

## Outcome of Neonatal intensive care units in maternity wards /Baghdad hospitals

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### Abstract:

**Background:** The neonatal period is the transitional time from intrauterine to independent existence, defined as approximately the first four weeks after delivery. The neonatal period is possibly the most tenuous in a human's lifetime. Neonatal mortality is one of the world's most neglected health problems. It is estimated that globally four million newborns die before they reach one month of age.

**Objective:** To study the outcome of neonates admitted to the neonatal care units of maternity wards in Baghdad hospitals and identifying causes of admissions and causes of deaths.

**Methods:** Across sectional study covering all neonatal intensive care units in Baghdad maternity wards. The study was carried out by hospital record review of 15 Neonatal care units for causes of admission and causes of death in neonatal care units during 2013(1/1/2013-31/12/2013).The study lasted from November 2013 till the end of March 2014.

**Results:** Total admission was 13195. Main causes of admission were respiratory distress syndrome (43%), prematurity and low birth weight (19.4%), transient tachypnea (17.4%), birth asphyxia (4%), hypoglycemia (3.8%), congenital anomalies (3.7%), neonatal jaundice(3%),while meconium aspiration and septicemia were the lowest (1%).From all these admission 74%were discharged well, 6%were referred, while those discharged against medical advice were 4% and the rest 16% died. Main causes of death in neonatal intensive care units were respiratory distress syndrome (34%),prematurity and low birth weight (31%), congenital anomalies (12%),birth asphyxia (8%),septicemia (4%), meconium aspiration (1%), and 10%due to other causes. Highest case fatality rate was among congenital anomalies (54%) followed by septicemia (51%), birth asphyxia (32%),prematurity and low birth weight (26.2%), meconium aspiration (20%)while the lowest case fatality rate was for respiratory distress syndrome (12.7%).

**Conclusion:** It can be concluded that respiratory distress syndrome and prematurity were the main neonatal health problems encountered in neonatal intensive care units in Baghdad.

**Keywords:** Neonatal care units' evaluation, Respiratory distress syndrome, Low birth weight.

### Introduction:

The neonatal period is the transitional time from intrauterine to independent existence<sup>(1)</sup>, and defined by medical dictionary as the interval from birth to 28 days of age.

It represents the time of the greatest risk to the infant. Approximately 65% of all deaths that occur in the first year of life happen during this 4-week period<sup>(2)</sup>. Newborn intensive care: is defined as care for medically unstable or critically ill newborns requiring constant nursing, complicated surgical procedures, continual respiratory support or other intensive interventions<sup>(3)</sup>.

Neonatal mortality is one of the world's most neglected health problems. Worldwide about eight newborn babies die every minute. It is estimated that globally four million newborns die before they reach 1 month of age and half of them die in their first 24 hours<sup>(4)</sup>. Maternal and neonatal mortalities continue to occur at unacceptably high levels in Iraq. The maternal mortality ratio and neonatal mortality rate remained as high as 84 per 100000 live births and 23 per 1000 live births, respectively in 2010<sup>(5)</sup>.

The high mortality rates are partially attributable to scarcity of trained skilled birth attendants and paucity of resources. Empowerment of health care providers with adequate knowledge and skills can serve as instrument of change<sup>(6)</sup>

### Subjects and Methods:

Across sectional evaluation study covering all accessible Neonatal care units (NCUs) in Baghdad maternity wards. Outcome evaluation study was done using the hospitals registration records review for causes of admission and causes of death in neonatal care units for the year 2013. Actual data collection lasted from November 2013 till the end of March 2014. Fifteen Neonatal intensive care units at maternity wards in Baghdad hospitals were involved in this study in Karkh and Rosafa.

### Results:

Total admissions to NICUs (13195). Male compromise 60%, while female admission was 40%. The admitted neonates were delivered either by spontaneous vaginal delivery 4135 (36%) or Caesarean Section (CS) 7516 (64%), except 10 cases were delivered by assisted delivery. Gender specific admission rate from hospital deliveries among NCUs neonates was 12.3% for males and 9%for females. Annual neonates inpatient per incubator ratio was (53.6).Common causes for neonatal admissions to NCUs in this study were respiratory distress syndrome (43%), with incidence rate in maternity hospitals 46.2/1000 live birth, then prematurity and low birth weight (19.4%) with incidence rate 20.8/1000 live birth, and transient tachypnea (17.4%) incidence18.7/1000 birth rate. The lowest percent

was septicemia and meconium aspiration (1%) (Table 1). From all admission to NCUs (74%) were discharged well. And (6%) were referred to other hospitals or to pediatric ward. while (4%) were discharged against medical advice and the rest (16%) died (Figure 1). Main cause of death in NCUs during 2013 in Baghdad maternity wards was RDS (34%), followed by prematurity and low birth weight (31%), while meconium aspiration compromise (1%) of the causes of death. Case fatality rate (CFR) in NCUs according to cause of death shown in table 2. Gender specific death rate according to deliveries and admissions is shown in table 3. It can be noticed that male admissions and death rate (20/1000) was predominant while female death rate was (14/1000).

### Discussion:

Gender proportions in NCU admission differ from retrospective study done in Riyadh which showed equal sex proportion<sup>(7)</sup>. The high percent of C/S admission to studied NCUs could explain the risk of C/S to newborn babies as in study done in Canada concluded that babies born by C-section were more likely to be admitted to NICUs/intensive care units<sup>(8)</sup>. Rate of neonate inpatient/incubator during 2012 in Baghdad was 56 while in current study it was 53.6 infant/incubator<sup>(9)</sup>. The high incidence of RDS (46.2/1000 live birth) in current study may be explained by poor use of Betamethasone before delivery in suspected premature delivery, or it could be due to high percentage of CS which is a risk factor for RDS occurrence agrees with one research found that pregnant ladies choosing repeated cesarean deliveries are up to two times more likely to have a baby with serious complications including respiratory distress resulting in NICU admission<sup>(10)</sup>. Prematurity and low birth weight also showed high incidence rate (20.8/1000 live birth) may be due to lack of good antenatal care and poor diet of mother which is known to be associated with low birth babies. Preterm birth rate varies in different part of the world as it was reported 5.5% in New South Wales (Australia) and 9.7% in USA, 3%, in Jordan, 15.2% in Zimbabwe, 20.3%<sup>(11)</sup>. Transient tachypnea also showed high percentage in admission to NCUs (17.4%) & high incidence rate (18.7/1000 live birth) this could be explained by, high CS deliveries, and more male were admitted to our NCUs as all these usually considered to be risk factor for TTN (Transient tachypnea of newborn) this agrees with study done in Al-Yarmouk hospital<sup>(12)</sup>. Other important cause of admission to NCUs in current study was the congenital abnormality (3%) with incidence rate (4/1000 live birth) which is within the worldwide incidence of congenital malformation, ranging between 3% to 7%<sup>(13)</sup>.

Meconium aspiration in the present study was (1%) which agrees with other study in Miraj India<sup>(14)</sup>. Septicemia was another cause for admission to NCU and accounted 155 (1%), which is much lower than a study done in NCU of Baghdad Teaching hospital that showed 9.3% of neonate in NCU had bacterial infection<sup>(15)</sup>.

In the present study there was 74% of NCUs neonate discharged well which is near to what was found in a study done in Turkey<sup>(16)</sup>. Death rate in current study was 16% & Neonatal mortality rate (NMR) was 17/1000 live births of maternity hospitals. This result did not include all neonates who died immediately after labor, or discharged from the unit and deteriorated at home. In other wards the figure is expected to be much higher. In a study done in Fallujah/Iraq during 2010, NMR was 41.5 /1000<sup>(17)</sup>, in United Arab Emirates (UAE) (11.59/1000 live births), in Afghanistan (121.63/1000 live births)<sup>(18)</sup>.

Gender specific death rate was calculated in relation to deliveries and was found to be 20/1000 for male and 14/1000 for female, disagrees with another study in Nigeria found that the neonatal mortality rate by gender was not significant<sup>(19)</sup>.

About 4% of our neonates discharged against medical advice (DAMA). The prevalence of DAMA varies widely in the literatures, from less than 1% up to 30% or even more<sup>(20)</sup>. Regarding the referred cases in the present study they were 6%, some were facing a problem of lacking transport incubator, in addition the procedure of referral is complicated one which increase the problem.

In the present study the main cause of death was RDS which is very high and could be due to unavailability of surfactant and ventilator in NICUs which agree with the study done in Fallujah General Hospital for five years<sup>(17)</sup>. RDS had the lowest case fatality rate in the present study (12%), second common cause of neonatal death in this study was prematurity and low birth weight (31%), agrees with Al-Nemri & Suljman in study in Saudi where prematurity (31%), but disagree with respiratory distress syndrome (27%) and perinatal asphyxia (7.6%)<sup>(21)</sup>. Case fatality rate of prematurity and LBW was (26.2%) in the present study which seem lower than case fatality rate in Abha general hospital (85%) among those who were delivered before 30 week<sup>(22)</sup>. Birth asphyxia case fatality was (32%), while in Nigeria case fatality around (40%)<sup>(23)</sup>. NCU death due to congenital anomalies was 12% and with high case fatality rate (54%) thus public awareness about preventable risk factors is to be created and early prenatal diagnosis and management of common anomalies is strongly recommended. Congenital malformations contribute to 10.3 % of neonatal deaths in a study done in Iraq between 1994-1999 which is less than our estimated rate<sup>(24)</sup>. Septicemic deaths was 4% and high CFR (51%) which may be due to poor hygienic

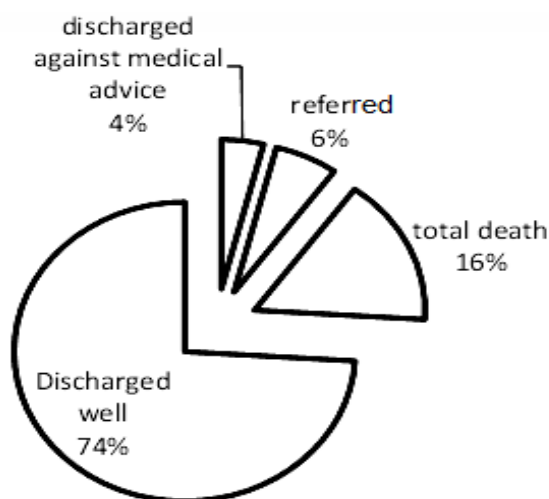
practice in cases of premature rupture of membrane and in the NICU. Meconium aspiration deaths were (1%). Meconium aspiration always carries high mortality rate and case fatality rate, in the present study CFR was about (20%).

In conclusions, male neonate admissions to NICU were one and a half times higher than female reflecting cultural gender sub-ordination. Leading

causes of NICU admission and death was RDS. Three quarters of NICU admissions were discharge well, while death rate was 16%. It is recommended to establish better antenatal care services with a good interaction between obstetricians and pediatricians. Initiation of death conferences in NICU is recommended to raise NICU staff awareness of causes and take appropriate actions.

**Table 1: Causes of admission to NICU from maternity Department of Baghdad hospitals, 2013**

Causes of admissions	Incidence/1000live births in maternity wards	No. (%)
Respiratory distress syndrome	46.2	5684(43)
Prematurity & LBW	20.8	2567(19.4)
Transient tachypnea	18.7	2301(17.4)
Birth asphyxia	4.3	537(4)
Metabolic hypoglycemia	4.06	500(3.8)
Hypocalcaemia	0.09	12(0.1)
Congenital anomalies	4.04	497(3.7)
Neonatal jaundice	3.3	418(3)
Meconium aspiration	1.17	145(1)
Septicemia	1.2	155(1)
Unclassified causes		379(2.8)
<b>Total</b>		<b>13195(100)</b>



**Figure 1: NICUs fate of maternity wards of Baghdad hospitals 2013**

**Table 2: Death rates at NICUs of maternity wards of Baghdad hospitals**

Causes of death	No. of admission	No. (%) of death	Case fatality rate
RDS	5684	725(34)	12.7
Prematurity and LBW	2567	674(31)	26.2
Congenital anomalies	497	269(12.4)	54
Birth asphyxia	537	177(8.2)	32
Septicemia	155	79(4)	51
Meconium aspiration	145	20(1)	20
Other causes of death	379	214(10)	
<b>Tot</b>	<b>9964</b>	<b>2158(100%)</b>	

**Table 3: NICU Gender specific death rate in relation to deliveries and admissions, 2013**

	Delivery	Admission	Death	NICU Gender specific death rate
<b>Males</b>	63912	7874	1272	20/1000
<b>Females</b>	59083	5321*	886	14/1000
<b>Total</b>	122995	13195	2158	17/1000

\*(4cases) of undifferentiated sex added to females

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