RESEARH STUDY

KCMJ 2014; 10(1): 62-68

* HafadhJaleel Hussein, F.I.C.M.S- Ped.

Dr. Nidhal M. Kadhum, F.I.C.M.S- Ped.

Dr. Aeshah Muneeb, DCH.

Dr. Luay M. Salih, MB.Ch.B

Relationship between Very Low Birth Weight Neonates and increased Neonatal mortality for age 0 to 7 days

ARTICLE INFORMATION

Authors addresses:

[a] **Ibn Al- Baladi Pediatrics and Maternity Hospital. Baghdad, Iraq.**

* Corresponding Author
E-mail address:
E-mail:hafizlao@yahoo.com

Article history:

Received:
Revised form:
Accepted:

Keywords:

Neonatal mortality, very lowbirth weight neonates, Relatioship

ABSTRACT

Background: Very low birth weight (VLBW) neonates constitute approximately 4-7 percent of all live births and their mortality is very high. ***Objective:*** to find out if there is a relationship between Very Low Birth Weight Neonates and increased neonatal mortality for age 0 to 7 days.

Methods A retrospective study of VLBW neonates admitted to NICU at Ibn Al-Baladi Pediatrics and Maternity hospital over one year (2012)were studied, study period was from April till August 2013. Exclusion criteria were: (1) neonates weighing less than 700 g and with gestational age less than 24 weeks (abortion) (2) death in the delivery room (3) neonates weighing more than 1500 g. (4) Postnatal age more than 7 days. The outcome measure was in-hospital death. Medical records were reviewed and data were analyzed. Results being considered as statistically significant when the P value was≤0.05.

Result A total of 150 cases of very low birth weight (VLBW) neonates were enrolled, of which a total of 69 (46 %) babies died. The survival rate was found to increase with the increase in birth weight and gestational age (P value was highly significant). There is no relation between gender, postnatal age, mode of delivery and social class with number of death. Respiratory distress, gestational age, neonatal septicaemia are the factors directly responsible for neonatal mortality. Premature rupture of membranes (PROM), multiple pregnancy and Young mothers were the most common maternal risk factors associated with death in VLBW.

Conclusions: Mortality rate in VLBW neonates was found to increase with the decrease in birth weight and gestational age. prematurity, RDS and infection are major causes of perinatal deaths. Advanced medical care must be available in each neonatal care unit including, Artificial ventilation, pulse oximetry and Surfactant.Obstetricians must be advised for Intense and regular follow up of at risk mothers(multiple pregnancy, PROM, IUGR, APH).

Introduction:

Three quarters of neonatal deaths occur in the first week, and more than one quarter occur in the first 24 hours. [1,2] Neonatal death account for 40% of deaths under the age of 5 years worldwide. Therefore, efforts to achieve the UN Millennium Development Goal 4 of reducing childhood mortality by two- thirds by 2015 are focused on reducing neonatal deaths in high- mortality countries. Two-thirds of the world's neonatal deaths occur in just 10 countries, mostly in Asia.[3, 4]

Very low birth weight (VLBW) babies constitute approximately 4%-7% of all live births but need a major share of effort, time and resources for their care. Despite this attention, the mortality in this subgroup is high, contributing to as much as 30% of early neonatal deaths. [5] Survival is directly associated with their birth weights and inversely associated with gestation.[6]

But these factors alone are insufficient to explain the large variations in neonatal mortality among various neonatal intensive care units (NICUs). The interaction of illness severity and physiological alterations complicate the management policies, the appropriateness of which determines the neonatal outcome. Approximately 50% of the 6 million perinatal deaths throughout the world each year are early neonatal deaths (occurring in the first 7 days after birth).[5] Early neonatal deaths

account for 75% of all deaths that occur within the first 28 days after birth.[5,6]

VLBW infants weigh < 1500 g and are predominantly premature. In the USA in 2008, the VLBW rates were approximately 1.46% overall, 3.01% among blacks, and 1.18% among whites. The VLBW rate is an accurate predictor of the infant mortality rate. VLBW infants account for over 50% of neonatal death and 50% of handicapped infants; their survival is directly related to birth weight, with approximately 20% of those between 500 and 600 g and more than 90% of those between 1250 and 1500 g surviving. [7] The VLBW rates has remained unchanged for black Americans but has increased among whites, perhaps because of the rise in multiple births among whites . Perinatal care has improved the rate of survival of VLBW infants. When compaired with term infants, VLBW neonates have a higher incidence of rehospitalization during the first year of life for sequelae of prematurity , infections, neurologic complications and psychosocial disorders. [7]

Terms and Definitions

RDS: respiratory distress syndrome
TTN: transient tachypnea of newborn
APH: antepartum hemorrhage
PROM: premature rupture of membranes
HT: hypertension
IUGR : Intrauterine growth restriction or small for gestational age (SGA) is defined as two standard deviations below the mean for gestational age or below the tenth percentile[8,9,10]. Approximately one-third of LBW infant are SGA.
Low birth weight (LBW) : Birth weight less than 2500g
Very low birth weight (VLBW) : Birth weight less than 1500g
Extremely low birth weight (ELBW): Birth weight less than1000g[8,9,10].
Aim of the study

To find out if there is a relationship between Very Low Birth Weight Neonates and increased neonatal mortality for age 0 to 7

Methods:

A retrospective study was conducted at Ibn Al-Baladi Paediatrics and Maternity Hospital in Baghdad, from April till August 2013. The medical records of VLBW infants admitted to the NICU during 2012 were reviewed with the help of Medical Records Department. The outcome measure was in-hospital death. Survival was defined as the discharge of a live infant from the hospital. All newborns with birth weight≤ than 1,500 g admitted to NICU were included in the study. Exclusion criteria were: (1) neonates weighing less than 700 g and with gestational age less than 24 weeks (abortion) (2) death in the delivery room. (3) Neonates weighing more than 1500 g. (4) Postnatal age more than 7 days. Data collected included detailed antenatal and natal histories, gestational age as per New Ballard Score, birth weight, sex and mode of delivery, details of clinical examination including vitals, and progress during the hospital stay and outcome. Details of morbidities and mortalities developed during the hospital stay, if any, were noted. Statistical analysis was performed using the commercial statistical software; Descriptive statistics included the use of frequencies, relative frequencies, means, standard deviations and ranges. The Chi-Square statistical test was used to test for associations between variables with the results being considered as statistically significant when the P value was≤0.05 SPSS statistical package version 20 was used for data description and analysis.

Results

Table (1) outcome of cases according to gestational age, weight, gender, postnatal age, mode of delivery, social class and malformations

		Outcome						
		alive		dead		Total		
		N0	%	N0	%	N0	%	P.value
Gestational age	<30	21	25.93	39	56.52	60	40.00	
	30-35	52	64.20	29	42.03	81	54.00	0.0001*
	>0r=36	8	9.88	1	1.45	9	6.00	
	Total	81	100.00	69	100.00	150	100.00	
Weight (Kg)	<1	4	4.94	8	11.59	12	8.00	
	1-1.2	33	40.74	43	62.32	76	50.67	0.002*
	1.3-1.5	44	54.32	18	26.09	62	41.33	
Gender	males	42	51.85	39	56.52	81	54.00	0.576
	females	39	48.15	30	43.48	69	46.00	
	Total	81	100.00	69	100.00	150	100.00	
Age (days)	<5	46	56.79	45	65.22	91	60.67	0.292
	>or=5	35	43.21	24	34.78	59	39.33	
	Total	81	100.00	69	100.00	150	100.00	
Mode of delivery	vaginal	59	72.84	57	82.61	116	77.33	0.154
	cesarean	22	27.16	12	17.39	34	22.67	
	Total	81	100.00	69	100.00	150	100.00	
Social class	high	0	.00	0	.00	0	.00	
	medium	17	20.99	10	14.49	27	18.00	0.302
	low	64	79.01	59	85.51	123	82.00	
	Total	81	100.00	69	100.00	150	100.00	
Malformations	Down	1	100.00	0	.00	1	14.29	
	Icthyosis	0	.00	1	16.67	1	14.29	
	CHD	0	.00	2	33.33	2	28.57	
	Microcephaly	0	.00	1	16.67	1	14.29	0.221
	Hypoplasia of lower limb	0	.00	1	16.67	1	14.29	
	cleft lip &palate	0	.00	1	16.67	1	14.29	
	Total	1	100.00	6	100.00	7	100.00	

In this table death among neo nates with gestational age < 30 weeks were 39 (56.5%), Death among neonates with gestational age 30 - 35 weeks were 29 (42.03%). While death among neonates with gestational age ≥ 36 weeks were 1 (1.45 %). Regarding body weight, those with weight < 1 kg, 8 (11.59%) of them died, those with weight between 1- 1.2 kg, 43 (62.3 %) of them died While those with weight between 1.3 - 1.5 kg, 18 (26%) of them died. Mortality rate in VLBW neonates was found to increase with the decrease in birth weight and gestational age. There is no relation between gender, postnatal age, mode of delivery and social class with number of death

Table (2) Outcome of cases in relation to the diagnosis

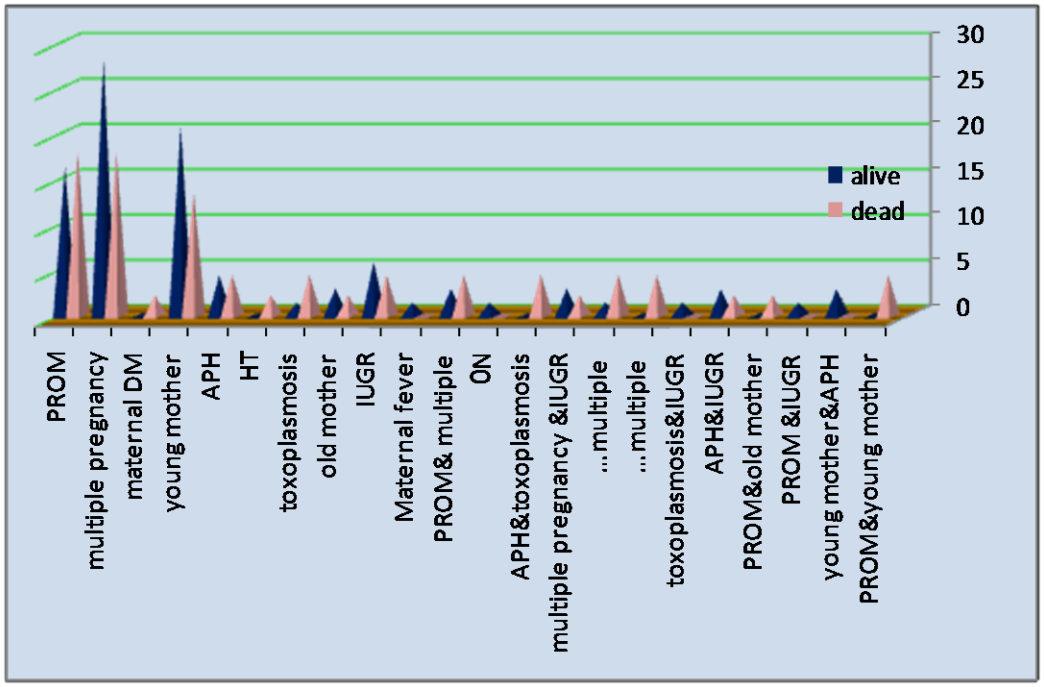
	Outcome					
	alive		dead		Total	
Diagnosis	N0	%	N0	%	N0	%
RDS	55	67.90	58	84.06	113	75.33
RDS & sepsis	0	.00	6	8.70	6	4.00
sepsis	6	7.41	3	4.35	9	6.00
Birth asphyxia	0	.00	2	2.90	2	1.33
hypoglycemia	0	.00	0	.00	0	0.00
TNN	6	7.41	0	.00	6	4.00
neonatal jaundice	13	16.05	0	.00	13	8.67
TTN & Hypoglycemia	1	1.23	0	.00	1	0.67
Total	81	100.00	69	100.00	150	100.00

P=0001*

This table shows that RDS is the most common cause of death, 58(84.06%) of neonates died Followed by (RDS &Sepsis) 6(8.7 %), Sepsis alone 3 (4.3 %) and Asphyxia 2 (2.9 %).

Figure 2:The distribution of study sample according to Risk Factors & outcome

Premature rupture of membranes (PROM), multiple pregnancy and Young mothers were the most common maternal risk factors associated with death in VLBW. Chance of death is increased if two or more risk factors are present.



Discussion

Neonatal death is a serious concern, both in the developing and the developed worlds. While infant mortality rates have been decreasing steadily all over the world, changes in neonatal mortality rate have been much slower. One of the commonest causes of neonatal mortality in developing countries is prematurity and low birth weight[11].

In the present study, death among VLBW neonates was found to increase with the decrease in birth weight and gestational age, this goes with a study done in India by Basu S, Rathore P, Bhatia BD. [12] Gender in our study was not significant, which is similar to a study done in Saudi Arabia by Haifa Mansouri. [13]
RDS was the most common cause of death in VLBW babies, most likely due to inavailability of surfactant in our hospital , while Kato et al, [14] had highest rate of survival among VLBW complaining of RDS this could be possibly explained by the availability of surfactant during the whole study period , or there could be a racial or genetic factors of Japanese babies to have a survival advantage at a lower birth weight and/ or the mean birth weight of this race is lower and so the deviation of VLBW from the mean is not a great.
Of 150 VLBW babies 69 of them died (46%), while in Italy the mortality rate in VLBW was 19.6%. [15], In United Arab Emirates mortality rate among VLBW was 20%. [16]Of course this may be due to advanced NICU. Other studies have documented a mortality rate varying from 23% to 29%. [17,18]rate of very low birth weight (VLBW, <1.500 g) is the principal predictor of neonatal mortality.[19]

It was observed that the incidence of maternal risk factors associated with VLBW is higher than in general pregnant women. Premature rupture of membranes (PROM), multiple pregnancy and Young mothers were the most common maternal risk factors associated with death in VLBW. In a study in U.S.A by Becerra JE, Rowley DL, Atrash HK.[20]Preliminary results indicate that infants born to multiparous women (parity of 2) whose age<20 years have the highest rates of neonatal death from medical conditions associated with the pregnancy.

Conclusions

The survival rate was found to increase with the increase in birth weight and gestational age. There is no relation between gender, postnatal age, mode of delivery and social class with number of death. Respiratory distress, gestational age, neonatal septicemia are the factors directly responsible for neonatal mortality.
Premature rupture of membranes (PROM), multiple pregnancy and Young mothers were the most common maternal risk factors associated with death in VLBW

Recommendations:

Advanced medical care must be available in each neonatal care unit including CPAP, Artificial ventilation, pulse oximetry and Surfactant. Regular training courses inside and outside the country for specialist doctors (Neonatologists and obstetricians), resident doctors, nurses and midwives. Neonatal Resuscitation Program (NRP) may reduce early neonatal mortality. Obstetricians must be advised for Intense and regular follow up of at risk mothers (multiple pregnancy, PROM, IUGR, APH).
Work in the NICU is a team- work: Pediatrician, Obstetrician, Pediatric Surgeon, radiologist, biochemist, Microbiologist, Anaesthetist and Parent groups must work as a complete team.

References

1. World health report 2005: make every mother and child count. Geneva: WHO; 2005.
2. Lawn JE, Cousens S, Zupan J.4 million neonatal deaths: when? Where? Why? Lancet 2005; 365: 891- 900.
3. Neonatal and perinatal mortality: country, regional and global estimates. Geneva: WHO; 2006.
4. Jalil F. Perinatal health in Pakistan : a review of current situation .ActaPaediatr 2004 ;93: 1273- 9.
5. Koops BL, Morgan LJ, Battaglia FC. Neonatal mortality risk inrelation to birth weight and gestational age: update. J Pediatr 1982;101:969-77.
6. Richardson DK, Phibbs CS, Gray JE, et al. Birth weight and illnessseverity: independent predictors of neonatal mortality. Pediatrics1993; 91:969-75.
7.WaldemarA.Carlo. Prematurity and intrauterine growth restriction.Nelson textbook of pediatrics, 18th Ed. Philadelphia, WB Saunders 2012; 91:556.
8. Richardus JH, Graafmans WC, Verloove-Vanhorick SP, Mackenbach JP.The perinatal mortality rate as an indicator of quality of care in international comparisons. Med Care 1998; 36:54.
9. Graafmans WC, Richardus JH, Macfarlane A, et al. Comparability of published perinatal mortality rates in Western Europe: the quantitative impact of differences in gestational age and birthweight criteria. BJOG 2001; 108:1237.
10. Mathews TJ, Miniño AM, Osterman MJ, et al. Annual summary of vital statistics: 2008. Pediatrics 2011; 127:146.
11. Carlo et al. High mortality rates for very low birth weight infants in developing countries despite training. American academy of Pediatrics J. 2010; 126: 1072- 1080.

12. Basu S, Rathore P, Bhatia BD. Predictors of mortality in very low birth weight neonates in India. Singapore Med J 2008; 49(7) :560.

13. Haifa Mansouri. Perinatal factors and neonatal outcome of very low birth weight and extremely premature babies at KAUH. Bahrain Medical Bulletin, 2001;23(2)

14. Kato EH, Yamada H, MatsumotoS et al. Relationship between perinatal factors and outcome of VLBW infants. J Perinat.Med. 1996;24:677-86.

15. Corchia C, OrzalesiM . Geographic variations in outcome of very low birth weight infants in Italy. *ActaPaediatr* 2007; 96: 35-38.

16. DawoduA ,Varady E, Verghese M, Al-Gazali LI. Neonatal audit in the United ArabEmirates: a countrywith a rapidly developing economy. *East Mediterr Health J* 2000; 6: 55-64.

17.Brito AS, Matsuo T, Gonzalez MR, de Carvalho AB, Ferrari LS. [CRIB score, birth weight and gestational age in neonatal mortality risk evaluation]. Rev Saude Publica 2003; 37:597-602.

18. Zardo MS, Procianoy RS. [Comparison between different mortality risk scores in a neonatal intensive care unit]. Rev Saude Publica 2003; 37:591-6.

19. Lee K, Paneth N. Garner LM, Pearlman M. The very low-birth-weight rate: principal predictor of neonatal mortality in industrialized populations. J Pediatr 1980;97:759-64

20. Becerra JE, Rowley DL, Atrash HK. Case fatality rates associated with conditions originating in the perinatal period: United States, 1986 through 1987. Pediatrics1992;89:1256-8.