Perinatal mortality at
King Abdulaziz University Hospital
Jeddah, Saudi Arabia

Haifa’a Mansouri, FRCSC

Abstract Objective: To study perinatal mortality rate and to identify the cause of perinatal deaths (PND) and to try and reduce them.

Design: A retrospective chart review of perinatal deaths (including neonatal deaths (NND) and stillbirths (SB)).

Setting: King Abdul-Aziz University Hospital (KAUH) Jeddah.

Subjects: All perinatal deaths occurred in the 5 year period 1986 to 1990. The records of the mothers and the neonates were reviewed.

Result: The perinatal mortality rate was 22.5, 10.7, 12, 13, and 11.9 per 1000 total births in the years 1986, 1987, 1988, 1989, and 1990 respectively. The main causes of perinatal deaths were due to asphyxia and prematurity and their complications.

Conclusion: The perinatal mortality rate at King Abdul-Aziz University Hospital was comparable to other tertiary care hospitals in the Kingdom. Improvement in perinatal care would be possible if greater efforts were made to expand neonatal units proportionate to obstetric beds and to regionalize perinatal care.


Keywords: Perinatal mortality rate (PNMR), perinatal deaths (PND), neonatal death (NND), early neonatal deaths (ENND), late neonatal deaths (LNND), stillbirth (SB)

In 1985 WHO estimated that there were 7.3 million perinatal deaths (PND) in the world, of which only 300,000 occurred in developed countries. Of the remaining 7 million PND, 3.2 million (40-50%) were early neonatal deaths (ENND) (0-6 days). Out of these, 420,000 PND (13% of the total 3.2 million) were in the Middle East and North Africa, the population of which is only 376 million (10.2% of the total developing world). WHO estimated deaths in the developing world were mainly based on studies carried out at community level.

Jeddah is the second largest city in the Kingdom. Obstetric care is mainly provided by government hospitals. The obstetric unit at KAUH includes 24 obstetric beds, 6 delivery rooms and 3 neonatal intensive care unit (NICU) beds. The total number of deliveries range between 1600-2300 per year. This study is a review of all perinatal deaths (PND) that occurred between January 1, 1986 to December 31, 1990 at King Abdulaziz University Hospital (KAUH), Jeddah.

Materials and methods The study involved a chart review of all PND over a 5-year period 1986-1990. The women delivered at KAUH are a heterogeneous group of both Saudis and non-Saudis with different racial and ethnic backgrounds. The PND were collected from the Labour Room registration book and from the Nursery and Neonatal Intensive Care Unit registration book. Both the mother’s and the neonatal charts were reviewed and the causes of PND were determined.

Perinatal deaths included all stillbirths and neonatal deaths. A stillbirth was defined none of the sign of life are present at or after birth of 500 grams weight baby or >22 weeks gestation. Neonatal deaths (NND) were classified to be early or late. An early neonatal death (ENND) refers to death of...
a live born infant during the first 7 days after births, while late neonatal death (LNND) refers to death after 7 days but before 29 days. Perinatal mortality rate is the number of stillbirths plus neonatal deaths per 1000 total births.

The cause of perinatal deaths were then classified according to Wigglesworth Classification. Each cause of death was then determined to be avoidable or potentially avoidable if it deviated from the accepted standards of care which might have contributed to the death. The accepted standard of care was defined by the reviewer, based on previous experience of perinatal care in Canada.

Results Over the 5-year period, there were 10393 deliveries (total births) and 160 perinatal deaths. Of these 94 (59%) were stillbirths, and 66 (41%) were neonatal deaths. Forty eight cases resulted in early NND while only 18 were late NND. The number of deliveries each year and the number of PND, ENND, and LNND are demonstrated in Table 1.

**Table 1 - Components of PNMR 1986-1990**

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<tr>
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<tbody>
<tr>
<td>Total Deliveries</td>
<td>1688</td>
<td>1870</td>
<td>2169</td>
<td>2305</td>
<td>2361</td>
</tr>
<tr>
<td>Still births</td>
<td>23</td>
<td>17</td>
<td>18</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>ENND</td>
<td>15</td>
<td>5</td>
<td>8</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>LNND</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Total PND</td>
<td>44</td>
<td>21</td>
<td>29</td>
<td>32</td>
<td>34</td>
</tr>
<tr>
<td>PNM / 1000 births</td>
<td>22.52</td>
<td>10.7</td>
<td>12</td>
<td>13</td>
<td>11.9</td>
</tr>
<tr>
<td>(SB+ENND)/1000 births</td>
<td></td>
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</table>

PNM - Perinatal mortality rate
ENND - Early neonatal death
LNND - Late neonatal death
PNM - Perinatal mortality

The PNMR each year defined as the number of stillbirths and neonatal deaths per 100 total births and after exclusion of late NND were shown in Table 1.

An initial marked drop in PNMR was noticed but then PNMR was almost the same for the following years or even with slight increase. When PNMR was calculated by only including ENND the rate increased to reach a maximum in the year 1989 but this could be explained by the high percentage of congenital anomalies as shown in Table 2.

The data were then analyzed to identify the different causes of death. They were grouped into 5 subgroups according to Wigglesworth classification of perinatal deaths. This included

**Table 2 - PNMR and its major determinants**

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<tbody>
<tr>
<td>Total deliveries</td>
<td>1688</td>
<td>1870</td>
<td>2169</td>
<td>2305</td>
<td>2361</td>
</tr>
<tr>
<td>LBW / (%)</td>
<td>149</td>
<td>144</td>
<td>77</td>
<td>160</td>
<td>73.8</td>
</tr>
<tr>
<td>PNMR (SB+ENND)/1000</td>
<td>38</td>
<td>22.5</td>
<td>20</td>
<td>10.7</td>
<td>26</td>
</tr>
<tr>
<td>Cong. ABN (%)</td>
<td>4</td>
<td>0.2</td>
<td>4</td>
<td>0.2</td>
<td>5</td>
</tr>
<tr>
<td>Corrected PNMR / 1000</td>
<td>34</td>
<td>20.1</td>
<td>16</td>
<td>8.6</td>
<td>21</td>
</tr>
<tr>
<td>PNMR - Perinatal Mortality Rate, ENND - Early Neonatal Death, SB - Stillbirth, LBW - Low Birth Weight, CONG ABN - Congenital Abnormality</td>
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</tbody>
</table>

**Table 3 - Causes of death according to Wigglesworth classification**

1. Normally formed macerated stillbirth 13
2. Congenital malformation 28
3. Condition associated with preterm birth (< 37 completed weeks) 31
4. Asphyxiial conditions developing in labour 46
5. Specific conditions other than above 12

13 (10%) normally formed macerated SB, 28 (21.54%) PND with congenital malformations incompatible with life. Thirty-one (23.85%) of PND were due to prematurity and its complication, 46 (35.38%) PND were due to asphyxiial conditions developing in labour, twelve (9.23%) PND were due to specific conditions other than the one mentioned, which included neonatal sepsis, necrotizing enterocolitis, cyanotic heart disease, milk aspiration and sacrococcygeal teratoma.

The other part of this study involved a detailed study of both the mother’s and neonatal charts to identify any avoidable factors leading to the perinatal deaths. One hundred and thirty chart pairs, except for 2 neonatal charts, were reviewed. Of the 128 chart pairs available, 67 were stillbirths and 61 were neonatal deaths. Of the 30 missing charts 27 were stillbirths and 5 were neonatal deaths.

Seventy three out of 128 perinatal deaths (57.2%) were thought to be avoidable deaths, while only 55 (42.8%) were non-avoidable deaths. Thirty-four (46.6%) were due to obstetric avoidable factors, 24 (32.9%) were due to pediatric avoidable factors and 15 (20.5%) were due to combined obstetric and pediatric factors.
Table 4 - PNMR and its major determinants

<table>
<thead>
<tr>
<th>SB</th>
<th>CONG ABN</th>
<th>Prem</th>
<th>ASPH</th>
<th>Others</th>
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<tbody>
<tr>
<td>n</td>
<td>Rate</td>
<td>n</td>
<td>Rate</td>
<td>n</td>
</tr>
<tr>
<td>&lt;1000</td>
<td>(n=21)</td>
<td>2</td>
<td>9.5</td>
<td>4</td>
</tr>
<tr>
<td>1001-1500</td>
<td>(n=53)</td>
<td>1</td>
<td>4.3</td>
<td>3</td>
</tr>
<tr>
<td>1501-2000</td>
<td>(n=21)</td>
<td>4</td>
<td>19.0</td>
<td>5</td>
</tr>
<tr>
<td>2001-2500</td>
<td>(n=15)</td>
<td>2</td>
<td>13.3</td>
<td>4</td>
</tr>
<tr>
<td>&gt;2500</td>
<td>(n=6)</td>
<td>4</td>
<td>11.1</td>
<td>7</td>
</tr>
<tr>
<td>unknown</td>
<td>(n=14)</td>
<td>0.0</td>
<td>5</td>
<td>35.7</td>
</tr>
</tbody>
</table>

SB - Stillbirth
CONG ABN - Congenital abnormality
Prem - Premature birth
ASPH - Asphyxia

Table 5 - Obstetric avoidable factors using Wigglesworth

Classifications:
1. IUFD no obvious cause
   Patient-related (poor attendance) 5 cases
2. Congenital abnormalities
   (Exomphalos delivered vaginally) 1 case
3. Prematurity
4. Asphyxia 27 cases
5. Others: 1 case ano-rectal carcinoma induced 1 case

The majority of the obstetric avoidable cases were due to asphyxia. The different conditions related to asphyxia included: intra-uterine growth retardation, intra-partum fetal distress, abruptio placentae, post term (>42 weeks), mechanical factors in labour and maternal disease complicating pregnancy such as essential hypertension, pregnancy induced hypertension (PIH), renal disease and diabetes.

It was thought that delivery of a diagnosed exomphalos antenatally by cesarean section and postnatal surgical correction would probably have prevented the perinatal death. Fitisimmons and colleagues (1988) emphasized that elective timing of delivery optimizes neonatal surgical care. It was thought that induction of the patient with anorectal carcinoma could have been postponed to achieve fetal maturity and better outcome.

The majority of pediatric avoidable factors were due to prematurity related complications and to neonatal sepsis.

Discussion This study was a review of PNMR at KAUH in Jeddah over a 5 year period 1986-1990. The published papers on perinatal mortality rate in different cities in the Kingdom were reviewed between the years 1973-1988. The PNMR range between 10.8-42.5 per thousand total births with the lowest rates being in the later years and in tertiary care hospitals. The rate at King Abdulaziz University Hospital was comparable to the tertiary care hospitals.

In this study an initial decline in PNMR was consistent with the fall in other studies and this was probably due to general improvement in health care facilities.

It was noticed that the macerated stillbirths were distributed randomly between different birth weight groups and the same is true for congenital anomalies. While prematurity, as expected, was only in the lower birth weight group < 1500 gms there were a few cases (14%) between 1501-2000 gms. Asphyxia was the commonest cause of death for babies > 2500 gms. Of the total cases of asphyxia 43.47% were among the group ≥ 2500 gm. birth weight group, as in the low birth weight group the NND would be due to prematurity and its complications rather than to asphyxia. From this study prematurity and its complications and asphyxia were the major determinants of perinatal death. Improvements in perinatal care would be possible if greater efforts were made to expand neonatal units proportionate to obstetric beds, and to regionalize health care.

An attempt was made to study PNMR in the Jeddah Area, but this could not be achieved because of the use of different definitions of perinatal deaths between hospitals and under rating of parental registration of PND especially of LBW group. This could be overcome by unifying definitions of PND, making a separate database for PND at health offices, and making registration of PND compulsory.

In conclusion combined efforts between different health provider’s sectors are required to achieve lowest perinatal mortality and morbidity and optimize the care for both mother and neonate.

References
الهدف: دراسة حالات وفاة حوالي الولادة والتعريض على أسباب الوفيات بهدف محاولة السعي إلى تقليلها.

التصميم: مراجعة ملفات وفاة حوالي الولادة (حالة وفاة حدثي الولادة، حالات الإخلاص).

المكان: مستشفى جامعة الملك عبد العزيز، جدة.


النتائج: كان معدل الوفاة حوالي الولادة 0.5٪، 0.7٪، 0.9٪، 1.2٪، 1.3٪، 1.0٪، 1.2٪، 1.3٪، 1.1٪ في الألف خلالي السنوات 1986-1989، 1990، على التوالي وكنتم أمم أسباب الوفاة حوالي الولادة حصر حالات نقص الأكسجين حوالي الولادة (أسيفكسيا).

الاستنتاج: يقترح معدل الوفاة حوالي الولادة في مستشفى الملك عبد العزيز بالمستشفيات (مستوى III) في المملكة.

ويمكن أن تتحسن عناية حوالي الولادة، إذا بذل جهداً أكبر لزيادة عدد سرير المواليد بالمقارنة بعدد الولادات، وترسيم جهاز عناية حوالي الولادة على ثلاثة مستويات مختلفة من العناية (مستوى III-I).