
OBSTETRICS

Perinatal Mortality Rate Selected in Bangkok Hospitals and Provincial Medical Schools in Thailand : 1991

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ABSTRACT

Objective To ascertain the accurate perinatal death rate, epidemiological informations and causes of perinatal death from the reliable vital statistic hospital-based data during a one year period.

Design Prospective descriptive study.

Setting Fourteen selected hospitals in Bangkok and three provincial medical schools.

Subjects and methods During January - December 1991 study forms were sent to all those participated hospitals and an obstetrician or neonatal intensive care unit personnel collected all informations and returned completed forms to the principal investigator monthly.

Results There were 99,309 births during one year, 684 stillbirths and 421 early neonatal deaths. Crude perinatal mortality rate was 11.26 per 1,000 total births. When excluding lethal congenital malformations crude perinatal mortality rate was 9.7 per 1,000 total births. For the regional studies, the group of hospitals in Bangkok, Khonkaen, and Songkla have crude perinatal mortality rate per 1,000 total births of 10.3, 18.8, 9.6 and 7.5 respectively. Seventy-nine percent of fetal deaths occurred among mother age group of 20-34 years old, low education, low income, no ANC (22.2%) and insufficient ANC (26.5% ANC less than 4 times). For causes of fetal death, 6.2/1,000 births were maceration, 1.7/1,000 births were asphyxia, 1.5 /1,000 births were premature and unknown 0.8 /1,000 births. Causes of fetal deaths were proved by autopsy in 48.7%.

Conclusion From this study, the problems of mother and child care are a reflection of the whole problems in economy, social and the national education. The government should improve the level of national education, increase the national income and institute better social welfare. Campaign of antenatal care programme, proper identification and referral of high risk cases, counselling programmes for premarital couples, prenatal diagnosis and also encourage family planning during post-natal care are all essential. In addition, the inter-departmental conferences among obstetricians, paediatricians, nurses and medical related personnels should be set up to analyse and correct the problems. With all of these integrated settings, the crude perinatal mortality rate could be reduced.

Key words : perinatal mortality, hospital based, Thailand

Perinatal mortality rate from a survey of Ministry of Public Health in 1988-1989, varied from 11.25 per 1,000 total birth.⁽¹⁻⁶⁾ The difference of perinatal mortality rate depends on many factors such as definition and criteria in perinatal statistics, population, place, time and socioeconomic status. On the whole the perinatal mortality is on a decline as reported in the annual conference of "Perinatal Health in Thailand : Regional challenges and prospects."⁽⁷⁾

The objective of this study was primarily to ascertain the accurate perinatal death rate, epidemiological informations, and causes of perinatal death from the reliable vital statistic hospital-based data in one year period. The results obtained hopefully can be used for improving and planning for better perinatal health in the future.

Materials and Methods

A prospective descriptive study of perinatal mortality in 14 self-selected hospitals in Bangkok and three provincial Medical Schools were carried out during January-December 1991. Study forms were sent to all these hospitals participating in this study, namely : Siriraj, Chulalongkorn, Ramathibodi, Vachira, Pramongkutkla, Bhumipol, Phrapinkla, Police, Hua

Chiew, Charoenkrung-pracharak, Mission, Srirakan (Khon-kaen University), Songklanakarin, and Maharaj Nakorn Chiangmai hospitals. Neonatal intensive care unit personnel or obstetrician collected informations such as all babies born and deaths in the delivery room and the neonatal care unit within seven days of age. These informations were sent back to the principal investigator at Department of Obstetrics and Gynaecology, Pramongkutkla hospital. Percentage, mean, standard deviation, Chi-square and T-test methods were used in analysing standard data, with significance set at $P < 0.05$.

Results

Perinatal mortality rate : The perinatal mortality rate of 14 hospitals are shown in Table 1. From 99,309 childbirths 684 of which were stillborn and 421 were early neonatal death. The crude stillbirth rate per 1,000 childbirths was 6.9, and the crude early neonatal mortality rate was 4.3, giving the crude perinatal mortality rate of 11.3. For the regional studies (Fig. 1), the group of hospitals in Bangkok, Chiangmai Hospital, Khonkaen Hospital, and Songkla Hospital have crude perinatal mortality rates of 10.3, 18.8, 9.6 and 7.5 respectively. Excluding 143 lethal congenital malformations such as anencephaly,

thanatophoric dwarf, etc., the crude perinatal mortality was 9.70.

Location : There is no difference in crude perinatal mortality rate of the group of hospitals in Bangkok with or without residency training programme ($P = 0.3483$). Comparing the crude perinatal mortality rate 10.3 per 1,000 child-births for Bangkok Hospitals to 18.8 for Chiangmai Hospital, this difference is statistically significant ($P < 0.001$). However, there is no statistical significance when comparing the crude perinatal mortality rate of the Bangkok Hospitals to that of Songkla Hospital ($P = 0.1003$), and to that of Khonkaen Hospital ($P = 0.385$) (Table 2).

Time of death : Amongst conditions of perinatal death stillbirths were the highest (61.9%),

while fresh death was 7.2%, 0-7 day after delivery was 24.5%, and death after discharge was 0.1% (Fig. 2).

Multiple pregnancy : There were 722 pairs of twins in which 6 were conjoined and the total number of babies were 1,444. There were 8 triplets with 24 babies (Table 3).

Parity : 93.0% of babies who died were from singleton pregnancy (1.0% of single childbirth) where as 7.0% who died were from multiple pregnancies. From 722 pair of twins, 5.5% died. Death from twin pregnancy was 5 times higher than singleton pregnancy.

Anomalies : 71.2% of babies were normal, 7.1% were noted to have anasarca, while 20.8% had congenital malformations. Of 230 anom-

Table 1. Perinatal mortality rate

Hospital	Early NND	Stillbirth	Total death	Lethal malformation	Total*	Delivery	PMR/1,000	PMR/1,000 (Corrected)	Livebirth
01 Mission	1	14	15	-	15	1,606	9.3	9.3	1,590
03 Police	31	49	80	5	74	6,370	12.6	11.6	6,323
04 Pramongkut	21	26	47	12	35	4,577	10.3	6.6	4,553
05 Siriraj	74	153	227	33	194	18,301	12.4	9.7	18,074
06 Chiangmai	57	94	151	11	140	8,017	18.8	11.4	7,923
07 Vajira	37	56	93	10	81	7,663	12.1	8.0	7,605
08 Bhumipol	36	43	79	12	67	9,270	8.5	6.8	9,226
09 Pinklao	10	49	59	3	56	7,183	8.2	7.1	7,140
10 Songkla	6	11	17	3	13	2,163	7.5	6.0	2,152
11 Hauchiew	23	34	57	3	54	5,269	10.8	9.3	5,235
12 Khonkaen	20	31	51	2	49	5,336	9.6	9.2	5,299
13 Chulalongkorn	48	59	58	28	79	10,411	10.3	7.6	10,353
14 Charoenkrung	26	32	56	6	50	5,373	10.4	9.3	5,341
15 Ramathibodi	31	33	64	15	49	7,770	8.2	6.3	7,739
Total	421	684	1,105	143	962	99,309	11.3	9.7	98,553

* Total = Lethal malformations are excluded from total death

NND = Neonatal death

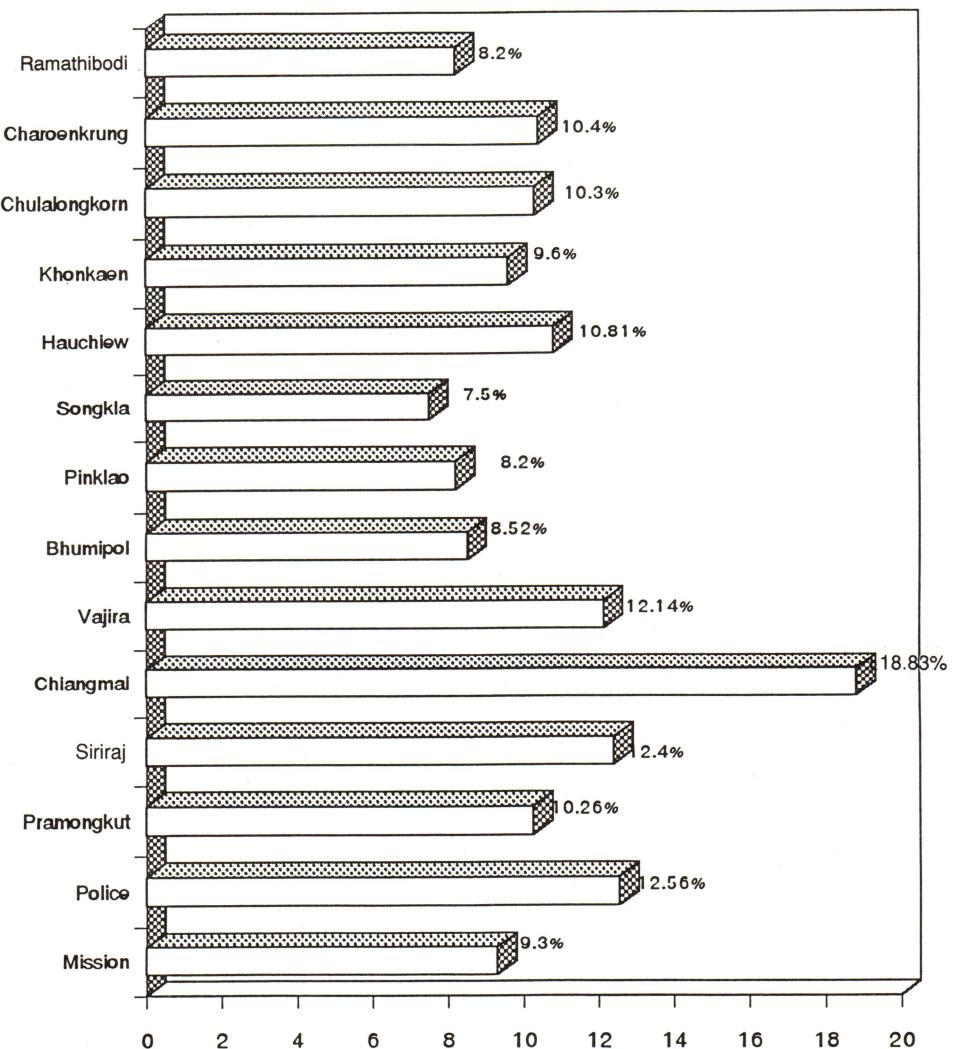


Fig. 1. Perinatal mortality rate.

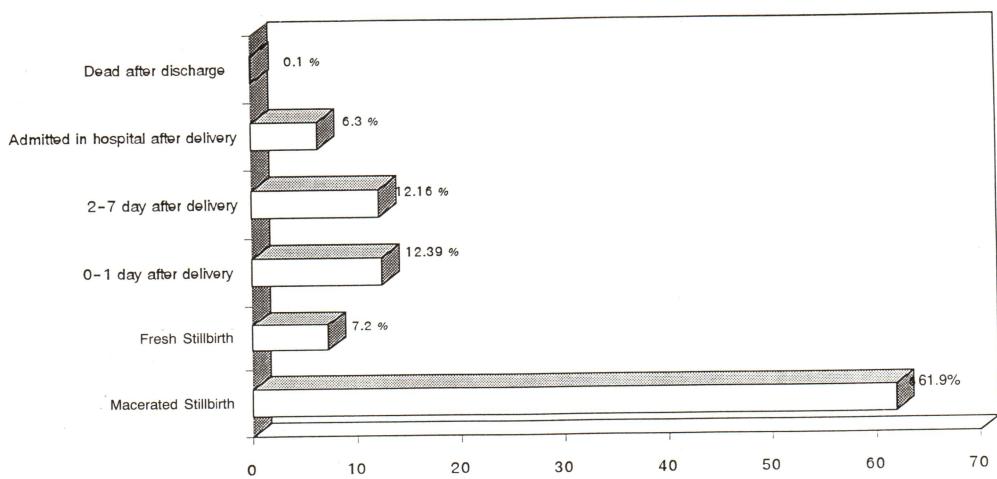


Fig. 2. Time of perinatal death.

Table 2. Comparison of PMR of the group of hospitals in Bangkok to three regional Provincial Medical Schools

No.	Hospitals	PMR/1,000	Compare	P
1.	Hospitals in Bangkok with Residency Training	10.3	1 and 2	0.3483
2.	Hospitals in Bangkok without Residency Training	10.3		
3.	Average PMR/1,000 of Hospitals in Bangkok	10.3	3 and 4	0.001
4.	Chiangmai Medical School (Northern Region)	18.8		
5.	Songkla Medical School (Southern Region)	7.5	3 and 5	0.1003
6.	Khonkaen Medical School (N-E region)	9.6	3 and 6	0.385

Table 3. Delivery of multiple pregnancy

Hospitals	pair of twins	no. of triplet	
Mission Hospital	9	-	
Police	44	1	
Pramongkutkla	35	-	
Siriraj	155	1	1 pair of conjoined twins
Chiangmai	55	1	
Vajira	64	1	
Bhumipol	81	-	
Pinklao	27	1	
Songkla	25	-	2 pairs of conjoined twins
Hauchiew	26	1	
Khonkaen	32	-	
Chulalongkorn	78	2	
Charoenkrung	38	-	
Ramathibodi	53	-	
Total	722	8	3 pairs of conjoined twins

ious babies, 9.4% of them were CNS anomalies, 5.4% had limb anomalies, 3.1% had abdomen anomalies, and 2.4% had spine anomalies.

Birthweights : Infant of low birthweight (< 2500 grams) group contributed 67.6% of death. For weight group between 500-999 grams 5.6% died, 1,000-1,499 grams 24.6% died, 1,500-1,999 grams 17.2% died and 2,000-

2,499 grams 20.2% died. Thirty-two percent who died weighed 2,500 grams or more (Fig. 3).

Gestational age : 56.9% of babies who died were at the gestational age less than 36 weeks, 38.7% at the gestational age between 37-41 weeks, and 4.3% were 42 weeks or more (Table 4).

Causes of death : only 48.7% of deaths

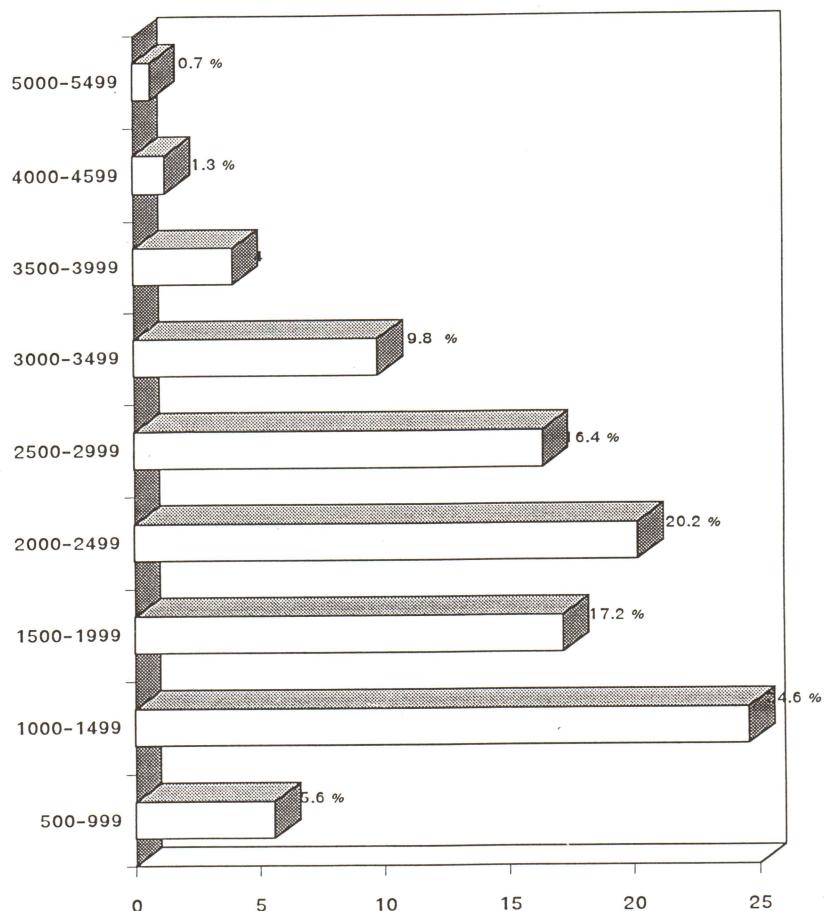


Fig. 3. Birthweights and perinatal deaths.

Table 4. Gestational age of perinatal death

Weeks	Number	%
28-31	270	24.5
32-36	359	32.5
37-41	428	38.7
≥ 42	48	4.3
Total	1,105	100.0

had autopsy. 48.9% of babies were normal but macerated stillborn, 12.9% were macerated with obvious congenital anomalies, 13.9% premature, 15.9% asphyxia, and 8.3% unknown (Fig. 4).

Maternal age : 9.4% of mother had age 15 -

19 years, and 79.0% had 20-34 years (Fig. 5).

Occupation : 39.3% were labourer, 30.8% housewives, 4.6% farmers, 8.9% business, 4.3% government services, and 4.3% unemployed and 7.4% unknown (Table 5).

Education and income : 43% of mothers finished primary school, 12.1% completed secondary school, 7.6% finished vocational studies, 3.5% received Bachelor degree, and 0.1% were illiterate, with 33.8% unknown. 18% of families earned 2,000 baht or less per month, 13.5% 2,000 - 3,500 baht per month, 11.8% 6,000 baht or more per month, and 56% were not recorded.

ANC attendance : 22.0% of mothers had never attended ANC, 21.6% attended ANC less than 4 times, and 56.2% attended ANC 4 times

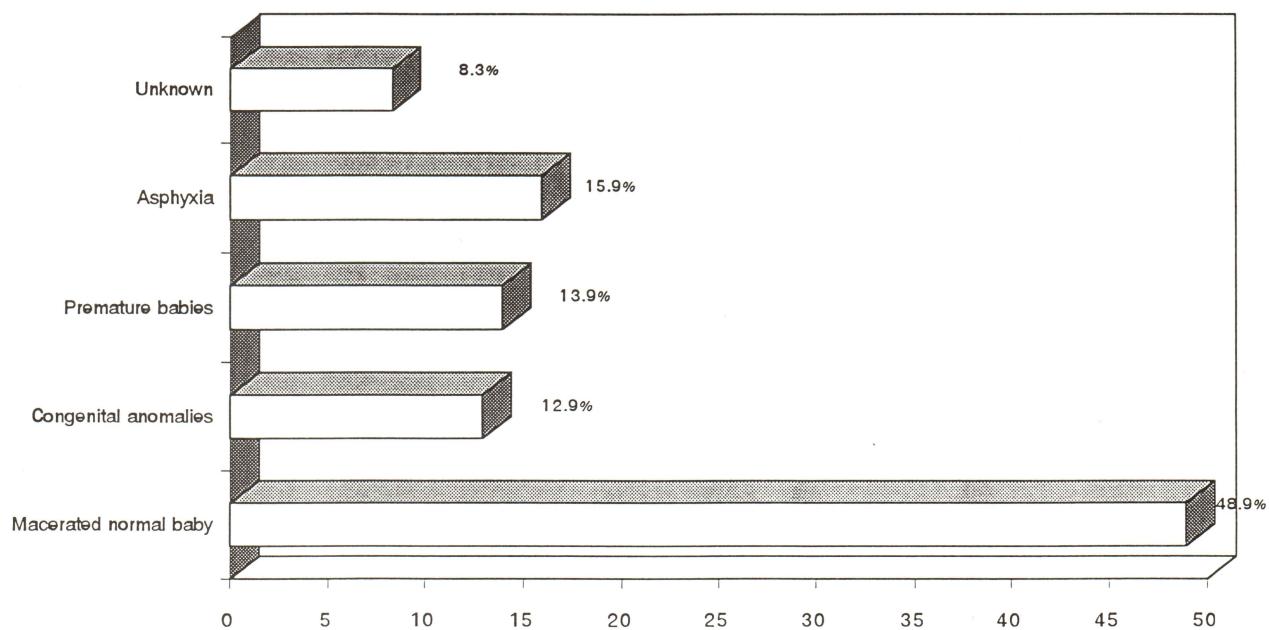


Fig. 4. Causes of perinatal death.

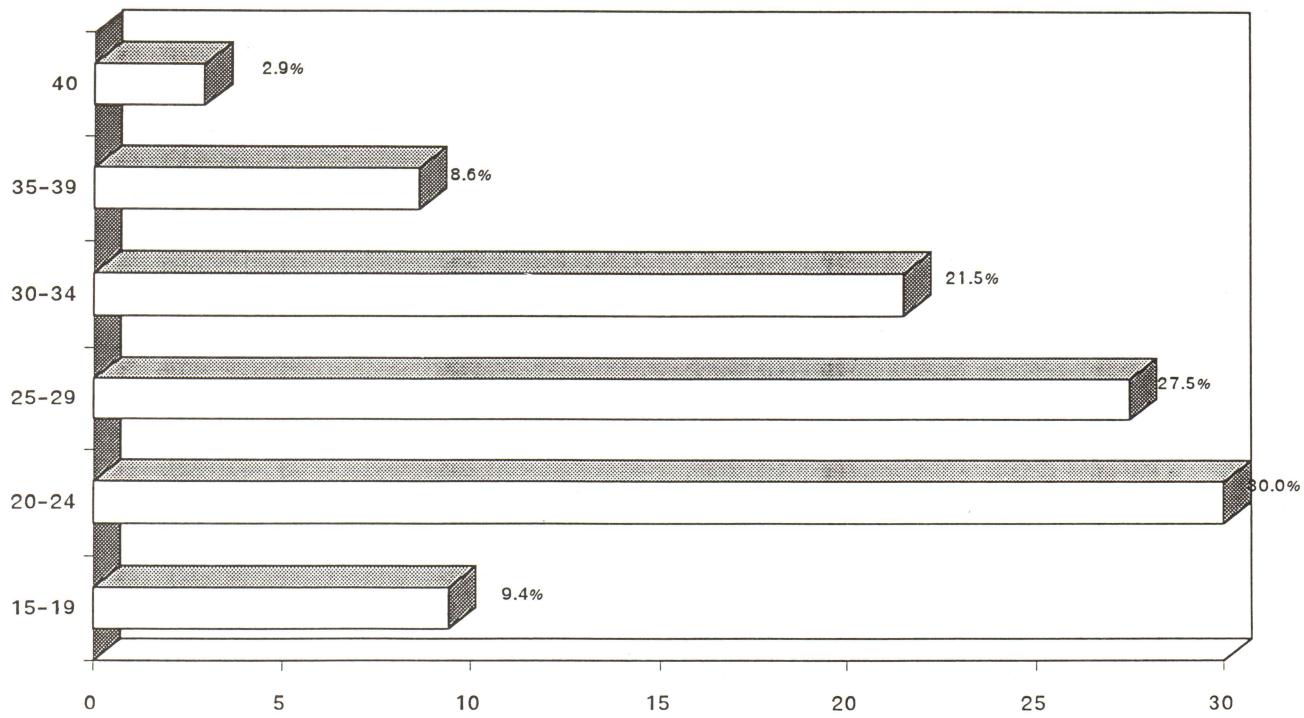


Fig. 5. Maternal age.

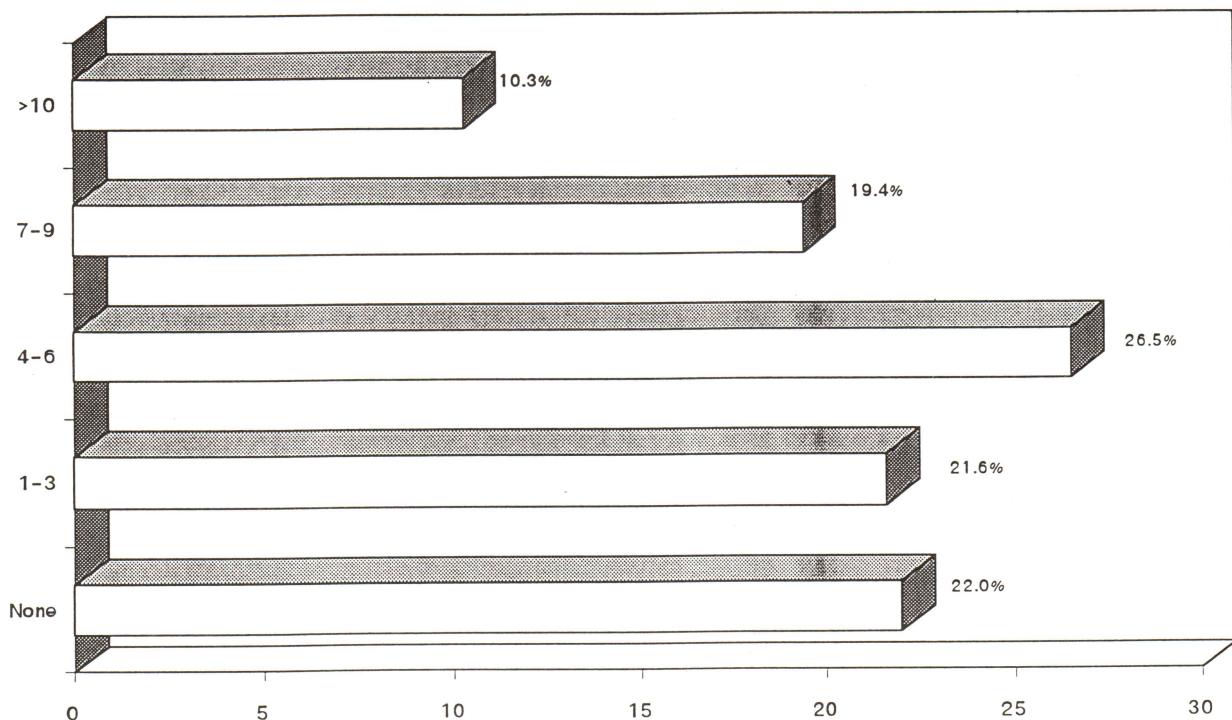


Fig. 6. Number of ANC.

or more (Fig. 6). 19% of mothers attended the first ANC at gestational age of 20 weeks or less, 13.5% attended at 21-27 weeks, 11.0% attended at 28 weeks or more, and 56.3% had no records.

Place of ANC : 31.2% of mothers attended ANC at government hospital, 22.1% at medical school, 7.5% at private hospital, 10.4% at clinic, 4.3% at community hospital, 2.3% at health centre, and 22.1% showed no records (Table 6).

Maternal complication : During pregnancy, 29.0% of mothers had complications. 4.3% had pregnancy induced hypertension, 2.8% hepatitis B virus infection, 1.9% syphilis, 1.4% anaemia, 0.3% heart disease, and 0.2% renal disease.

Type of delivery : 66.3% of mothers had normal delivery, 18.1% caesarean section, 9.0% breech assisting, 3.9% forceps extraction, and 2.7% vacuum extraction (Table 7).

Intrapartum complication : 4.5% had haem-

Table 5. Occupation of the mothers

Occupation	Number	%
Labourer	434	39.3
Housewife	341	30.8
Business	98	8.9
Farmer	51	4.6
Government Service	48	4.3
Unemployed	47	4.3
Employee	4	0.4
Not available	82	7.4
Total	1,105	100.0

morrhage, 4.3% premature rupture of membranes, 1.6% chorioamnionitis, 1.5% prolapsed cord, and 0.2% eclampsia.

Table 6. Place of ANC

Place	Number	%
Government Hospital	346	31.3
Medical school	244	22.1
Clinic	115	10.4
Private hospital	83	7.5
Community Hospital	48	4.3
Health centre	25	2.3
Not available	244	22.1
Total	1,105	100.0

Discussion

The crude perinatal mortality rate (PMR) from this study was 11.3 per 1,000 total births and 9.7 per 1,000 total births when excluding lethal congenital malformations such as anencephaly, multiple anomalies, thanatophoric dwarfs. Comparing PMR amongst different regional hospitals revealed 10.3 in Bangkok, 18.8 in Maharaj Chiangmai Hospital, 7.5 in Songklanakarin, and 9.6 in Khonkaen Hospital. There was statistical difference between PMR in selected Bangkok Hospitals and Maharaj Nakorn Chiangmai Hospital ($P < 0.001$) but no difference in PMR between Bangkok Hospitals and Songklanakarin Hospital, ($P > 0.1003$) or with Khonkaen Hospital ($P > 0.385$). The perinatal mortality in Maharaj Nakorn Chiangmai in the northern part was the highest rate in the study. There were many factors which influence high perinatal mortality such as high maternal mortality rate (63.1/100,000 livebirths), more critical conditions of mothers were referred to the Maharaj Chiangmai Hospital.⁽⁸⁾

The incidence of twin pregnancy in this study was 14/1,000 deliveries of all births. This is higher than other reports.^(9,10) Deaths of

Table 7. Mode of delivery

Mode	Number	%
Normal	732	66.3
C/S	200	18.1
Breech assisting	100	9.0
Forceps extraction	43	3.9
Vacuum extraction	30	2.7
Total	1,105	100.0

babies in twin pregnancy were 5 times higher than those in singleton pregnancy. Perinatal mortality occurred more frequently in second twins. Socio-economic factors were the main associated causes of high perinatal loss. These findings were similar to other reports.⁽¹⁰⁻¹⁴⁾ Twenty-two percent of mothers had never attended antenatal care, 21.6% had insufficient antenatal care (less than 4 times). Twenty percent of the mothers had preexisting disease and 29.0% had complications during intrapartum period such as prolapsed cord, PROM more than 24 hours, antepartum haemorrhage and eclampsia. These high risk factors leading to abnormal deliveries, which were 24.8% and contributed significantly to high perinatal mortality.⁽¹⁵⁻¹⁷⁾ For causes of death, 61.9% or 6.2/1,000 were stillbirth (5.2 were macerated, 1.4 were macerated with obvious congenital anomalies). These macerated deaths ranked first in the cause of perinatal death, this is in agreement with several others.^(4,6,18,19) Further investigations such as haemoglobin and chromosome study should be instituted in the future study in identifying risk factors. Perinatal mortality in congenital malformation group can be reduced by genetic counselling, prenatal

diagnosis and selective abortion of abnormal fetuses. Sixteen percent or 1.7/1,000 births were deaths from asphyxia and 7.2% or 0.79/1,000 births were fresh stillborn that can be used for enquiries into the preventability of perinatal death. Fourteen percent of perinatal death or 1.5 per 1,000 birth were caused by prematurity comparable with 1.4 per 1,000 from other study.⁽¹⁹⁾ As birthweight is a major determinant of perinatal death, birthweight-specific perinatal mortality rate are widely used as an indicator of the quality of health care in pregnancy and perinatal period but this study can not use birthweight-specific rate because of lack of data of weight group of livebirth from each studied hospitals. Autopsy could only be carried out in 48.7% in this study, emphasizing the need for classification that requires no autopsy, i.e. Wigglesworth.

The most effective ways for reduction of perinatal mortality is the Government's action to improve general education, national income and better social welfare, assure providing high quality health care in pregnancy and perinatal period. Premarital counselling and prenatal diagnosis will reduce and eliminate some loss from preventable genetic diseases and congenital malformations. The public must be educated to seek early and continuous antenatal care as well as to demand a quality service during the intrapartum as well as postpartum period.

Acknowledgement

The authors wish to thank representative obstetricians and paediatricians from participated hospitals (Dr. Prassin Chanvit, Dr. Suraphol Puyanon, Dr. Yupayong Hangchovanith, Dr. Maneesri Laohaviriyakamol, Dr. Pichai Jiaraswadwathana, Dr. Montree Wasinamorn, Dr.

Preyapun Saenggaroon) who helped in providing clinical informations and vital statistics of this study.

References

1. Taneepanichkul S, Voramongkol N, Sritapanya W. Perinatal mortality study in Singburi and Angtong Province 1988-1989. Report of Annual Conference on maternal and perinatal mortality "Safe Mother and Childhood," December 21-22, 1989 : 105.
2. Aumkul N, Chotikanta D, Suthutvoravut S, et al. Perinatal mortality study in health centers and governmental hospitals, Sukhothai Province 1989. Report of Annual Conference on maternal and perinatal mortality "Safe Mother and Childhood," December 21-22, 1989: 106.
3. Sirisraest M, Pupichpongs V. Causes of early perinatal mortality in Hadyai Hospital 1989. Report of Annual Conference on maternal and perinatal mortality "Safe Mother and Childhood," December 21-22, 1989: 107.
4. Paungsupt S, Chaturachinda K, O-Prasertsawat P. Perinatal mortality of Singleton in Saraburee Province 1983-1987. Report of Annual Conference on maternal and perinatal mortality "Safe Mother and Childhood," December 21-22, 1989: 108.
5. Tipsaiyasn T, Chaturachinda K, Suthutvoravut S. Perinatal mortality of singleton in Nakornpathom Hospital 1984-1987. Report of Annual Conference on maternal and perinatal mortality "Safe Mother and Childhood," December 21-22, 1989: 109.
6. Koochaisiti C, Chaturachinda K, Suthutvoravut S. Perinatal mortality of singleton in Ramatibodi Hospital 1980-1983. Report of Annual Conference on maternal and perinatal mortality "Safe Mother and Childhood," December 21-22, 1989: 110.
7. Perinatal Health in Thailand : Regional challenges and prospects. Report of Thai Perinatal Society, Regent Hotel, Cha-am, November 10-11, 1994.
8. Israngkura B, Muttamata S, Suthutvoravut S. Maternal mortality rate in hospitals in Bangkok and Provincial Medical Schools in Thailand. Annual Conference 1995, the Royal College of Obstetricians and Gynaecologists of Thailand, Central Convention Center, Central Hotel, October 11-13, 1995: 137-49.

9. O-Prasertsawat P, Linasmita V, Sirimongkolkasem R, The perinatal mortality of twins at Ramathibodi Hospital : 1981-1984. *J Med Assoc Thai* 1986; 69: 336-40.
10. Jakobovits A.A. The abnormalities of the presentation in twin pregnancy and perinatal mortality. *Eur J Obstet Gynecol Reprod Biol* 1993; 52: 181-5.
11. Cord K, Codrington G, Escffrey C. Perinatal mortality in Jamaica 1986-1987. *Acta Paediatr Scand* 1991; 80: 749-55.
12. Zahalkova M. Changes in perinatal mortality in twins. *J Pediatr* 1993; 48: 346-50.
13. Parazzini F, Pirotta N, La vecchia C. Determinants of perinatal and infant mortality in Italy. *Rev Epidemiol Sante Publique* 1992; 1 : 15-24.
14. Howell EM, Vert P. Neonatal intensive care and birth weight-specific perinatal mortality in Michigan and Lorraine. *J Pediatr* 1993; 91: 464-9.
15. Misra PK, Thakur S, Kumar A. Perinatal mortality in rural India with special reference to high risk pregnancies. *J Trop Pediatr* 1993; 39: 41-4.
16. Leiberman Jr, Kasis A, Shoham Vardi. Perinatal mortality in hypertensive disorders of Jewish and Bedouin populations. *Eur J Obstet Gynecol Reprod Biol* 1993; 48: 159-67.
17. Akepatcha K, Leimsombat A, Horpaapan S. Factors associated with singleton perinatal mortality in Prae Province : 1990-1992. Report of Thai Perinatal Society, Perinatal Health in Thailand : Regional challenges and prospects. Regent Cha-am Hotel, November 10-11, 1994: 67.
18. Srisookum T, Suthutvoravut S, Pandit W. Perinatal mortality of singleton pregnancy in goverment hospital in Petchaboon Province : 1992-1993. Report of Thai Perinatal Society. Perinatal Health in Thailand : Regional challenges and prospects. Regent Cha-am Hotel, November 10-11, 1994; 66.
19. Aumkul N. Perinatal Health in The Central Region : FN 1993. Report of Thai Perinatal Society. Perinatal Heath in Thailand : Regional challenges and prospects. Regent Cha-am Hotel, November 10-11, 1994: 22-4.