Original Research Article

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Maternal factors associated with low birth weight: a case control study in rural Kerala

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ABSTRACT

Background: Low birth weight (LBW) continues to remain a major public health problem worldwide. There are numerous factors contributing to LBW both maternal and foetal. The maternal risk factors are biologically and socially interrelated. The mortality of low birth weight can be reduced if the maternal risk factors are detected early and managed by simple techniques. This study was conducted to study the maternal risk factors associated with low birth weight.

Methods: A retrospective record based case control study was conducted. Retrospective data collection was done using registers from medical record section of Obstetrics and Gynaecology department. After applying exclusion criteria and checking for completeness of records, we selected 60 cases and 124 matched controls. Data was entered in Microsoft excel and analyzed using SPSS version 16. Students 't' test, chi-square test and odds ratio were used to find out the factors associated with low birth weight.

Results: In the present study, 60 cases and 124 controls were studied. Mean age of mothers in the case group was 24.4±4.7 yrs. and in the control group was 24.8±4.42 yrs. Mean weight of the cases was 62.5±6.89 kg and of the controls was 65.04±7.16 kg. A total of 35% of the cases and 20% of the controls suffered from pregnancy related diseases.

Conclusions: Maternal factors like Socio-economic status, weight, haemoglobin and parity were significantly associated with LBW. Maternal diseases like hypertension, diabetes can result in LBW baby.

Keywords: Maternal factors, Low birth weight, Kerala

INTRODUCTION

Low birth weight (LBW) is defined by World Health Organisation (WHO) as birth weight less than 2,500 g at a birth, irrespective of the region, the community or culture. LBW is an important indicator of reproductive health and general health status of population. LBW leads to an impaired growth of the infant and is associated with higher mortality rate, increased morbidity, impaired mental development and chronic adult disease. Infants who weight less than 2,499 gm at birth are at twenty times more risk of neonatal death than those who weigh

more than 2,500 gm.³ LBW is considered the single most important predictor of infant mortality, especially of deaths within the first month of life.³

LBW is a major public health problem worldwide especially in the developing countries. According to the estimates of WHO about 25 million low birth weight babies are born each year and 5 million of them die globally.⁴ The prevalence of low birth weight in India was found to be 26%. There are numerous factors contributing to LBW, both maternal and foetal. The maternal risk factors are biologically and socially interrelated. The mortality of low birth weight can be

reduced easily, as most of the maternal risk factors can be modified if detected early and managed by simple techniques.

Kerala state is noted for its high health achievements at low cost; the most of health indices are comparable to those of developed countries. However, Kerala has been reported to have a high proportion of LBW babies compared to developed countries. The present study was designed to determine the proportion of LBW infants among hospital deliveries in Kerala and to identify the maternal factors associated with LBW.

METHODS

A retrospective record based case control study was conducted in the KMCT Medical College, Mukkam in June 2014. All babies born in the KMCT Medical College hospital during January 2014 to April 2014 were included in the study. Retrospective data collection was done using registers from medical record section of Obstetrics and Gynaecology department. The data was collected by 3rd MBBS students under the guidance of authors. Information related to mother such as age, height, weight, socio-economic status (SES), parity, gestational age, diseases during pregnancy and information related to baby such as birth weight and sex were extracted from the records. All babies born with birth weight less than 2500 g were included in cases and

those born with birth weight more than 2500 g formed pool for selecting controls. Deliveries with incomplete records were excluded from study. Preterm deliveries were excluded from study. Still births and early neonatal deaths were also excluded from the study. After applying exclusion criteria and checking for completeness of records, we selected 60 cases and 124 matched controls; required sample size was 38 in each group. Data was entered in Microsoft excel spread sheet and analyzed using SPSS version 16. Students 't' test, chi-square test and odds ratio were used to find out the factors associated with low birth weight.

RESULTS

A total of 60 cases and 124 matched controls were included in the study. Cases and controls were matched for factors such as age of mother, gestational age, height of mother, sex of baby, mode of delivery, number of antenatal visits, etc. Comparisons of some maternal characters used for matching in cases and controls are shown in Table 1.

Majority of the LBW neonates, 49 (81.7%) had birth weight between 2 to 2.5 kg while remaining 11 had birth weight less than 2500 g. Mean income of cases was Rs. 36766±25.58; which was significantly lower than mean income of controls i.e. Rs. 48806±29.19. Also, there was significant difference between weight and haemoglobin values of cases and controls (Table 2).

Table 1: Comparison of basic variables of mothers between cases and controls.

| Variables | Cases (n=60) | Controls (n= 124) | t value/ ϰ²value | P value |
|-----------------|--------------|-------------------|--------------------|---------|
| Age | 24.4±4.77 | 24.8±4.42 | t=0.637 | 0.52 NS |
| Height | 158.8±6.73 | 157.3±4.40 | t=1.78 | 0.07 NS |
| Normal delivery | 27 | 58 | $\kappa^2 = 0.051$ | 0.82 NS |
| >3 ANC visit | 55 | 113 | $\kappa^2 = 0.15$ | 0.90 NS |

Table 2: Maternal risk factors for low birth weight.

| Variables | Cases (n=60) | Controls (n=124) | t value | P value |
|----------------------|-------------------|------------------|---------|---------|
| Annual income in Rs. | 36766 ± 25.58 | 48806±29.19 | 2.72 | 0.0007 |
| Weight in Kg | 62.5±6.89 | 65.04±7.16 | 2.30 | 0.02 |
| Haemoglobin gm% | 11.1±1.01 | 11.7±1.49 | 2.92 | 0.04 |

Table 3: Maternal risk factors for low birth weight.

| Variables | Cases (n=60) | Controls (n=124) | Odds ratio (95% CI) | P value (Chi-square) |
|---------------------------|--------------|------------------|------------------------|-------------------------|
| Weight of mother (<60 Kg) | 24 | 27 | 2.39 (1.22-4.68) | 0.010 |
| Maternal diseases | 21 | 25 | 2.13 (1.07-4.24) | 0.024 |
| Primipara | 26 | 33 | 2.10 (1.10-4.03) | 0.023 |
| Anemia in mother | 18 | 19 | 2.36 (1.13-4.95) | 0.020 |

Table 3 shows various other risk factors associated with Low birth weight. In the present study it was observed that if maternal weight at full term was less than 60 kg there was risk of LBW. Also if mother was suffering

from diseases such as hypertension, diabetes, CHD etc; the risk of LBW was high. Primipara also had significant risk of delivering LBW babies.

DISCUSSION

According to UNICEF estimate, every third newborn (30%) in India is LBW. The National Family Health Survey (NFHS)-3 reported that 21.5% of all children had LBW. The proportion of low birth weight babies in a Kerala based study was found to be 18%.

In the present case control study SES, weight, parity and haemoglobin status of mother was significantly associated with LBW. Kramer in his meta-analysis of LBW has identified 43 determinants of LBW. Nutritional status of mothers has been demonstrated to be an important determinant of birth weight by Kramer and Deshpande. In the present study mothers having weight less than 60 kg at delivery had 2.39 times more risk of giving birth to LBW baby. Weight gain during pregnancy would have proved to be a better factor but could not be studied because of missing information. Similarly effect of spacing could not be studied.

Maternal haemoglobin is an indirect indicator of overall maternal nutrition and therefore, low maternal haemoglobin is an important risk factor for LBW. In the present study this relationship was re-established as shown by previous studies. The significant association of low SES and LBW babies found in this study was also consistently seen in previous studies. The prevalence of LBW was significantly high among primiparous mothers and it fell up to parity 4. Similar finding to our study has been reported by Agarwal et al and Kour et al. Maternal diseases such as hypertension and diabetes are important risk factors for LBW. Similar findings are reported by many studies. Similar findings are reported by many studies.

CONCLUSION

Birth weight is an important factor affecting the neonatal and infant mortality and morbidity. LBW babies are more likely to have disabilities in the form of developmental delay and poor growth. Maternal factors like Socioeconomic status, weight, haemoglobin and parity are important risk factors for low birth weight. Maternal diseases like hypertension, diabetes can result in LBW baby.

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