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## ORIGINAL ARTICLE

# Survival of Extremely Premature Infants at the Largest MOH Referral Hospital in UAE: Comparable Results to Developed Countries

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**Abstract:**

**Objective:** to investigate the survival rate of extreme premature infants born between 2000 and 2008 at AL Qassimi hospital that is the largest Ministry of Health (MOH) referral hospital in the United Arab Emirates (UAE).

**Methods:** This was an institutional review board approved retrospective study of the outcomes of pregnancies in women who were in labor and delivered between 23 and 25 weeks' completed gestation at Al Qassimi Hospital in the Emirate of Sharjah between January 1,2000 and December 31,2008. Its neonatal unit has a capacity for 24 neonates. It is a level III unit, equipped with high frequency ventilation and nitric oxide therapy. The obstetric estimation of completed gestational age was based on postmenstrual dates and early gestations prenatal sonographic findings confirmed with postnatal Ballard physical examination. A neonatologist attended all vaginal, elective or emergency cesarean sections of preterm deliveries. If the infant had a heart rate and GA was  $\geq 23$  weeks, attempts of resuscitation were started with bag-and-mask ventilation and intubation. Survival rates were calculated by dividing the number of discharged infants born at a given gestational age by the total number of infants delivered alive at the same gestational age. Mortality data were collected from the medical records. The World Health Organization (WHO) definition of neonatal mortality was adopted in this study as: neonatal death during the first 28 days of life per 1000 live births. Corrected neonatal mortality excludes lethal congenital malformations and BW <500g (WHO definition).

**Results:** Between January 1<sup>st</sup> 2000 and December 31<sup>st</sup> 2008, 40577 infants were born alive at Al Qassimi Hospital. Total neonatal death during this period was 217 infants (5.3/1000 live births). Corrected neonatal deaths in the 9 years was 154 infants which is 3.79/1000 live births. Over the past 9 years, survival of extreme premature infants of 23-25 WG ranged from 26% to 75%. The last 3 years (2006-2008) survival rate of this group age was persistently  $\geq 50\%$ . Neonatal survival increased steadily with increasing gestational age: 88% at 26-29 weeks 97% at 30-32 weeks and 98% at 33-34 weeks. Neonatal survival declined slightly to 95% and 93% at 35-37 weeks and  $>37$  weeks respectively.

**Conclusion:** Neonatal mortality rate at Al Qassimi Hospital, which is the largest referral center among UAE Ministry of Health hospitals, is 3.8 per 1000 live births. Survival of extremely preterm infant's  $\leq 25$  WG was  $\geq 50\%$  over the last 3 years. These results are comparable to the published data from different developed countries.

**Keywords:** Survival, Extremely Premature Infants

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## Introduction

The decision to provide life support or not for premature infants at the threshold of viability is an important and ongoing debate. During the past 2 decades, survival rates have increased substantially due to advances in knowledge, medical technology, and therapeutic options [1]. With respect to offering life support, various authors and societies come to different conclusions, based on their interpretations of the

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available data concerning cost of care, burden to the patient, family, and society, and long-term outcomes. The American Academy of Pediatrics suggests that parental choice based on thorough information should be respected within the limits of what is medically feasible and appropriate. Definitions of these limits are vague, except that non-initiation of resuscitation is considered appropriate for newborns < 23 weeks of gestation and/or birth weight (BW) of <400 g [2]. In the Netherlands, long-term outcomes are interpreted as being very poor for gestational age (GA) of <25 weeks [3], and Dutch centers consider it inappropriate to offer life support for infants born before 25 to 26 weeks' gestation (WG) [4]. In Norway, a national consensus conference in 1998 concluded that the GA limit for offering resuscitation should be 23 to 25 completed weeks and that within this range an individual approach is appropriate [5].

Recently in March 2008, the General Presidency of Scholarly Research and Fatwa in Saudi Arabia issued a religious (Islamic) legal opinion stated that: "In the case of infants born at less than 6 lunar months (25 weeks' gestation), two senior physicians could evaluate the infant's condition and based on their opinion, the infant could be offered full resuscitation or not" [6].

The threshold of human viability seems to be limited to the physiologic development of the lungs (sacchular phase) that takes place around 22-24 weeks. Consequently, survival rate at this age is not expected to improve [7].

Survival rate of extreme premature infants has been recently published for many European countries and in Japan [8,9]. Through Medline database research, I found a lack of published peer reviewed data regarding the survival of the extremely premature in developing countries.

The objective of this study is to investigate the survival rate of extreme premature infants born between 2000 and 2008 at AL Qassimi hospital, which is the largest Ministry of Health (MOH)

referral hospital in the United Arab Emirates (UAE).

#### **Methods:**

This was an institutional review board approved retrospective study of the outcomes of pregnancies in women who were in labor and delivered between 23 and 25 weeks' completed gestation at Al Qassimi Hospital in the Emirate of Sharjah between January 1,2000 and December 31, 2008.

Al Qassimi Hospital is the largest referral center among the Ministry of Health Hospitals in UAE. Its neonatal unit has a capacity for 24 neonates. It is a level III unit, equipped with high frequency ventilation and nitric oxide therapy.

The obstetric estimation of completed gestational age was based on postmenstrual dates and early gestations prenatal sonographic findings confirmed with postnatal Ballard physical examination. In case a mother was in labor at 22 to 25 WG with adequate time before delivery, she was consulted by both an obstetrician and a neonatologist regarding resuscitative measures. Discussion with the concerned parents included the knowledge of survival rates and outcome expectations based on literature. Mode of delivery was determined by the obstetrician.

Treatment of women in labor at 22-25 WG included the following: routine determinations of vital signs, initiation of intravenous access, hydration and monitoring of fetal heart rate and uterine contractions. A clinical examination for evaluation of cervical dilation, chorioamnionitis, and rupture of membranes was conducted, If membranes were intact, tocolysis was initiated; otherwise antibiotics were started after culture. An abdominal sonogram was obtained to ascertain placental placement, amniotic fluid volume, presentation and estimated fetal age and weight. Antenatal steroids were administered at the discretion of the obstetricians but occurred in the majority of cases. A neonatologist attended

**Table 1. Neonatal mortality, Al Qassimi NICU**

	Live Birth	Total Neonatal Death	Lethal congenital anomalies death	Corrected Neonatal death	Corrected Death/1000 live births
2000	4637	26	8	18	3.8
2001	4765	16	7	9	2
2002	5056	17	8	9	2
2003	3465	25	9	16	4.7
2004	6588	41	7	34	5
2005	4787	29	5	24	5
2006	3563	22	5	17	4.7
2007	3539	22	8	14	3.9
2008	4177	20	7	13	3.1

all vaginal, elective or emergency cesarean sections of preterm deliveries. If the infant had a heart rate and GA was  $\geq 23$  weeks, attempts of resuscitation were started with bag-and-mask ventilation and intubation. Although surfactant therapy was not given in the delivery room, it was given as early rescue to all preterm infants after they were transferred to the neonatal intensive care unit (NICU) and their endotracheal had been checked for appropriate position.

Survival rates were calculated by dividing the number of discharged infants born at a given gestational age by the total number of infants delivered alive at the same gestational age. Mortality data were collected from the medical records. The World Health Organization (WHO)

definition of neonatal mortality was adopted in this study as: neonatal death during the first 28 days of life per 1000 live births. *Corrected* neonatal mortality excludes lethal congenital malformations and BW  $<500\text{g}$  (WHO definition).

#### Results:

Between January 1<sup>st</sup> 2000 and December 31<sup>st</sup> 2008, 40577 infants were born alive at Al Qassimi Hospital. Total neonatal death during this period was 217 infants (5.3/1000 live births). Corrected neonatal deaths in the 9 years was 154 infants which is 3.79/1000 live births (table 1). Over the past 9 years, survival of extreme premature infants of 23-25 WG ranged from 26% to 75%. The last 3 years (2006-2008) survival rate of this group age was persistently

**Table 2. Al Qassimi Neonatal Survival for 23-25 WG (2000-2008)**

Year	BW $\leq$ 25 WG	Survival till discharge	Percentage
2000	15	4	26%
2001	8	5	62%
2002	12	9	75%
2003	13	4	31%
2004	21	6	29%
2005	10	3	30%
2006	9	5	56%
2007	22	11	50%
2008	19	12	63%

$\geq$ 50% (table 2). Neonatal survival increased steadily with increasing gestational age: 88% at 26-29 weeks 97% at 30-32 weeks and 98% at 33-34 weeks. Neonatal survival declined slightly to 95% and 93% at 35-37 weeks and  $>$ 37 weeks respectively. None with GA  $<$  23 weeks survived. Incidence of un-booked mothers during that period ranged between 15% and 20%. In these cases, GA was estimated according to postmenstrual dates and postnatal Ballard physical examination.

#### **Discussion:**

Our results for infants born in the largest tertiary care centre of the Northern Emirates during the past 9 years indicate a corrected neonatal mortality of 3.8 per 1000 live births.

In its official website, WHO 2006 bulletin published their data of neonatal mortality per 1000 live births as 45 in Africa, 21 in Eastern Asia, 19 in Southern Asia, 15 in Southern America, 5-12 in Gulf countries, and 3-4 in Western European countries and Japan [10]. In

the Egypt national study, neonatal mortality was estimated to be 25 per 1000 live births [11].

Our results reach within the neonatal mortality range of Western Europe countries. However, our data might be overestimated since private hospitals in Sharjah region (5 hospitals) usually do not cater for preterm newborn  $<$ 34 WG. These babies are generally transferred to our hospital during their ante- or postnatal period. The peak of neonatal mortality is among this group.

Survival rates of extreme premature infants'  $\leq$  25 WG at Al Qassimi Hospital were persistently  $\geq$  50% over the last 3 years.

A prospective birth cohort of very preterm infants for 10 European countries showed a wide variation in the survival rates to discharge [8]. It represented an obvious example of policy differences in the treatment of very preterm infants that lead to large differences in European region survival rate [8]. As an example, Dutch data revealed no survival rates below 24 WG. This is most likely related to the Dutch Pediatric Association guidelines indicating that at 23 completed weeks, active resuscitation is not adequate [12].

Survival rates of extreme prematurity in UK in the EPIcure 2 study (2006) [13], were 20%, 46% and 67% at 23 WG, 24 WG, and 25 WG respectively. These results were influenced by the British Association of Perinatal Medicine that issued a number of practical suggestions in 2000 [14]. They stated that neonates born between 22 and 28 weeks are within the variability limits.

#### **Conclusion:**

Neonatal mortality rate at Al Qassimi Hospital, which is the largest referral center of Northern Emirates in the UAE, is 3.8 per 1000 live births. Survival of extremely preterm infant's  $\leq$  25 WG

was  $\geq 50\%$  over the last 3 years. These results are comparable to the published data from different developed countries.

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