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OBSTETRICS

Reduction of Perinatal Mortality in Rayong Hospital

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ABSTRACT

Objective To determine whether perinatal mortality could be improved after the interventions.

Interventions 1. Determination of gestational age by sonogram as necessary. 2. All high risk pregnant women are assessed for fetal well being at ANC clinic and referred to the high risk clinic. 3. Partogram is used routinely in the labour room. 4. Specific protocol for preterm labour including steroid administration and inhibition of labour are attempted in preterm labour less than 34week gestation barring contraindication. 5. Perinatal conference is held monthly.

Design Before and after study.

Setting Obstetric unit, Rayong Hospital.

Subject All deliveries at obstetric unit Rayong Hospital during Oct1,1997-Sept30,1998. The study was divided into 2 periods, period I during Oct1,1997-Mar 31,1998 and period II, after interventions, during Apr1,1998-Sept 30,1998.

Result There were 5309 births during the study period, 2767 births in period I and 2542 births in period II. The perinatal mortality rates were 16.98 and 10.23 during period I and II respectively. The most common cause of death were asphyxial condition in both periods. Perinatal mortality seemed to be improved in death related to immaturity group. While no improvement was found in other categories.

Conclusion Improvement of perinatal mortality can be achieved by the interventions conducted in Rayong Hospital. Despite the fact that these interventions are considered standard obstetric practice, they are rarely practiced in many provincial hospitals. Continuous quality improvement should be adopted in order to deliver better perinatal care.

Key words: perinatal mortality, improvement, reduction

Perinatal morbidity and mortality statistics, despite their inherent limitations, provide an important form of audit. Routinely collected data have limitations; some conclusions, however, can be drawn from such data, and areas of care for further analysis may be highlighted. Analysis of data on a regular basis allows both the neonatal and obstetric staff the opportunity to examine and critically evaluate patient management and to undertake appropriate interventions wherever possible. The rate of perinatal mortality, fetal and early neonatal death after 28 week gestation or birth weight at least 1000 gm, in Rayong Hospital, had not appreciably changed during the last 6 years. The rates were 15.07,18.91,15.27,16.86,12.21 and 16.19 in the year 1992,1993,1994,1995,1996 and 1997 respectively (Figure1). The average was 15.75. While 4 year (1990,1992,1994,1996) national average was 12.06/ 1000 births.[1] In attempt to decrease perinatal mortality rate (PNMR), interventions have been implemented.

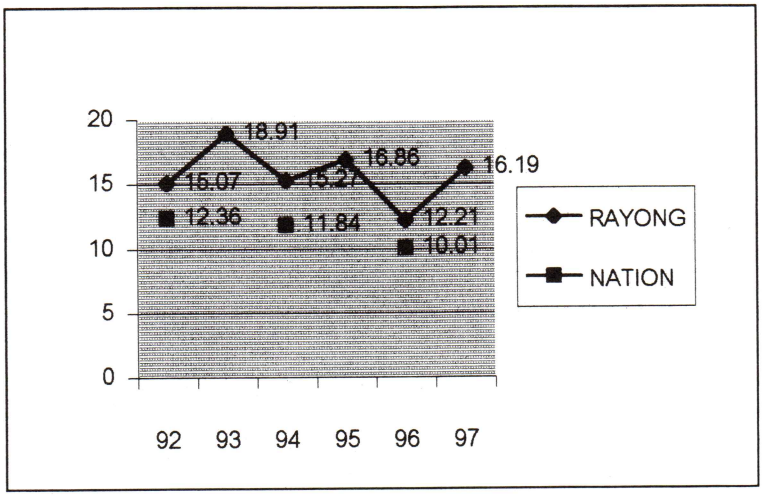


Fig. 1.

Materials and Method

Medical records of all deliveries in Rayong Hospital in period I (October 1, 1997-March 31, 1998) were reviewed and data regarding maternal age, parity, antenatal care, patient status (private or service), gestational age, birth weight, Apgar's score at 1 and 5 minutes and causes of perinatal death were collected. The causes of death were classified using revised Wigglesworth classification.[2] In January 1998, an ultrasound machine and 2 external fetal monitors were available. Those with uncertain or unknown last menstrual periods had their gestational ages determined by sonogram on their first visit to antenatal clinic. Fetal well being was tested in all high risk patients periodically in antenatal clinic using nonstress test. In February 1998, 2 radiant warmers were available, one in the labour room, another in the operating room. Routine use of partogram[3] was implemented in February 1998. Protocol for preterm birth, including inhibition of preterm labour and use of steriod in all preterm labour barring contraindication, has been in routine use since January 1998. The steriod regimen was 4 doses of 5mg intramuscular dexamethasone every 12 hours.[4] The doses were repeated every week until 34 weeks of gestation. Tocolytic drug was terbutaline sulfate 0.1mg/minute infused intravenously. Increase of 0.05 mg. every 10 minutes was given until no contraction was detectable or side effects were unacceptable. The infusion was continued for 2 hours after cessation of contraction. After which, a dose of 0.25 mg. was given subcutaneously every 6 hours for next 24 hours. 2.5 mg terbutaline tablet was given four times a day until 36 week gestation. Intrapartum external fetal monitoring was also used if fetus was at risk of hypoxia. Perinatal conference was held monthly in order to increase the awareness of problems and find solutions for perinatal problems encountered. Pediatricians were also invited to attend and gave their valuable advice. In March, 1998, all interventions were settled. The perinatal data was then routinely collected monthly from April,1998-Sept 30,1998. Analysis of data and statistical test were carried out using SPSS7.5 for windows and Epi Info version6.

Results

Maternal characteristics are shown in Table 1. and 2. The most common age group was 20-29 in both periods. The age ranged from 13-47 in the first group and 14-43 in the second group. The average ages were 25.46 and 25.86 during period I and period II respectively. Most mothers were primigravida. The range of parity was 0-7 in the first and 0-8 in the second group. The antenatal care rates were 95.80% and 96.23% during period I and II. The antenatal care rates were 74.5%and 76.9% in perinatal death group. The proportion of private patients were 53.42%and 55.15% in period I and II. Private patients accounted for 21.3% during period I and 7.69% during period II in perinatal death group. Total births, low birth weight, caesarean section, vacuum, forceps extraction in the fiscal year 1998 were shown in Table 3. Before the interventions, confirmation of gestation age was carried out by a radiologist, 83 patients (3.0%) had their gestational age determined. During the intervention, 386 patients (15.2%)with uncertain or unknown LMP had their gestational ages confirmed by obstetrician at their first antenatal visits. Fetal well being assessment at high risk clinic were carried out on 192(7.6%) occasions during period II in contrast to 29(1.1%) during period I. During period II, 31 patients (1.2%) who had preterm labour recieved dexamethasone and terbutaline sulfate while 19 patients(0.7%) received the treatment during period I. During period II, partogram were used in all patients. Partogram had not been used before the commencement of period II, Table 4.

The most common cause of death was asphyxia during both study periods. The second most common cause of death related to immaturity and formed marcerated during period I and II respectively. The overall perinatal mortality rate during period I was 16.98.After the intervention the rate declined to 10.23[RR=0.60(0.37<RR<0.97), P<0.05]. Perinatal deaths due to immaturity decreased significantly [RR=0.37(0.14<RR<0.99]. Asphyxial condition during period I did not differ from period II [0.54 vs 0.32,P=0.15]. Normally formed marcerated death were not different in both groups [RR=0.85(0.32<RR<2.27, P>0.5]. There were 4 congenital malformations during each period.

Table 1. Maternal Ages

Age (years)	Period I		Period II	
	Number	%	Number	%
<15	13	0.47	4	0.16
15-19	432	15.61	379	14.91
20-24	855	30.9	721	28.37
25-29	787	28.44	736	28.97
30-34	474	17.13	509	20.03
35-39	176	6.36	162	6.38
>39	29	1.05	30	1.18
Total	2767	100	2542	100

Table 2. Parity

Parity	Period I		Period II	
	Number	%	Number	%
1	1309	47.31	1157	45.53
2	1018	36.79	987	38.84
3	337	12.18	317	12048
4	79	2.86	55	2.17
5	17	0.61	17	0.67
6	4	0.15	4	0.16
7	3	0.11	1	0.04
8	0	0	2	0.08
Total	2767	100	2542	100

Table 3. Rayong hospital birth statistics in fiscal year 1998

	Period I		Period II		Total	%
	Number	%	Number	%	Number	
Total births	2767	100	2542	100	5309	100
Low Birth Weight	197	7.12	179	7.04	376	7.08
Caesarean Birth	770	28.07	701	27.70	1471	27.71
Breech Assisting	21	0.79	16	0.63	37	0.7
Vacuum Extraction	166	6.00	161	6.33	327	6.16
Forceps Extraction	44	1.59	57	2.24	101	1.9

Table 4. The use of antepartum and intrapartum interventions

Interventions	Period I		Period II	
	Number	%	Number	%
1. GA determination by ultrasound	83	3.0	386	15.2
2. Fetal well-being assessment	29	1.1	192	7.6
3. Preterm labour treatment	19	0.7	31	1.2
4. Partogram	0	0	2542	100

Table 5. Causes of perinatal death

Causes of Death	Period I		Period II		RR (95%CI)
	Number	%	Number	%	
1. Antepartum fetal death	9	0.33	7	0.27	0.85 (0.32<RR<2.27)
2. Congenital malformations	4	0.14	4	0.16	1.08 (0.27<RR<4.32)
3.Condition associated with immaturity	15	0.54	5	0.19	0.37 (0.14<RR<0.99)
4. Asphyxia condition	16	0.58	8	0.32	0.54 (0.23<RR<1.26)
5. Specific conditions	3	0.11	2	0.08	0.72 (0.12<RR<4.31)
Total	47	1.698	26	1.023	0.60 (0.37<RR<0.97)
Total births	2767	100.00	2542	100.00	

Table 6. Congenital malformations

Malformations	Period I	Period II
Anencephaly	1	1
Hydrocephalus	0	2
Diaphragmatic hernia	1	0
Microcephaly	1	0

Discussion

After the interventions the perinatal mortality rate had declined significantly from 16.98 to 10.23 per 1000 births[RR=0.60,(0.37<RR<0.97)]. These interventions included use of prenatal ultrasonogram for those who did not known their exact last menstrual periods, periodic fetal nonstress test for all high risk pregnancies, better equipped radiant warmers in both labour and operating rooms. Specific protocols for preterm labour and routine use of partogram recommended by WHO[3] were also started in Feb,1998. These interventions seemed to help decrease perinatal mortality rate in Rayong Hospital. In contrast to developed world where their most common problem is low birth weight[5], in developing world the most common cause of death is asphyxial condition[8-14] Asphyxia was the most common cause of death at Rayong Hospital as well as at Supanburi Hospital.[6] An Australian study also demonstrated the leading cause of death was asphyxia and the second most common cause of death was death related to immaturity.[7] Autopsy finding at Ramathibodi Hospital showed that asphyxia was the commonest known cause of perinatal death.[8] On the other hand, the leading related finding of death at Makarak, Prapokklao and Prachuakirikhan were marcerated stillbirth.[15,16,17] This discrepancy was probably due to the fact that the classification was not followed strictly. The national leading cause of death was also group 1,ie, normally formed marcerated stillbirth. Revised Wigglesworth classification should be followed strictly in order to have comparable data.[2,7] Reduction in perinatal mortality at Rayong Hospital was not different from other studies where better prenatal and intrapartum care were provided.[18,19,20]

Asphyxia and immaturity accounted for nearly half of perinatal mortality in both periods. This was in

accordance with the Australian finding.[7] The most improved part was those in group 3[death associated with immaturity]. During period I and II, the rates of low birth weight babies(<2500gm)born were not different significantly[7.12 vs 7.04%,p>0.5]. Tocolytic use showed no beneficient effect on preterm delivery. Use of tocolytic was found not to decrease perinatal mortality rate in spontaneous preterm labour.[21] The babies weighing less than 1500 gm thrived better in period II than period I. This was attributed to use of steroid in preterm labour and availability of radiant warmers in both labour and operating room. During period I and before this study began, hypothermia was the most common cause of neonatal apnoea. Aphyxial condition caused 16 perinatal deaths [0.58/1000 births] during period I and declined to 8[0.32/1000 births] during period II. The difference was not statistically significant [P=0.15]. Despite the fact that intrapartum fetal monitoring have been available, both obstetrician and nurse, did not follow instructions strictly resulting in stable high asphyxial mortality rate. And worse yet, untimely caesarean section contributed to preterm delivery and its consequence. In February 1998, perinatal conference was started. Obstetricians, pediatricians and nurses participated and the problems were discussed and reached for pragmatic solution. Awareness of the situation increased, both in obstetricians and pediatricians. They were convinced that improvement of perinatal death can be achieved by these means. Asphyxia should have been improved if pediatrician had been at the scene when the high risk baby was born. In other words, resuscitation of newborn should be carried out effectively by more competent pediatricians and resuscitation teams. The present situation, obstetrician taking care of both mother and newborn baby is less effective. In critical situation, the condition of the baby can be further enhanced by appropriated and effective resuscitation at delivery. In other studies, death associated with hypoxia could be reduced if there were good intensive care units.[22,23] The advantage of good prenatal care could not be overemphasized. During both periods, the perinatal mortality rate in pregnant women with antenatal care were significantly lower than those without antenatal care. This was in agreement with other studies.[5,7,9] The private patients did better in this study in contrast to Ramathibodi study.[27] This probably reflect the widely known different socioeconomic status[24,25] rather than differences in standard care of the patients. Because Rayong Hospital is a secondary care center, some pregnant women have their antenatal care at primary centers where the quality are somewhat doubtful. Two postterm babies and 2 prolonged labour were referred from primary centers. With better antenatal care, these problems should be lower or eliminated. For congenital malformations to be reduced prenatal diagnosis by ultrasound guided amniocentesis will decrease certain malformations such as anencephaly and hydrocephalus. Rayong Hospital will provided amniocentesis service in January 1999. Hopefully, the perinatal mortality rate will be further improved. Although unexplained death before the onset of labour did not decrease and will continue to occur, perinatal mortality can be reduced if its causes and risk factors in community are given priority in prenatal and intrapartum care. The study should be more extensive and the design should be a randomized controlled trial in order to obtain more meaningful result.

The study shows that reduction of perinatal mortality could be achieved by providing good antenatal care, well equipped labour and operating rooms and leading causes of death in community, ie, asphyxial condition and immaturity are given priority in ANC and intrapartum programme. Continuous quality improvement should lead perinatal mortality rate to the level observed in more developed world.

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References

1. Department of Health,Ministy of Public Health Statistics

1992-1996.
2. Keeling JW,Gillivary,Golding J,Wiggleworth J,Berry J,Bunn DM. Classification of perinatal death. Arch Dis child 1989;64:1345-51.
3. World Health Organization. The partogram:a managerial tool for the prevention of prolonged labor. WHO/MCH/90.2. Geneva:WHO,1990.
4. Cunningham FG. et al Williams Obstettrics.20th Edition:815-21.
5. Paneth NS. The problem of low birth weight. The Future of Children,5:1 spring 1995.
6. Diavatanavivat n. The perinatal mortality at Chaoprayayomraj hospital in 1992-1994. Region7 Medical J 1995;1:25-32
7. Raghuveer G. Perinatal death:relavance of Wiggleworth's classification. Paediatr Epidemiol,1992 Jan,6(1):45-50.
8. Boonpasat Y. Causes of perinatal death defined by autopsy at Ramathibodi Hospital. J Med Assoc Thai. 1992,75 Suppl 10:76-80.
9. Owa JA;Abusrair-h;Trends in perinatal mortality in Qatif Central Hospital,Saudi arabia. Saudi-Med J.
10. Dasgupta S;et al. Study of perinatal mortality and associated maternal profile in a medical college hospital. J. India Med Assoc.1997;95:3,78-79.
11. Al-mulhim A;Al-Najagh S. Perinatal mortality in Saudi Arabia:a six year study. J Obstet Gynecol 1996;16:4: 230-234.
12. Mac Donald,D;Baillieres. Asphyxia. Clin Ostet Gynecol 1995; Setp;9(3):579-94.
13. Airede,Al;Weerasinghe,HD. Birth Asphyxia:a review. East Afr-Med J 1995; Apr;72(4):252-7
14. Maouris P. Reducing perinatal mortality in Vila Central Hospital,Vanuatu. P-N-G Med J 1994; Sept37(3):178-80
15. Tuntiyawarong C,Kanchanatawan P. Perinatal mortality of Makaruk hospital in October1991-September1994. Region7 Med J 1995 Jan-Mar 14(1):15-23.
16. Somboon Somlaw. Perinatal mortality rate in Prapokklao Hospital 1992-1996. The journal of prapokklao Hospital Clinical Medical Education Center 1997 Jan-Mar 14(1): 6-16.
17. Nimitsurachat S,srinuunchal K,Glinnirun B,Srira J,Kingsawat S. Factors related to perinatal mortality at Prachuabkirikhan. Bulletin of The Department of Medical Services 1998;Aug 23(8):427-435.
18. Atrash HK;Rowley D;Hoque CJ. maternal and perinatal mortality. Feb,1992. Curr Opin Ostet Gynecol,4(1): 61-71.
19. Iffy L;Bilenki I;Apuzzio JJ;Ganesh V;Sun SC;Thomus H;Kaminetzky HA. The role of obstetric factors in perinatal mortality trends.Int J Gynecol Obstet,1986 Apr,24(2):85-95.
20. el-Zibdeh MY;Al-Suleiman SA;Al-Sibai MH. Perinatal mortality at King Fahd Hospital of the University Al-Khobar,Saudi Arabia. Int J Gynecol Obstet, 1998,26(3):399-407.
21. Boyland P;O'Driscoll K. Improvement in perinatal mortality rate attributed to spontaneous preterm labour without use of tocolytic agents. Am J Obstet Gynecol 1983 Apr,145(7):781-3.
22. Barson AJ;Tasker M;Leiberman BA. Impact of improved perinatal care on the cause of death. Arc dis child,1984 Mar,59(3):199-207.
23. Tan KL. Infant,neonatal and perinatal rates in Singapore. Annal Acad Med Singapore,1982 Jul,11(3):344-53.
24. Mheen H Van De, et al. Socioeconomic inequalities in infant mortality and mortality from 1854-1990 in Amsterdam, The Netherland. European Journal of Publish Health 1996,6:3,166-174
25. Mavalankar DVC, et al. Level and risk factors for perinatal mortality in Ahmedabad,India. Bulletin of World Health Organization.1991,69(4):435-442.
26. Mc Dermott-J et al. Perinatal mortality in rural Malawi. Bulletin of The WHO 1996,74:2,165-171.
27. O-Prasertsawat P. Obstetrics Ramathibodi, 2nd Edition 1996; 59-86.