Outcome and short-term complications of preterm babies born in a tertiary neonatal unit in Sudan.

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ABSTRACT

Advances in neonatal care have contributed to improved survival among extreme low birth weight infants and the significance of prematurity lies in the complications sustained by these infants. We aimed to study the various complications that preterm babies suffer during their stay in hospital, maternal factors associated with prematurity and neonatal mortality due to prematurity and its complications. This was a prospective, hospital based study carried out in the neonatal intensive care unit at Soba university hospital during the period December 2011 to May 2012. 100 preterm babies were included in this study. Data was collected using maternal and neonatal characteristics and was analyzed using statistical Programme for Social Sciences. Frequency analysis for background variables was conducted. The main results revealed that most of the mothers were ranging between 20-40 years of age, pregnancy induced hypertension was the commonest medical problem and was found in 23% of the mothers, followed by multiple pregnancy in 20%. Hyperbilirubinaemia represented the commonest neonatal complication in 69%, respiratory distress syndrome in 38%, followed by sepsis and necrotizing enterocolitis. The survival rate among the study group was 87%.

Keywords: Preterm; neonate; morbidity; mortality; Sudan

INTRODUCTION

Premature birth is defined as the delivery of an infant before completion of 37 weeks gestation, this occurs on or before the 259th day after the first day of the last menstrual period of the mother. It is associated with approximately one-third of all infant deaths in the United States. The significance of preterm birth lies in the complications of prematurity sustained by the infant and the impacts of these complications on the infant’s survival and subsequent development. (Eichenwald et al., 2008).

Preterm birth rates have been reported to range from 5% to 7% of live births in some developed countries, but are estimated to be substantially higher in developing countries (Lawn et al., 2006).

The exact aetiology of premature labour is not fully understood, however factors that might lead to premature birth include maternal and foetal medical conditions, genetic factors, environmental exposure, infertility treatments, socioeconomic factors and iatrogenic prematurity (Goldenberg et al., 2008). Prediction of outcome for an individual infant, especially at the threshold of viability, remains uncertain. It appears to be approximately 23 to 25 weeks gestation or 400 to 500
grams, although exceptions may occur (Hack and Fanaroff, 1999).

In developing countries it is difficult to make estimates of the rates of premature birth due to a number of factors including different definitions used for preterm birth, determination of gestational age, registration processes, perception of viability for preterm babies and religious practices (Graafmans et al., 2001).

The aims of this study were to identify the various complications that preterm babies suffer during their stay in hospital, maternal factors associated with prematurity and neonatal mortality due to prematurity and its complications.

MATERIALS AND METHODS

This was a prospective, hospital based study carried out in the neonatal intensive care unit at Soba university hospital during the period December 2011 to May 2012. This is the main teaching hospital linked to university of Khartoum, the leading university in Sudan. All preterm babies who were alive with a gestational age between 24-36 weeks and admitted to the neonatal unit during the study period were included in the study. Neonates who died before admission to the unit and those with major congenital anomalies were excluded from the study. 100 preterm babies were included in this study.

Date was collected using a specifically designed questionnaire containing maternal and neonatal data. Maternal data included age, parity, antenatal follow up, history of preterm labour, maternal illness during pregnancy and mode of delivery. Neonatal characteristics included gestational age, sex, birth weight, Apgar score, duration of hospital stay, complications during stay and outcome of admission. All investigations done for the babies including blood tests, radiological tests and microbiological tests were also recorded. No cranial ultrasounds were done in the unit due to lack of portable ultrasound machine and as a result intraventricular haemorrhage could not be well studies here. Clinical examination and follow up was done by a consultant paediatrician and senior registrar. Data was analyzed using statistical Programme for Social Sciences version 18. Frequency analysis for background variables was conducted.

Ethical clearance and approval for conducting this study was obtained from the ethical committees of Soba university hospital. Informed verbal consent was obtained from the mothers participating in this study after full explanation of the study.

RESULTS

During the study period 100 live born preterm babies were included in this study. All mothers were on regular antenatal care. Regarding mothers’ age, 41% were ranging between 20-29 years, 40% between 30-40years, those who were less than 20 years were 13% and 6% were above 40 years. Regarding medical problems during pregnancy, 29% had no medical problem. Pregnancy induced hypertension (PIH) was the commonest medical problem and was found in 23% of the mothers, followed by multiple pregnancy in 20%, 14% of the mothers presented with history of prolonged rupture of membranes (PROM). 4% of the mothers had both PIH and diabetes mellitus whereas 10% had other problems like cardiac disease, bronchial asthma and oligohydramnious.

It was also found that 59% of the mothers received antenatal dexamethasone while 41% didn’t. 4% of the mothers had history of preterm delivery while 96% had no past history. Out of the 100 preterm babies, 56 were females and 44 were males. 55 babies were delivered as a singleton, 36 as twins and 9 were triplets. Birth order revealed that 45 babies in the group studied were 1st born baby, 17 were 2nd born, 14 were 3rd born while 24 babies had more than 3 siblings. Regarding the mode of delivery, 61 babies were delivered by emergency Caesarean Section, 17 babies were delivered by elective section, while 22 babies were delivered by spontaneous vaginal delivery.

During the study period no babies were delivered with a gestational age less than 28 weeks, 16 were delivered with a gestational age 28-32 weeks and 84 were delivered with a gestational age 32-36 weeks. No extreme low birth weight babies (< 1000 gm) were found in this study, those with very low birth weight (1000 - <1500 gm) were 23 babies, those with a birth weight between 1500-<2000 gm were 30 babies and those with a weight between 2000-<2500gm were 47 babies. (Table 1).

Regarding Apgar score which was recorded at 1 and 5 minutes, no baby had an Apgar score less than 5 at 5 minutes, 11 babies had an Apgar score between 5-8 at 5 minutes, 89 babies had an Apgar score more than 8 at 5 minutes. Only 2 babies required resuscitation immediately after birth, while 98 babies didn’t need resuscitation at birth. Regarding Oxygen requirement at the time of delivery and during the stay, 60 babies were given oxygen during their stay, 2 of these required continuous positive airway pressure (CPAP) and 58 babies received O2 by nasal cannula. No babies were given Surfactant during the study period. 39 babies (65%) received oxygen less for than 5 days, 10 babies (16%) received oxygen for 5-10 days, and 8 babies (14%) received for10-20 and only 3 (5%) need oxygen for more than 20 days. Figure 1.

Concerning the duration of stay, 16 babies stayed in the unit for less than 5 days, 14 stayed for a period 5- <10 days , most of the babies (25) stayed for a period of 10-
Table 1. Birth weight distribution among study population

<table>
<thead>
<tr>
<th>Weight Range</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>From 1000 to &lt;1500 gram</td>
<td>23</td>
<td>23.0</td>
</tr>
<tr>
<td>From 1500 to &lt; 2000 gram</td>
<td>30</td>
<td>30.0</td>
</tr>
<tr>
<td>2000 to &lt;2500 gram</td>
<td>47</td>
<td>47.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Figure 1. Duration of Oxygen supply among the study population

Table 2. Duration of stay in NICU distribution among study population

<table>
<thead>
<tr>
<th>Duration</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5 days</td>
<td>16</td>
<td>16.0</td>
</tr>
<tr>
<td>5-10 days</td>
<td>14</td>
<td>14.0</td>
</tr>
<tr>
<td>10-15 days</td>
<td>25</td>
<td>25.0</td>
</tr>
<tr>
<td>15-20 days</td>
<td>22</td>
<td>22.0</td>
</tr>
<tr>
<td>20-30 day</td>
<td>12</td>
<td>12.0</td>
</tr>
<tr>
<td>&gt; 30 days</td>
<td>11</td>
<td>11.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
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NICU: Neonatal intensive care unit

<15 days, 12 babies stayed for a period of 20-30 days, while 11 babies stayed > 30 days. Table 2.

Regarding the complications that were encountered during their stay, hyperbilirubinaemia represented the commonest complication and was found in 68 babies, 28 babies developed jaundice alone, 19 babies had jaundice, sepsis, anemia and feeding problems, 9 babies developed jaundice plus respiratory distress syndrome (RDS), 13 babies had jaundice plus sepsis. RDS was found in 38 babies, feeding problem in 32 babies, sepsis in 30 babies, anemia was found in 27 babies. While necrotizing enterocolitis (NEC) was found in 22 babies, Retinopathy of prematurity (ROP) in 6 babies, one baby developed Hydrocephalus. Other complications encountered were hypoglycaemia in 4 babies and 3 babies had patent ductus arteriosus (PDA). 12 babies didn’t develop any complications during their stay. Figure 2.

The babies who died represented 11 babies (11%) of the total of study population. 2 babies were transferred to another hospital upon parents request and the rest (87%) were discharge in good condition.

DISCUSSION

Advances in perinatal and neonatal care over the last 30 years have contributed to improved survival among extremely low birth weight (ELBW) infants but the rate of morbidity remained stable (Fanaroff et al., 2003). 100 live born preterm babies were included in this study. All mothers were on regular antenatal care as Soba.
university hospital is considered as a tertiary care center that accepts only booked patients. Regarding mothers’ age, 41% were ranging between 20-29 years, 13% were less than 20 years and only 6% were above 40 years, this is against the finding by Greasy et al (1980) regarding the predictors for spontaneous onset of preterm labor where teenaged female adolescents, and mothers older than 40 years are at highest risk of premature delivery, this could well be explained by the smaller sample size used in this study.

Only 4% of the mothers had history of preterm delivery and the majority didn’t, this is actually contrary to what has been published in the literature as pre-term birth is more commonly associated with a prior history of spontaneous pre-term delivery (Mercer et al., 1999).

Regarding medical problems during pregnancy, 14% of the mothers presented with history of PROM, a similar finding was reported by Mahmoodi et al (2010) regarding the association between PROM and preterm birth. Our study also demonstrated that 4% of the mothers had both PIH and diabetes mellitus, whereas 10% had other problems like cardiac disease, bronchial asthma and oligohydramnious. Similar results were reported in a similar study in Iran where the risk of preterm labor in women with history of diabetes mellitus, thyroid dysfunction, and cardiac disease was found to be 2.3 times higher than healthy mothers (Nabavizadeh et al., 2012). Multiple pregnancy was found in 20% of our study group, this agrees with similar studies where women with multiple gestation pregnancies are at high risk of preterm labor and delivery and account for increasing percentage of preterm births and ELBW infants (Fritz, 2002).

It was also found that 59% of the mothers received antenatal dexamethasone while 41% didn’t. The role of dexamethasone in enhancing lung maturation is well known however in a recent meta-analysis by Ruolin et al. (2014) indicated that dexamethasone use in preterm infants may have significant deleterious effects on hearing and intelligence. The investigators found a significantly lower intelligence quotient in patients who received dexamethasone treatment within seven days following birth, compared with the placebo group (Ruolin et al., 2014).

Our study demonstrated that Hyperbilirubinaemia was the commonest complication and was found in 68% of the babies, a similar result was obtained in a Swedish study where hyperbilirubinaemia was found in 59% (Altman et al., 2011). RDS was found in 38%. In one report, the incidence rate of RDS was 42% in infants weighing 501-1500g, with 71% reported in infants weighing 501-750g, 54% reported in infants weighing 751-1000g, 36% reported in infants weighing 1001-1250g, and 22% reported in infants weighing 1251-1500g, among the 12 university hospitals participating in the National Institute of Child Health and Human Development (NICHD) Neonatal Research Network. RDS is encountered less frequently in developing countries than elsewhere, primarily because most premature infants who are small for their gestation are stressed in utero because of malnutrition or pregnancy-induced hypertension (Hintz et al., 2007).

NEC which is a syndrome of inflammation and necrosis of the small and large intestines, was found in 22% of the babies, this is higher than international figures which ranges between 5 to 10% of very-low-birth-weight infants. However the incidence of this syndrome varies widely among centers (Fanaroff et al., 2007). The higher incidence in study could well be explained by the fact that infection control measures are not strictly applied in developing countries as well as lack of total parenteral nutrition.

ROP was reported in 6% of the babies which is actually comparable to international figures, despite the fact that a restrictive approach to oxygen delivery is not applied in our unit and oxygen is given liberally (Tin et al., 2001). This could be explained by the fact that there were no babies below 28 weeks in our study group.

Our study showed a survival rate of 87%, this is a better...
survival rate than a similar study done in Sudan in 2003 which showed a survival rate of 74% (Salih and A/Gadir, 2013). The fact that no babies below 28 weeks were delivered in our study group might explain this improved survival rate.

Approximately 85% of infants with a very low birth weight survive to be discharged from the hospital. During the past decade, survival has improved, particularly in infants with extremely low birth weight (Fanaroff et al., 2007).

CONCLUSION

History of PIH, multiple pregnancy and PROM were identified as the most important risk factors for preterm birth. The commonest complications encountered among preterm babies were hyperbilirubinaemia, RDS and sepsis. Advances in neonatal care have contributed to improved survival among extreme low birth weight infants.

ACKNOWLEDGEMENTS

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REFERENCES


