MATERNAL RISK FACTORS ASSOCIATED WITH LOW BIRTH WEIGHT AT MATERNITY TEACHING HOSPITAL IN ERBIL CITY: A CASE CONTROL STUDY

Madiah M. Abass[1] & Shukir S. Hasan[2]*

[1]*Nursing Department, College of Nursing, Hawler Medical University- Kurdistan region -Iraq.*
[2]*PhD. Assist Prof. Nursing department, Child Health Nursing, College of Nursing,
Hawler Medical University - Kurdistan region, Iraq.*

Corresponding Author Email: shukirh@gmail.com, shukr.saleem@nur.hmu.edu.krd

ABSTRACT

The weight of the newborn is not only the most important parameter reflecting the status of maternal health and nutrition, but it is also a universal predictor of neonatal morbidity and mortality. This study aimed to explore the main risk factors of low birth weights babies in Erbil city. A descriptive-case-control study was conducted on 200 mothers, who delivered their baby at the maternity teaching hospital in Erbil city, during the period 1st December, 2013 to 7th June, 2014. A special questionnaire was formulated by the researchers concerning the risk factors of the low birth baby. The questionnaire was validated through panels of experts and reliability (r = 87), direct interview was conducted for data collection. Analysis of data was done using descriptive statistics; frequency and percentage mean and standard deviation, and Inferential statistical analysis; Chi-square test, Fishers test Correlation coefficient. All the statistical procedures were tested at P ≤ 0.05. The results showed that the highest percentage of mothers with low birth weight baby suffered hypertension, anemia, hypoglycemia, irregular prenatal care, during pregnancy period. A highly significant relationship was found between low birth weight and maternal risk factors. Anemia and gapping in childbirth was the most risk factors associated low birth weight. The study recommended a health educational program for all mothers during pregnancy to avoid low birth weight.

Keywords : Maternal Risk factors, Low birth weight, Maternity Hospital

INTRODUCTION

At birth, the fetal weight is a single parameter that is directly related to the health and nutrition of the mother, it is a parameter to survive and experience healthy growth and development (Jyotishi, Padhi, & Mishra, 2014). The strong association of birth weight with infant mortality is the main focus of birth weight research. The World health organization (WHO) defined LBW as a birth weight less than 2500 grams (WHO, 2009). Approximately thirty million children worldwide are born of LBW every year which is representing 23.8% overall births. Depending on the personal relationship with census department at Maternity Teaching Hospital (MTH) in Erbil city the researchers reported that there are 2084 neonates were born during January 2017, and 160 cases were associated with LBW, which is representing 12.2% of total new births in Erbil city. Several factors may account for why we do not yet have a clearer picture of the emotional, behavioral, and social difficulties facing LBW (Mathewson *et al.,* 2017). Maternal weight, low hemoglobin, prime-parity, adolescent mothers and poor or inadequate maternal nutrition during pregnancy, smoking, alcohol, drug users, certain medical conditions (such as high blood pressure), diabetes, infection, and placental problems, also induce the risk of LBW (Singh and Shrestha, 2010). In addition, certain groups of babies, including African-Americans (two times more likely than white babies to have LBW), babies born to teenage mothers, and multiples Mothers with low socio-economic status and low levels of education also face increased the risk of LBW. Researchers emphasized that LBW babies have a higher risk of morbidity and mortality than infants with normal birth weight (Chiavarini *et al.*, 2012). As there are no studies concerning the maternal risk factor associated with term LBW in Erbil, this study was done

to evaluate these risk factors and their effect on LBW. The nurses can play an important role in the assessment of mothers and help them to prevent the maternal risks factors which are leads to LBW effectively.

RESEARCH METHODOLOGY

Study design and setting

A descriptive, case - control study design was conducted, at MTH in Erbil city. This study was carried out during the period started from 1st December 2013 to 7th June 2014.

Ethical approval

Official permission was obtained from Erbil General Health Directorate and MTH in Erbil City. Participants' confidentiality and anonymity were kept confident. No personal and identifiable data were used such as name of the participants, their address, or any other personal information. The purpose of the study was explained to the participants and the verbal agreement was obtained from the participants in the study. The confidential, and anonymity was maintained for all participants.

Data collection

Data collection was conducted during the period of 1st December, 2013 to 7th March, 2014, using the constructed questionnaire, medical records, and direct interview. All mothers who attended the hospital for birth were recruited to participate in this study, we emphasized that their participation is strictly voluntary. The interview had been applied after 6 hours of birth, or when the mother is ready for answering the questions. Two hundred mothers participated in this study (100 mothers with LBW as a case and 100 mothers with normal birth weight as a control). All mothers with primipara and multipara, all ages were included; while mothers with twin babies, preterm birth, stillbirth babies, overweight babies, cesarean section were excluded.

Questionnaire design

The questionnaire was designed and constructed by the researchers through an extensive review of relevant literature. For a proper collection of data, a questionnaire interview format was developed by the researchers to determine the risk factors of mothers on birth weight of newborn, after checking the weight of newborn and recording the physical measurement. This questionnaire consisted of three parts:

Part one - demographic data such as maternal factors which includes age, occupation, level of educational, residential, and socio-economical scale (SES), this scale which was built by nursing researchers in Iraq, and composed of five main question related to occupation, and level of education of both partners, house and housing and crowding index (CI); (CI = number of individual per house divided on number of bed rooms, except kitchen and reception room), with monthly salary both partner. The scores which were recorded as follow, less than 80 considered low SES, the scores between 80 -150 considered middle SES, and a scores less than 151 - 225 considered High SES.

Part two - related to obstetrical information such as gravidity, parity, miscarriage, number of children, contraceptive use and type of contraception, were obstetrical questions that designed in the questionnaire

Part three - Medical and surgical history such as having any chronic diseases, or previous operations.

Validity and reliability

The validity of the questionnaire was checked initially through 15 panels of experts who specialized in nursing, medicine, and maternity. The experts' responses were based on agreement or disagreement with items of the questionnaire. The researchers took into consideration on their responses and prepared the final version of the questionnaire. The alpha correlation coefficient was computed, and the correlation was 0.969, which was statistically adequate.

Pilot study

Twenty mothers from the maternity ward at the MTH in Erbil City were selected as a pilot study to determine the reliability of the checklist and were included in the main study sample. The pilot study started on 1st December, 2013, and the reassessment was done in the same day by the researchers.

Data analysis

Data were analyzed using the statistical package for social science (SPSS, version 20). Basic Descriptive Statistics Data Analysis . Chi – square: This test was used to determine the significant relationship between psychological, social and economic burden with some of demographic characteristics. The level of significant at $p \le 0.05$.

RESULTS

Table 1: Socio-demographic characteristics of mothers

Items	Control n = 100 No. (%)	Case (LBW) n = 100 No. (%)	Total n = 200 No. (%)
Age (years)			
< 20	9 (9)	11 (11)	20 (10)
20-24	34 (34)	26 (26)	60 (30)
25-29	27 (27)	28 (28)	55 (27.5)
30-34	20 (20)	14 (14)	34 (17)
35	10 (10)	21 (21)	31 (15.5)
Occupation			
Employee	29 (29)	41(41)	70 (35)
Private work	1 (1)	2 (2)	3 (1.5)
House wife	61 (61)	56 (56)	117 (58.5)
Student	9 (9)	1(1)	10 (5)
Level of education			
Illiterate	22 (22)	4 (4)	26 (13)
Primary school	7 (7)	6 (6)	13 (6.5)
Intermediate school	38 (38)	48 (48)	86 (43)
Secondary school	26 (26)	40 (40)	66 (33)
University graduate	7 (7)	2 (2)	9 (9)
Residency areas			
Urban	92 (92)	94 (94)	186 (93)
Rural	8 (8)	6 (6)	14 (7)
House			
Rented	8 (8)	18 (18)	26 (13)
Partially owned	51 (51)	53 (53)	104 (52)
Owned	41 (41)	29 (29)	70 (35)
Socio-economic status			
Low	56 (56)	48 (48)	104 (52)
Medium	34 (34)	45 (45)	79 (39.5)
High	10 (10)	7 (7)	17 (8.5)

The result showed that less than half (30%) of the mothers were aged between 20-24 years old, more than half of the participants (58.5%) were unemployed - housewives. There were 43% of mothers who graduated from intermediate school. However majority (93%) of the study participants were living in urban area, half of the mothers had low SES (Table 1).

Table 2: Distribution of samples by visits to primary health care centers (PHCC)

Visit primary health care	Control n = 100 No. (%)	Case (LBW) n = 100 No. (%)	Total n = 200 No. (%)
Not attending	2 (2)	2 (2)	4 (2)
Regular attending	87 (87)	61 (61)	148 (74)
Irregular attending	11 (11)	37 (37)	48 (24)

Table 2 shows that the most (74%) of study sample had regular ANC (Antenatal care) visits , while 24% in both group had irregular ANC visits.

Table 3: Distribution of samples by folic acid supplement during pregnancy

Folic acid and Iron supplement during pregnancy	Control n = 100	Case (LBW) n = 100	Total n = 200
	No. (%)	No. (%)	No. (%)
Iron supplement			
No	15 (15)	7 (7)	22 (11)
Yes	85 (85)	93 (93)	178 (98)
Folic acid supplement (regularly)			
No	89 (89)	70 (70)	159 (79.5)
Yes	11 (11)	30 (30)	41(20.5)

Table 3: the study found that most (98%) in both group received Iron supplement, while indicated that 79.7% in both group did not received folic acid regularly.

Table 4: Distribution of sample by history of anemia and hyperemesis, spacing with last child during pregnancy.

	Control n = 100		Case (LBW) n = 100		Total n = 200		Chi-Square p-value
	NO	%	NO	%	NO	%	
History of anemia during pregnancy							
No	3	3	42	42	45	22.5	<0.001
Yes	97	97	58	58	155	77.5	
Hyper emesis during pregnancy							
Yes	59	59	90	90	149	74.5	< 0.001
No	41	41	10	10	51	25.5	
Spacing with last child* only 61 in control and 74 in case group were multipara mothers							
12months	0	0	6	8.1	6	4.4	
18months	2	3.3	20	27	22	16.3	
24months	41	67.2	44	59.5	85	63	<0.001
36months	18	29.5	4	5.4	22	16.3	
Total	61	100	74	100	135	100	
Hypertension							
Yes	0	0	31	31	31	15.5	< 0.001
No	100	100	69	69	169	84.5	
Hypoglycemia							
Yes	0	0	20	20	20	10	<0.001
No	100	100	80	80	180	90	

Table 4 shows that there were significant association between history of anemia during pregnancy, hyperemesis during pregnancy, gap in child birth and hypoglycemia with both case and control groups at p-value 0.001 respectively.

Table 5 : Results of Logistic regression analysis where the dependent variable was L.B.W.

Variables	B	P	OR	95% C.I for OR	
				Lower	Upper
ANC (not regular) Regular visits	0.544	0.284	1.723	0.637	4.657
Anemia	3.046	0.001	21.023	4.475	98.768
Spacing					
< 2years	4.181	0.001	65.452	9.411	455.192
2 years	1.386	0.043	3.998	1.043	15.323

Table 5 showed that logistics regression of the main risk factors of pregnancy-which are induced by low birth weight including anemia [OR=21.023(4.475-98.768)], spacing with the last child < 2years [OR=65.452(9.411-455.192)] and 2 years spacing with the last child

DISCUSSION

1. Demographic characteristics of the study sample

The findings of the present study showed that most of the mothers were within 20-24 years old. High percentages of Kurdish ladies are married in her early age. This result is in disagreement with a study which was done by researchers that who confirmed that the age of mothers who had LBW was between 26-36 years (Adham, 2008; Geda and Lako, 2011). Majority of study sample were unemployed- housewife. This result is similar with a study done by Adham (2008), who found that the majority of sample was housewives. A study done by Reed *et al.*, in 2012 and Zanganain in 2010 reported that majority of the sample were housewives, and had intermediate school graduate. Salih (2012) and Sarode in India (2010) reported that the majority of the study samples were primary and intermediate school graduates. More than half of participants believed that their monthly income was not enough. Others found that highest percentage of pregnant women who attend MCH (maternal & child health unit), reported that their economic state was satisfactory (Zangana, 2010).

2. Antenatal care visits

The majority of the study sample had regular ANC visits. These finding were in agreement with the results of the study conducted in Erbil by Ali (2012). Rizwan *et al.*, (2013) emphasized that Anemia in pregnancy constitutes a major public health problem in developing countries and a high morbidity and morbidity among antenatal mothers, and found that low birth weight was found among 96 (14.0%) individuals, among overall participants in the study.

3. Folic acid supplement intake

The result of current study showed that the highest percentage of pregnant women received the folic acid tablet. This result is in agreement with a result of a study done by Rosmawati (2012) that found folic acid supplementation during pregnancy was associated

[OR=3.998(1.043-15.323)], at *p*-value 0.001 and 0.043 respectively. While logistic regression didn't show visiting the ANC for both regular and irregular visits (not regular) [OR=1.723 (0.637-4.659)] as a factor induce low birth weight.

with a lower risk of gestational hypertension. Adam & Babiker, (2008), in his study showed that more than half of the study sample received folic acid and iron supplement during pregnancy. Anaemia diagnosed in pregnancy is associated with increased risks of low birth weight and preterm delivery. Iron deficiency is the most commonly recognized nutritional deficit in either the developed or the developing world. Women need iron and folic acid to meet their own needs and also for those with developing fetus and growth weight (Rizwan *et al.,* 2013; Taseer *et al.,* 2011)

4. History of anemia during pregnancy

About history of anemia during pregnancy, majority of mothers confirmed and also felt that they complain of anemia and symptoms of anemia during pregnancy. Ali (2012) found that the anemia was the second most significant risk factor (49.5%) among the subjects. This result was in disagreement with the study performed in Iran by Mirzaie in 2010, showed only a few of pregnant women (4.7%) complain from anemia during pregnancy (Rizwan *et al.,* 2013).

5. Hypertension during pregnancy

The result of the present study showed that the highest percentage of study samples (84.5%) had no hypertension and (15.5%) of study samples were associated with hypertension. This was in agreement with the result of a study done in Thiqar/Iraq by AL-Ghezay (2010) that showed that pregnant women had hypertension during pregnancy. Ali (2012) urged that women aged 35 years and old had significantly more risk for hypertension during pregnancy and risk for LBW.

6. Hyperemesis during pregnancy

Current result revealed that about 74.5% had hyperemesis. Hyperemesis gravid arum (HG) often results in dehydration, electrolyte disturbance, and nutritional deficiency in many cases, mandating intravenous hydration and, in severe cases, the use of parenteral nutrition, and resulted in more post-

traumatic stress, motion sickness, muscle weakness and infants with irritability, severe colic and growth restriction (Veenendaal *et al.,* 2011). This result was in agreement with a recent systematic review and meta-Analysis of existing studies which showed that infants of women who experienced hyperemesis gravid arum is significantly more likely to exhibit a lower birth weight; be small for gestational age, and to be born prematurely. Mother who went untreated; HG can cause LBW, preterm labor, pre-eclampsia, and postpartum depression (Awoleke *et al.,* 2011).

7. Spacing the last child

The result of the current study revealed that there was highly significant association between spacing with the last child and LBW. These findings were comparable with the study done in Baghdad by Hasoon (2010). Inter- pregnancy interval is one of the determinant factors for preterm birth, LBW, small gestational age births and stillbirth. Current result is in disagreement with the study conducted in Ethiopia by Tegegne (2012) who reported that majority of the sample had birth interval less than 24 months. The study in Kenya found that childbirth order, mother weight, and height are significant predictors of birth weight, and added that birth order categories 2-3 and 4-5, were significant predictors of child size at birth (Gathimba *et al.,* 2017).

8. Nutritional risk factors

The result of the current study showed that the majority of mothers were not malnourished and the lowest percentage had malnutrition. The highest percentages of mothers were not vegetarian while lowest percentages (14%) were vegetarian. Regarding hemoglobin level, the majority of mother i.e, 75% showed haemoglobin level of 11g/dl and 25% were 12g/dl. Low antenatal attendance leads to the increased risk of LBW babies (Tegegne *et al.,* 2010), and again, disagreement with another study conducted in India which found that low nutritional education and low socioeconomic status lead to LBW (Shah and Chowdhury, 2012). Adverse pregnancy outcomes thought to be affected by anemia including maternal mortality, perinatal mortality, preterm birth (PTB), LBW, and small for gestational age (SGA). In the third trimester, hemoglobin below 11g/ dL increases the risk of LBW by 30%. Hemoglobin level below 10 g/dL in the third trimester also increases the risk LBW by 2.6 to 3.6 times (Barooti *et al.,* 2006). Wealth index of richer family and mother height were significant predictors of child size at birth (Gathimba *et al.,* 2017).

CONCLUSION

The study concluded that poor nourishment, irregular family planning were the most common factors associated with LBW in Erbil city.

RECOMMENDATION

The study recommended that regular health education program through mass media and regular education program in ANC units for pregnant mothers are vital and essential to avoiding LBW babies.

LIMITATION

The study faced many of limitation during data collection as most of mothers did not answer or refused to participate in the study because of their critical condition after birth, inadequate statistics which clearly refer to number of birth per year and the baby weight. These are considered as limitation for preventing the number of participants.

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