

## PERINATAL MORTALITY AT PRINCESS BADIA' TEACHING HOSPITAL, NORTHERN JORDAN

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Perinatal mortality is a sensitive index of child health, maternal and perinatal care.<sup>1-3</sup> It varies with the quality and degree of utilization of antenatal care and perinatal services.<sup>4</sup> Most perinatal mortality studies have been done in developed countries. Few published data from developing countries suggest that the perinatal mortality rate (PMR) is still high<sup>5,6</sup> compared to developed countries.

The aim of the present prospective study was to calculate the PMR in a hospital-based population in Northern Jordan and to investigate the principal causes of perinatal deaths and maternal and perinatal risk factors.

### Material and Methods

Princess Badia' Teaching Hospital is the main maternity referral hospital in which about 40% of deliveries in the Irbid Governorate (one million population) take place. The neonatal intensive care unit has a capacity of 30 beds and caters to ill neonates, whether inborn or outborn.

The study population comprised all deliveries and babies born at the Princess Badia' Teaching Hospital during a one-year period from September 1994 to September 1995. All data of stillbirth (gestational age  $\geq 28$  weeks or birth weight  $\geq 1000$  g) neonatal deaths and their mothers were collected and recorded prospectively. These included age, parity, mode of delivery, plurality, details of antenatal care and medical and past obstetric history of the mother. The infant's sex, gestational age, birth weight and the cause of morbidity and mortality were recorded.

In this study, perinatal deaths included stillbirths and newborns over 28 weeks' gestation who died within the

first week of life (early neonatal deaths). The statistical analysis done utilized the chi-squared test with  $P < 0.05$  considered significant.

### Results

There were 9451 deliveries during the study period, made up of 9330 single and 121 multiple births. This accounted for 41% of the total number of births in North Jordan during the same period. There were 207 perinatal deaths, generating a PMR of 20.9 per 1000 births. The numbers of stillbirths and early neonatal deaths were 107 and 100 respectively. Accordingly, their mortality rates were 11.3 and 10.6 per 1000 births respectively.

The early neonatal death rate (ENDR) for multiple gestation (131.6/1000) was significantly higher than singletons (9.2/1000) ( $P < 0.00$ ). A total of 4805 males and 4774 females (1:1) were delivered. ENDR for males was 13.3/1000 and was significantly higher than for females (7.8/1000) ( $P < 0.01$ ), while for the stillbirth rate (SBR), there was no significant difference ( $P < 0.16$ ).

Table 1 shows the effects of antenatal care, maternal age, parity and plurality on perinatal mortality. The SBR and ENDR were increased proportionally with maternal age and both showed a significant  $P$ -value for the trend (0.01, 0.03) respectively. Grandmultiparity ( $\geq 5$ ) was associated with a threefold increase in the risk of stillbirths ( $P < 0.00$ ), but did not affect ENDR ( $P < 0.35$ ). Table 2 shows the effect of gender, mode of delivery and birth weight on PMR. Although only 3.4% of the total deliveries were breech, as much as 18% of the stillbirths were associated with this mode of delivery.

The low birth weight (birth weight less than 2500 g with no maternal complications) rate among live births was 7.5% and this was associated with a high perinatal mortality rate (161.4/1000). The ENDR fell progressively as birth weight increased, however. The lowest PMR was found among babies with a birth weight between 3500 to 3999 g. Table 3 lists the main causes of stillbirth and early neonatal deaths. Respiratory distress syndrome, congenital

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TABLE 1. The effect of antenatal care, maternal age, parity and plurality on PMR.

Risk factor	Stillbirth			Early neonatal death			
	A	Rates/1000	P-value	B	Rates/1000	P-value	PMR rates/1000
Antenatal care							
Booked	8616	10.2	0.00	8528	11.1	0.25	21.1
Not booked	835	22.8		816	6.1		28.7
Maternal age (years)							
16-19	648	7.7		643	6.2		13.9
20-24	2821	10.3		2792	6.4		16.7
25-29	2826	8.8	0.04	2801	13.9	0.02	22.6
30-34	1918	12.0	0.01*	1895	11.6	0.03*	23.5
35-39	956	20.9		936	17.1		37.7
≥40	282	17.7		277	3.6		21.3
Maternal parity							
0-4	7731	8.5	0.00	7665	10.2	0.35	18.6
≥5	1720	23.8		1679	13.1		36.6
Plurality							
Singleton	9330	10.7	0.00	9230	9.2	0.00	19.8
Multiple	121	57.9		114	131.6		181.9

A=total number of deliveries; PMR=perinatal mortality rate; B=number of liver births; \*P-value for trend.

TABLE 2. The effect of sex, mode of delivery and birth weight on PMR.

Risk factor	Stillbirth			Early neonatal death			
	A	Rates/1000	P-value	B	Rates/1000	P-value	PMR rates/1000
Sex							
Male	4805	12.9	0.16	4743	13.3	0.01	26
Female	4774	9.4		4729	7.8		17.2
Mode of delivery							
Spontaneous	8164	10.8		8076	11.4		22.0
Vertex	834	0.0	0.00	834	7.1	0.39	7.2
Cesarean section	320	59.4		301	3.3		62.5
Breech vacuum	133	0.0		133	7.5		7.5
Birth weight (gram)							
<1000	31	129		27	0.0		161.3
1000-1499	83	120.5		73	370		481.9
1500-1999	172	133.7		149	174		296.5
2000-2499	476	33.6		460	37		75.6
2500-2999	1706	11.1	0.00	1687	7.7	0.00	19.3
3000-3499	3780	3.7	0.00*	3766	2.1	0.00*	6.6
3500-3999	2622	2.3		2616	3.1		5.0
≥4000	715	4.2		712	1.4		5.6
<2500	762	69.6	0.00	709	98.7	0.00	161.4
≥2500	8823	4.8		8781	3.4		9.5

A=total number of deliveries; PMR=perinatal mortality rate; B=number of liver births; \*P-value for trend.

anomalies and infections are the main causes of mortality during the first week of life.

### Discussion

Perinatal mortality has been used as a monitor of perinatal care and health services.<sup>1,3</sup> In developed countries, it has a major influence in outlining areas of

deficiency and stimulating efforts toward reduction of perinatal death. Data on PMR and maternal risk factors in Jordan are scarce.<sup>7</sup>

In this study, the PMR was found to be 20.9/1000 births. This rate is higher than figures in developed countries, but lower than rates in many developing countries (Table 4). Regarding risk factors which were studied, 9% of all patients were unbooked and seen for the

TABLE 3. Causes of perinatal death.

Causes	Stillbirth	Early neonatal death	Total
Congenital anomalies	18	22	40
Antepartum asphyxia	63	–	63
Intrapartum asphyxia	26	7	33
Hyaline membrane disease	–	51	51
Infections	–	14	14
Intracranial bleeding	–	6	6
Total	107	100	207

Based on modified Wigglesworth's classification.<sup>20,21</sup>

TABLE 4. Comparison of perinatal mortality rates.

	PMR/1000 births
Princess Badia' Teaching Hospital Northern Jordan	20.9
Maternity & Child Health Hospital Jeddah, Saudi Arabia <sup>16</sup> (1987–1998)	31.4
Scotland <sup>22</sup> (1990)	8.7
SAT Hospital, Trivandrum, India <sup>23</sup>	42.7
Shanghai 1986–1987 <sup>14</sup>	15.0
Western Australia <sup>24</sup> (1983–1985 mean)	12.5
Sweden <sup>25</sup> (1990)	6.3

PMR=perinatal mortality rate.

first time in labor, and the SBR was significantly higher in this group ( $P=0.00$ ) compared to booked patients. It is obviously necessary to publicize the importance and advantages of antenatal care in the press and on television. There was a significant linear increase in PMR with maternal age with significant  $P$ -value for trend ( $P=0.01$ ). This contrasted with the classical U-shaped association with mother's age,<sup>8,9</sup> which showed a higher PMR for mothers aged under 20 and over 30 years, and a low rate for mothers in between. Similar to Feldstein<sup>10</sup> and Millat,<sup>11</sup> our young mothers had an advantage, since the younger the mother, the lower the risk of perinatal death. This could be due to the fact that our primiparous mothers are young, educated, well-supported socially, and not married before 16 years of age by law. A twofold increase in PMR was found in multiparas ( $\geq 5$ ) compared to those with less parity, this being consistent with other studies elsewhere.<sup>12,13</sup> The PMR for multiple pregnancy, as well as male gender, was significantly high compared to singleton and female groups. These findings are consistent with those found in other studies.<sup>11,14</sup> This may be exacerbated by a low cortisol concentration in the amniotic

fluid of male fetuses, which may lead to immaturity of the male fetal lung, which was reported by some researchers,<sup>15</sup> while multiple pregnancy is usually associated with low birth weight babies, so the survival rate is usually lower when compared to the full term newborn.

Low birth weight babies in this study fared worse than their full size counterparts, in accordance with trends in both developing<sup>16,17</sup> and developed countries.<sup>18</sup> Although low birth weight babies constituted only 8% of our deliveries, they accounted for 59% of the perinatal deaths and 70% of ENDR. However, survival at a given birth weight depends on the quality of perinatal care, explaining the lower mortality rate in Western countries. The main causes of deaths were hyaline membrane disease, congenital anomalies, asphyxia and infections, which were similar to those described elsewhere.<sup>19</sup>

Throughout the world, the trend has been toward a fall in the PMR, due to improvement in antenatal care, health education, socioeconomic status and medical technology.

In conclusion, this is the first prospective hospital-based study in Jordan about PMR, highlighting the maternal and perinatal risk factors, and in contrast to other studies, low PMR in young mothers was found in our study. Although PMR is slightly high, on a long-term basis, further national study is required to reduce PMR and maintain good health care.

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