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FREQUENCY OF LOW BIRTH WEIGHT AMONG NEONATES ADMITTED TO THE NEONATAL INTENSIVE CARE UNIT

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ABSTRACT
Low Birth Weight among neonates has an important role in the morbidity and/or mortality rate. The mortality of low birth weight can be reduced if the risk factors are detected early and managed properly. The incidence of LBW may vary across different environments. A great variation was seen in birth weight between countries and from one region to another within the same country. In this cross-sectional study neonates that admitted to 5 neonatal intensive care units (NICU) in Iraq, were enrolled from September 2014 to March 2015. Data on neonate variable were gender, birth weight, and congenital malformation. Maternal variable were age, bad obstetric history, and socioeconomic status. The prevalence of low birth weight among 297 neonates admitted to neonatal intensive care units was 134 (45.1%). Male to female ration was 1.14:1. Low birth weight was associated with maternal bad obstetric history and congenital abnormality, while no association was found with gender, maternal age, and socioeconomic status. The study result showed that mothers with bad obstetric history are at risk to giving birth of low birth weight, they should provide with adequate prenatal and health care facilities.

KEY WORD: Low birth weight, Neonates, Iraq.

INTRODUCTION

Low birth weight (LBW) is a public health problem at global level [1]. World Health Organization reported about 15% of total births was born with LBW and approximately 94% of these infants were born in developing countries [2], like Iraq. The risk of diseases and mortality rate are high during the first year of life among infants born with LBW[3]. The World Health Organization (WHO) has defined the term low birth weight as a birth weight of less than 2500gms, irrespective of the duration of the gestational period[4]. These infants may experience higher rates of impaired neurological function and impaired neurological growth development that cause chronic disease, such as hypertension in the perinatal period, during infancy, and even in adulthood [5-7]. In addition respiratory disease and diarrheal disease is also high among LBW infants[8]. Congenital malformations are one of the most important factors that determine low birth weight[9]. LBW among live birth neonates have been recorded 15.1% at 1993[10] and 13.3% at 1994[11] respectively in Baghdad, Iraq and 29.2% at 2009 in Al- Anbar governorate, Iraq [12]. LBW rates among infants reported in the United State 7.7%, Korea 7.2%, Turkey 10%, and Qatar 12.4%, the rate varies from 2.9-11.8% in different parts of Iran [13-15]. High rate was also reported in Bangladesh 36%, India 30%, and Pakistan 24% [16]. A great variation is seen in birth weight between countries and from one region to another within the same country [13,15]. A study conducted by Nagargoje *et al.* [17] suggested that mother's socioeconomic status (SES), education, occupation, physical activity during pregnancy, duration of sleep and rest, age, time of registration of pregnancy, tobacco consumption, number of antenatal visits, tetanus toxoid immunization, folic acid and calcium supplements, days of iron, all are found to be significantly associated with LBW. These factors vary from one region to another, depending upon socio-economic, cultural, geographic factors. Since the prevalence of LBW is consider as one of the health indices, it is important to determine the incidence and the factors related to LBW in different area of the world [18].

METHODOLOGY

A cross-sectional study was performed from September 2014 to March 2015. A total of two hundred ninety-seven (297) neonates were enrolled in this study. Inclusion criteria for selecting neonates were the age group from zero time to 28 days. Neonates admitted to neonatal intensive care unit (NICU) were selected by consecutive sampling from hospitals in four Iraqi governorates (Bagdad, Wasit, Dhi Qar, and Sulaymaniyah). Number of neonates per each NICU and names of hospitals are shown in table (1).
Data on neonate variable were gender, birth weight, and congenital malformation. Birth weight of neonates was measured using infants weighing scale pan type in which the weight was estimated to the nearest 100 grams. The data collection of malformed neonates was performed from the medical records. Maternal variable were age, education,

occupation, and income. Mothers classified as a mother with BOH were those mothers with previous unfavorable pregnancy and/or delivery outcome in terms of two or more consecutive spontaneous abortions, history of intrauterine fetal death, intrauterine growth retardation, preterm deliveries, early neonatal death, and deliveries with congenital defect. Maternal data were completed during face-to-face interviews of neonates' mothers. All the questionnaire information was successfully filled. Kuppuswami scale was used to get the most relevant outcome in terms of reliability regarding SES. The scale includes income, occupation, and education of the household as a variable that is used for SES measure. Kuppuswami scale was adapted according Iraqi society by the investigator. Ethical approval to perform the study was obtained from the Research Ethical Committee at College of Medicine of Al-Nahrain University. Statistical analysis was performed in SPSS 24 using Frequency analysis to calculate rate and ratios; Chi-square was used to test the relation between qualitative data. P value of less than 0.05 was considered significant.

RESULTS

The prevalence of LBW among a number of 297 neonates admitted to neonatal intensive care units of four Iraqi governorates was 134 (45.1%) neonates. As shown in table 2, close rate of LBW were seen in males 73 (54.5%) and females 61 (45.5%), male to female ratio was 1.14:1. No significant statistical association between gender of neonates and LBW. Higher rate of LBW 22 (16.2%) than normal weight 2 (1.2%) was found among neonates with congenital malformations. A significant statistical relation was found between congenital malformed neonates and LBW. Central nervous system anomalies were present in 19 (%) of LBW neonates, whereas defects in the musculoseletal system were present in 3(%) neonates.

TABLE 1: Number of neonates and hospitals for each governorate

Governorate	Hospitals	Number of samples per each hospital
Baghdad	Children's Wellfair Hospital	110
	Imamein Kadhimein Medical City	71
Wasit	Specialized Women and Children Hospital	38
Dhi-Qar	Bint Al Huda Maternity and Children Hospital	42
Sulaymaniyah	Pediatric Teaching Hospital	36

TABLE 2: Relation of LBW to gender, congenital malformations, mother's age, maternal BOH, and maternal socioeconomic status

		LBW				P value
		Y		N		
		Count	%	Count	%	
Gender	Male	73	54.5	96	58.9	
	Female	61	45.5	67	41.1	NS
Congenital	Malformed neonates	22	16.4	2	1.2	
Malformations	Normal	112	83.6	161	98.8	S
Mothers	<20	23	43.4	30	56.6	NS
age/years	20-25	52	29.4	65	55.6	
	26-30	17	20.5	66	79.5	
	>31	8	18.2	36	81.8	
Mothers BOH	Without BOH	17	12.7	4	2.5	
	With BOH	117	83.3	159	97.5	S
SES	Low	57	42.5	73	44.8	
	Middle	72	53.7	81	49.7	NS
	High	5	3.7	9	5.5	

NS: Not significant, S: Significant

The remaining malformations were present in gastrointestinal tract 1(%) and genitourinary system 1(%) table (3). Table 2 shows that the highest rate of LBW neonates (43.4%) was born to mothers who were less than twenty years of age. The relationship between mothers' age and LBW neonates was not found to be statistically significant. According to maternal BOH, LBW deliveries was higher among neonates 117 (87.3%) from mothers with BOH than neonates 17 (12.7%) from mothers without BOH. A significant statistical association was found between maternal BOH and LBW deliveries. Highest rate 72 (53.7%) of LBW neonates was found from mothers with middle SES followed by 57 (42.5%) of LBW from mothers with low SES and 5 (3.7%) from mothers with high SES. No significant statistical association was found between the LBW and mothers SES.

TABLE 3: Congenital defect according to the anatomical system

Anatomical system	No	% of LBW
Central nervous system	**19**	**13.3**
Microcephaly	9	6.3
Hydrocephalus	6	4.2
Meningocele	4	2.8
Spina bifida	1	0.7
Musculoskeletal system	**3**	**2.1**
Cleft lip	2	
Club foot	1	
Gastrointestinal tract	**1**	**0.7**
Abnormal wall defect	1	
Genitourinary system	**1**	**0.7**
Hypospadias	1	
Total	**24**	**16.8**

DISCUSSION

Low birth weight is a significant factor for perinatal mortality and/or morbidity in developing and developed countries [13]. In this study 45.1% of neonates admitted in NICUs found with LBW. Higher result 51.8% was reported by Abdul-Latif *et al.* of LBW among NICUs admitted neonates at 2000 in Diyala city, Iraq[19]. The higher results might be related to studying a particular hospital in a particular part of Iraq as compared to the present study, which might lead to sampling variability in exposure to the factors that increase the risk of pregnant women giving birth to infants with LBW. No relation was found between gender and LBW deliveries, similar to a study conducted in Iran[15]. In the present study, the LBW presented a significant association with congenital malformations with *P value* of less than *0.05*. This result agreed with a study result conducted in Nigeria [20], India [21], and Barazil [22], while another author reported no association between LBW and congenital congenital malformations in urban community in Nigeria [23]. It should be noted that some authors have evidenced of a significant association between LBW and the presence of congenital anomalies, in addition to an increased incidence in the number of cases compared to normal births of greater weight [24]. Central nervous system malformation was the most frequent sign (13.3%) presented among LBW neonate with congenital malformation. A similar finding was reported among LBW with congenital malformation in Brazil [22] and Ethiopia [25].

Very young women are psychologically and physically immature for reproduction, hence pregnancy in this age group is generally considered to be high risk event. In addition, there are some other factors such as illiteracy, inadequate prenatal care, poor nutrition etc. that affect the outcome of pregnancy in very young women [26]. In the current study, no relation found between maternal age and LBW. This result is consistent with the studies conducted in India [27] and Pakistan [28]. However, other authors reported results contrary to our findings [29, 30]. This may be due to lesser sample size in current study population.

Maternal BOH was related to LBW among neonates as shown in table (2), the result indecated women with BOH delivered more number of infants with LBW than women without such history this was in accordance with other studies in Nigeria[31,32] and in Pakistan [16]. Maternal medical illnesses and obtetric factors are related to increased incidence of LBW among neonates[19, 33] since obtetric factors companioned by haemorrhage that could lead to anaemia and hypertensive disorder which affect maternal health [15]).Moreover, investigators have verified that women who had already had a malformed baby were 2.4 times more likely to have a second affected baby when compared to other women without as such history due to some persistent causal factor [34]. Socioeconomic status is an important determinant of health status because of its influence on the prevalence and the incidence of various health-related conditions [35]. Many SES scales have been proposed to measure the SES classe [36]. Selecting SES scales that are most relevant to the outcome of a study is a challenge in the terms of reliability and practicality. The reasons behind selecting the Kuppuswami scale in the current study as a measurement for SES levels are the following:

1) it is difficult to investigate SES by income only among families in Iraq because of cultural-based attitudes[37].

2) The Kuppuswami scale is widely used in communities [35].

3) The scale are used education, income and occupation for SES measure, which make the scale relevant to the outcome of the study. The level of education is a factor that contributes to obtaining quality prenatal care. the educational level is positively related to qualified prenatal care, which means that women with more education were more likely to receive quality care [38] Thus, it is believed that the higher the level of maternal education, the better discernment of the mother in relation to the need to monitor her pregnancy and care for the child, therefore the uneducated mother with highest income will not be the highest SES level [37]. Additionally, maternal occupation had been identified as risk factors for LBW neonates.

In the current study, no relation found between SES and LBW deliveries, a finding that similar to a recent study conducted in India that found SES of mothers was not related to LBW of neonates. However, occupation of

mothers was found as significant risk factors for LBW babies in the same study [39].

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Author contributions

Sevan Najem Alwan collected the sample and writes the manuscript; Haider Sabah Kadhim concepts of the study revised and approved the final version of the manuscript; Atheer Jawad AL-Saffar the study design, implementation of the statistical aspects, revised the final version of the manuscript; Hala Sameh Arif clinical consultation; Yasmeen J. Al-Bayaa: data base entry.

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List of Abbreviations

LBW = low birth weight
BOH= bad obstetric history
SES= socioeconomic status
Y= yes, N= no, No= number