Risk factors survey of low birth weight neonates.

- Jasim M.AL.Marzoki,(C.A.B.P) Consultant Pediatrician
-Shaker K. Gatea,(C.A.B.P) Consultant Pediatrician
-Zaher Ganem ,(M.B.Ch.B) Pediatrician
(Dept. Pediatrics, Babylon Medical College, Babylon University, Hilla-Iraq- Babylon Maternity and Children Teaching Hospital)

الملخص

إن معدل الوفيات لحديثي الولادة هو احد أهم المشاكل الصحية والتي بدورها تتأثر بمسببات تحدث في فترة الحمل وأثناء وبعد الولادة لذا فان هذه الدراسة أجريت لتقييم الأسباب التي تؤدي إلى فشل الوزن لحديثي الولادة .إن في كل عشر ثواني هنالك طفل يموت في الدول النامية نتيجة الأمراض والالتهابات التي تعزى إلى فشل الوزن لدى حديثي الولادة .هذه الدراسة وصفية مقطعية أجريت على 1023 طفل ولدوا في مستشفى بابل التعليمي للنسائية والأطفال في الحالة للفترة من أيلول 2007 إلى نيسان 2008 . المعلومات مثل وزن الطفل ، جنس الطفل ، مدة الحمل ، الفترات من حمل وأخر ، إسقاط سابق ، الرعاية أثناء الحمل ، الحمل الأول أو أحمال متكررة ، التحصيل الدراسي ، أمراض مزمنة ، التهاب المجاري البولية والتناسلية ، نوع الولادة، الحالة المعاشية ، محل السكن ووزن وطول الأم ، قد شملت بهذه الدراسة.لقد وجد النتائج إن نسبة 14% من الولادات أثناء تلك الفترة لديهم فشل ولادي في الوزن وان الغالبية العظمى من هؤلاء هن إناث حيث إن نسبة الإناث إلى الذكور هي 0.6:1 . إن قلة وزن وطول الأم ، فترة الحمل ، الحالة المعاشية ، التحصيل الدراسي تؤدي إلى زيادة إنجاب أطفال لديهم فشل ولادي في الوزن . كذلك فان الأمهات اللاتي يقطن الريف ، أولئك اللاتي يلدن بالعملية القيصرية أو لديهن أمراض مزمنة أو التهاب المجاري البولية والتناسلية هن أكثر عرضه لولادة أطفال لديهم فشل ولادي في الوزن.استنتج ان هنالك علاقة وثيقة ما بين فشل الوزن لدى حديثي الولادة مع فترة الحمل ، وزن وطول الأم ، الأمراض المزمنة أو التهاب المجاري البولية والتناسلية لدى الأم ، الرعاية أثناء فترة الحمل وجنس الطفل . كذلك إن سكن الأم التحصيل الدراسي الحالة المعاشية نوع الولادة الحمل المبكر لها علاقة مباشرة بوزن الطفل .

Abstract

Background: Neonatal mortality rate is one of the main health problems which affected by prenatal status and perinatal conditions. LBW is one of the main causes of neonatal and infantile mortality. Approximately every ten seconds, an infant from a developing country dies from a disease or infection that can be attributed to low birth weight, so this study was done to evaluate the risk factors of LBW in neonate.

Method: A descriptive cross sectional study was done on 1023 neonates, born in Babylon Maternity and Children Teaching Hospital from September 2007 to April 2008 .Neonatal data such as birth weight, gender, gestational age, and maternal data including maternal age, birth interval, history of abortion, antenatal care, parity, level of education, systemic disease, genitourinary infection, smoking, type of delivery, socioeconomic state, residence and maternal weight and height, were reported in this study.

Results: **The study reveals that, 14% of neonates were LBW, were female/male ratio 1:0.6. The lower (maternal weight and height, gestational age, economic state and level of education) were associated with more LBW neonates. Also rural residence, irregular antenatal care, GUT infection, C/S delivery or having underling systemic diseases were at risk to get LBW neonates, while maternal age, birth interval and history of abortion found no effect on birth weight.**

Conclusions: **the results revealed a correlation between LBW in neonates with gestational age, maternal weight and height, and systemic diseases of the mothers. Also there was a correlation with the gender of baby, residence, level of education, socioeconomic state, GUT infection, parity and type of delivery.**

Introduction

   Birth weight is a powerful predictor of infant growth and survival. Infants born with a low birth weight begin life immediately disadvantaged and face extremely poor survival rates. Approximately every ten seconds, an infant from a developing country dies from a disease or infection that can be attributed to low birth weight [1]. Each year approximately 17 million infants are born with low birth weight in developing countries [2][3]. Low birth weight(2500 grams or less)[1], is a reasonably well-defined problem caused by factors that are potentially modifiable. It is, therefore, encouraging that the international public health community has begun to increase its attention toward four million infants who die each year and the many more who survive with a diminished quality of life [4]. Many of those infants who survive suffer cognitive and neurological impairment. Moreover, a child born with low birth weight has, in later life, a greater risk of illness and premature death from cardiovascular disease, hypertension, and diabetes compared to others with adequate birth weights. In fact, the great majority of low birth weight is believed to be directly linked to abnormalities that extend throughout the life cycle [1]. Low birth weight is an intergenerational problem [4][5]. The costs of preventing many causes of low birth weight are well within reach, even in poor countries. However, due to the intergenerational characteristics of low birth weight, some successful interventions may require substantial programmed and donor commitment over a sustained, extended period. This recognition, as well as a new sense of urgency, has underlined the need for greater attention to the problem of low birth weight, and new solutions are forthcoming from well-designed research on low birth weight [6][7]. Many factors affect the duration of gestation and of fetal growth, and thus, the birth weight. They relate to the infant, the mother or the physical environment and play an important role in determining the infant's birth weight and future health[8].

Birth weight is affected to a great extent by the mother's own fetal growth and her diet from birth to pregnancy, her body composition at conception and her educational level [9].

Aim of Study

This study was under taken to estimate the frequency and evaluate the risk factors of LBW neonates delivered in Babylon Maternity and Children Teaching Hospital, and to detect mothers at risk for getting LBW to deal with them properly, treat and follow their baby carefully.

Patients and Methods

A descriptive cross sectional study extended for seven months from first of September 2007 to first of April 2008, in the delivery room and theater of Babylon maternity and children teaching hospital, in which data were taken by direct intervention with the mother by researcher that include variables in the maternal history considered as a major risk factors for LBW infants, like: gestational age (by LMP and U/S), mothers age, parity, birth intervals, prenatal care (regular if there was visit in first and second trimester or more than 4-5 visits in whole pregnancy, irregular if there was no visit in the first and second trimester or less than 4-5 visits),history of abortion, smoking, systemic disease (as diabetes mellitus, hypertension, asthma, anemia),genitourinary tract infection (UTI, Vaginitis), educational level (illiterate, read and write, primary, secondary, preparatory, institution and college) , residence (rural or urban), and socioeconomic state classified to High, moderate, low according to modified score mainly from Al-Mashhadani 1988;Soori 2001;Kim 2003;Sarlio 2004. Mother's gestational weight and height was measured by beam scale (seca150 Kg maximum weight Germany made), body mass index was calculated by the equation:

BMI= Weight in Kg/ (Height in m)^2 and waiting till mothers delivery either by NVD in the delivery room or by C/S in the theater, after that the baby underwent full clinical examination, his sex was determined, assessment of gestational age using Ballard scale, and naked baby weighing by beam scale (seca,16 Kg maximum weight, Germany made) to classify the newborns to LBW and NBW(2500–4000 grams)[1] . Multiple pregnancies were excluded from the study. Statistical analysis was done by Chi square test using statistical package available (SPSS system), version 10 to analyze the data that had been collected and the P-value was measured to determine the significance of variables (<0.05 suggested as significant and <0.01 as highly significant and > 0.05 no significance).

Results

The total number of newborns enrolled in this study were 1023 delivered in Babylon Maternity and Children Teaching hospital, of them 145 (14.17%) were low birth weight (LBW). Table 1 shows the effect of many risk factors to the delivery of low birth weight neonates, where there is significant relation between (female gender, premature delivery, primigravida mothers, irregular antenatal care, Presence of maternal systemic disease, and genitourinary tract infections, cesarean section mode of delivery, rural residence, and normal body mass index), with delivery of LBW neonates . The higher educational level decreases the incidence of LBW, with significant difference P-value < 0.05, as shown in (figure 2). Hypertension was the most common maternal systemic diseases affecting birth weight, followed by anemia and asthma as shown in (figure 1). Other risk factors shows no significant relation with the delivery of LBW neonates including (history of previous abortion, socioeconomic state, birth interval, and mothers age). No one of the mothers enrolled in this study was found to be smoker .

Table 1: Relation of risk factors to delivery of low birth weight neonates

| Risk factors	Total No. of neonates	%	No. of LBW neonates	%	P-Value
Gender: Male	507	49.56	58	11.43	< 0.01
Female	516	50.43	87	16.86	
Maturity: Preterm	151	14.76	83	54.96	< 0.001
Term	872	85.23	62	7.11	
Parity: Primigravida	250	24.43	45	18.00	< 0.05
Multigravida	773	75.56	100	12.93	
Antenatal care Regular	626	61.19	56	8.94	< 0.05
Irregular	397	38.80	89	22.41	
History of abortion Yes	251	24.53	36	14.34	> 0.05
NO	772	75.46	109	14.11	
Maternal systemic diseases					
Present	207	20.23	48	23.18	< 0.05
Absent	816	79.76	97	11.88	
Genitourinary tract infections					
Present	69	6.74	15	21.73	< 0.05
Absent	954	93.25	130	13.62	
Mothers Residence Urban	454	44.37	51	11.23	< 0.01
Rural	569	55.62	94	16.52	
Mode of delivery C/S	569	55.62	96	16.87	< 0.05
NVD	454	44.37	49	10.79	
Socioeconomic state Low	325	31.76	60	18.46	
Moderate	658	64.32	78	11.85	> 0.05
High	40	3.91	7	17.50	
Mothers BMI < 30	558	54.54	109	19.53	< 0.001
> 30	465	45.45	36	7.74	
Mothers age < 35 years	943	92.17	133	14.10	> 0.05
> 35 years	80	7.82	12	15.00	
Birth interval < 1 year	162	15.83	26	16.04	> 0.05
> 1 year	861	84.16	119	13.82	
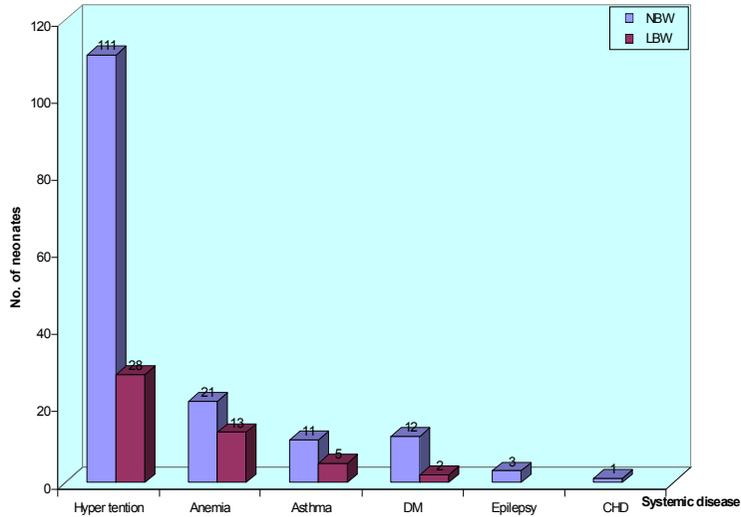
Figure 1: Relation between maternal systemic diseases and birth weight
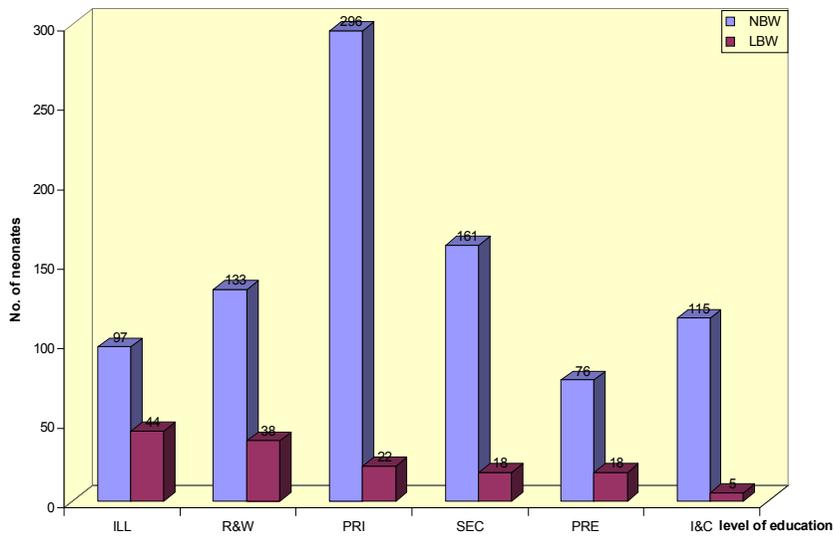**(NBW: normal birth weight, LBW: low birth weight)**

Figure 2: Relation between maternal educational level and birth weight
(P-value < 0.05)
(NBW: normal birth weight, LBW: low birth weight, ILL: illiterate,
R&W: read and write, PRI: primary, SEC: secondary, PRE:
preparatory, I&C: institution and college)

Discussion

   From the results of the study, which include 1023 neonates, from them 145 (14.17%) were LBW, and this goes with UNICEF and World Health Organization study in 2004[10],which shows the distribution of LBW around the world, where it was 15% in Iraq. Regarding gender, LBW neonates were mainly females, with female to male ratio of 1:0.6, which is consistence to other study stated that female neonate was smaller than male[13].There is significant relation ship between gestational age and birth weight, that goes with other studies[7,14,15]. Regarding parity, LBW was more in primigravid mothers (18%) and in (12.9%) of multigravid mother, which is similar to other study done in university of   Hong Kong,1998 [11]. Regular antenatal care is important factor in lowering incidence of LBW as in other study [16]. History of abortion was not affecting the birth weight in this study, while other studies showed that recurrent abortion had an effect on increasing the rate of LBW [6,16], and this may be due to that greater number of mothers had once time of abortion rather than recurrent. The most common systemic maternal disease affecting birth weight was hypertension by its effect on uteroplacental circulation, reducing size with multiple infarction of placenta, as shown by other studies [17,18,19]. There is significant increase in deliveries of LBW neonates if there is genitourinary infections of the mother which goes with other study[20]. There is high rate of rural mothers who delivered LBW baby (16.5%) than urban mother(11.2%), with significant difference which is similar to other studies [6,19,21] that could be explained by heavy physical work and poor health care. The current study shows that the rate of LBW neonates increasing as the maternal level of education decreases, and this may correlated with other factors, as cultural, economic, and antenatal care.[16,19,22]. Low birth weight increased in those baby delivered by C/S (16.8%), which may be explained by that those mothers may had complicated pregnancies so they need delivery by CS[17,19,23].Mothers with low socioeconomic state are more likely to deliver LBW neonates and this goes with a study done by WHO[6]and other studies [19,24]. In the current study, there is no information about mother weight and height before pregnancy and most of the mothers didn't know their pre gestational parameters, so we toke gestational weight and height then BMI was calculated, then classified to >30 or <30. By this study there is (19.5%) of mother with BMI <30 had delivered LBW neonates compared with (7.7%) of mothers with BMI >30, with highly significant relation. In spite of the bias of BMI estimation, these results goes with other studies [3,20,21,25]. There was no significant relation between mothers age and delivery of LBW neonates, which differs from other study [12] that showed that the incidence of LBW neonates were increased in women over 35 years compared with that of younger age group, this could be explained by

the small No. of mothers with age >35 year(7.8%).

   There is no increasing in the incidence of LBW by decreasing birth interval <1 year which is not goes with that mentioned in a study done in USA.1999, that showed the optimal inter pregnancy interval for preventing adverse perinatal outcomes was 18-23 months [11]and this may explained by that the current study had choose one year as an birth interval in compare to two years in that study. No one of the mothers enrolled in this study been found to be smoker, this might be due to direct intervention with the mothers , and smoking was regarded sinful in our society.

Conclusions

There are many risk factors correlated with LBW neonates, including: male gender and premature neonates, primigravida mothers with irregular antenatal care, and rural residence. Maternal systemic disease and genitourinary tract infection, C/S mode of delivery, low educational level and body mass index have significant relation with delivery of LBW neonates. Mothers age, socioeconomic state, history of abortion, and birth interval proved to have no significant relation with the delivery of LBW neonates.

Recommendations

▪ Ensure that girls attending schools and encourage her educational level.
▪ Ensure that women have access to essential health information by available media.
▪ Try to reduce domestic chore workload (collecting water, farming, planning and tending crops, preparing food) to ensure more time for pregnancy care.
▪ Protect/support health and nutrition of mother for positive pregnancy outcome.
▪ Facilitate prenatal care and safe birthing.

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