growth and cognitive development and also associated with chronic diseases later in life (10). Majority of the community based studies on birth weight are in a rural community and studies from urban areas are limited. Urban population in India is expected to go up to one-third of the total population by the end of the current decade. Mothers in rural areas enjoy benefits of public health services provided by Government-created network of delivery systems. However, in urban areas such a network of services has not yet been developed or underdeveloped as a result of which mothers are deprived of preventive and promotion services (11). They used to change their residence very frequently. Hence, there is a need to carry out studies in urban population to find the magnitude of the LBW and the associated factors so that appropriate strategies can be designed to tackle the problem. The present study was carried out to assess the magnitude of LBW and factors contributing it in an urban slum community. A number of variables have been found to be associated with the LBW of newborns. Kramer (12) in his meta - analysis of LBW has analyzed the determinants of LBW. Parity (13, 14) educational status (15, 16) and age of mother, (17) etc. have been found to be associated with LBW. With increasing maternal age, the birth weight decreased significantly (18-20). Low maternal hemoglobin concentration was associated with low birth weight babies (21). The incidence of low birth weight is more in primi para than in multi para (Odds ratio 1.15). Similar results have been seen in other studies (Dowding, 1981; Murphy and Mulcahy, 1971; Dougherty and Jones, 1982; Van Roosmallen, 1988). The first parity had the higher incidence of LBW. Effective implementation of health awareness and health promotion programmes would be beneficial in reducing the rate of LBW (23).

Conclusion

From this study we have concluded that, Low Birth Weight is a major public health problem. To achieve the Government target to reduce the Infant Mortality Rate to 100, we must take some measure to improve the Gestational Birth Weight. Some of the factors for LBW can be prevented by educating mother about nutritious diet, how to prevent anemia etc. In the study among the three parameter responsible for birth weight, two parameters are irreversible. Out of these two one is significant in relation to birth weight that is age of mother. Other one is parity which is not significant. The third one is Hb% which we can change with treatment and routine follow up. Further study is required to evaluate other parameter which we can modify.

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