Morbidity and Mortality From Birth Before Arrival at Siriraj Hospital

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Abstract

Objective : To identify maternal and infant morbidity and mortality from birth before arrival at Siriraj Hospital.

Study design : Prospective case-control study.

Setting : Department of Obstetrics & Gynecology, Faculty of Medicine Siriraj Hospital, Mahidol University.

Subjects : Three hundred and twenty patients, who had delivered at Siriraj Hospital, were divided into two groups. The study group consisted of 160 patients, who gave birth before admission to the labour room of Siriraj Hospital. The control group consisted of 160 patients, who had normal deliveries in the labour room of Siriraj Hospital at the same period of time.

Intervention : Interviewing the patients and reviewing the medical records of the mothers and infants from both groups. The data were analyzed by using the EpiInfo program.

Main outcome measure : Maternal and infant characteristics after delivery, maternal and infant outcomes including puerperal morbidity, low birth weight, perinatal death and infant morbidity.

Results : The study showed that the mothers in the study group had to stay in the hospital longer than the control group (3.9 $\pm$ 2.5 days and 3.6 $\pm$ 1.3 days respectively, $p < 0.05$). The infants in the study group also had to stay in the hospital longer than the control group (5.1. $\pm$ 6.5 days and 3.3 $\pm$ 1.7 days respectively, $p < 0.001$). The birth weights of infants in the study group were significantly lower than in the control group (2753.4 $\pm$ 594.1 grams and 3016.6 $\pm$ 405.0. grams respectively, $p < 0.001$). The body temperature of the newborns in the study group were also lower than in the control group (36.2 $\pm$ 0.6 degree Celsius and 37.0 $\pm$ 0.4 degree Celsius respectively, $p < 0.05$).

Concerning maternal and infant outcomes, all variables including low birth weight, perinatal death and infant morbidity were better in the control group significantly ($p < 0.05$) except for puerperal morbidity that had no significant difference ($p = 0.77$).

Conclusion : From the present study, the authors confirmed the higher mortality and morbidity rate of infants who were born unexpectedly before hospital admission. However, there was no difference in morbidity between the mothers of both groups.

Key word : Maternal Morbidity, Infant Morbidity, Perinatal Mortality, Birth Before Arrival

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The question about the proper place of delivery has been abundantly researched over the past two decades, because of many factors involved in this process. Campbell[1] reported since 1984 a higher perinatal mortality rate in cases of birth before arrival. However, in some developed countries, many pregnant women prefer to deliver at home[2,3].

In Thailand, the trend of pregnant women to deliver under a controlled process in the hospital has increased because of the policy of the Thai government, to increase the rate of delivery assisted by health care workers. Nevertheless, Thai people believe that the hospital is the best and safest place for delivery.

However, a statistical report from the Obstetric and Gynecologic Registry Unit, Department of Obstetrics and Gynecology, Siriraj Hospital also showed that, from 1988 to 1995, there were more than one hundred birth before arrival cases a year at Siriraj Hospital. Nevertheless, there is an upward trend year by year. A number of infants were born at home, in an ambulance or a car, etc.

In order to improve maternal and child health, the authors noticed that women and their infants, who were not delivered in proper places, have a higher mortality and morbidity rate. There is a limited data available on birth before arrival cases in Thailand. The authors established this prospective case control study, in order to evaluate the prevalence of the problem in the local population, to estimate the perinatal mortality rate of babies born before arrival and also to identify the outcome to both mother and infant.

MATERIAL AND METHOD

A prospective case-control study was conducted. Three hundred and twenty pregnant women, who delivered at Siriraj Hospital, were enrolled in this study and equally divided into two groups. 160 patients who gave birth before admission at Siriraj Hospital were assigned as the study group and 160 patients, who had normal deliveries in the Siriraj labor room at the same period of time, were assigned as the control group.

The term birth before arrival, or out born, is defined as the unplanned delivery of infants at home; en route to the hospital either in a private car or ambulance; in other places, such as the street; and sometimes within the hospital campus (parking lot), unattended by a physician or a qualified midwife capable of caring for the mother and the infant.

Maternal morbidity was defined as the requirement of treatment for maternal diseases in the immediate postpartum period such as postpartum hemorrhage, laceration of birth passage or puerperal febrile, etc.

Infant morbidity was defined for the purpose of the present study as the requirement of the infants for more intensive care, intervention and treatment such as premature babies, fever, polycythemia, asphyxia, neonatal jaundice and meconium aspiration syndrome, etc.

All information to complete the objective of this study was obtained from patient interviewing and also reviewing the medical records of the mothers and their infants.

The data were analyzed by using the EpiInfo program. Comparison between the groups was calculated statistically by Student's *t*-test, Fisher's exact test and Chi-square test. P-value < 0.05 was considered statistically significant. Odds ratio and 95 per cent confidence interval were calculated where appropriate.

RESULT

During the present study period, there were 25,728 births in Siriraj Hospital. The prevalence of birth before arrival at Siriraj Hospital was expected to be 6.2 per 1,000 births.

When comparing the sex of the babies in both groups, there were 76 males in the study group and 83 males in the control group. The male-female sex ratio between the groups was not different statistically.

When considering mortality for the babies, who were born unexpectedly outside the hospital, there were 4 perinatal deaths. On the other hand, there was no perinatal death case in the control group. Estimated perinatal mortality rate in the study group was about 25 per 1,000 births.

For the place of birth in the study group, there were 73 deliveries (45.6%) in front of the hospital, 66 deliveries (41.3%) on the way to the hospital and 21 deliveries (13.1%) at home.

The health personnel, who assisted the deliveries, were nurses (61.9%), physicians (17.5%), midwives or other health personnel (11.9%) and relatives or non-health personnel (8.7%).

Table 1 shows the general characteristics of the study cases. There were no statistical differences between both groups concerning patient's age, gestational age at first antenatal care and time taken to reach the hospital. The important variable, duration time between onset of labor and delivery, is significantly shorter in the study group.

Table 2 shows the maternal and infant characteristics after delivery. The authors found that both mothers and infants in the study group had to stay longer in the hospital than both in the control group. The birth weight of infants in the study group was lower than in the control group significantly and there was also lower body temperature.

Table 3 shows the comparison between both groups concerning maternal and infant outcomes in terms of mortality and morbidity. All variables except puerperal morbidity were better in the control group compared to the study group.

Table 1. General characteristics.

Characteristics	Study group (N = 160)	Control group (N = 160)	P-value
Age (year)	25.1 ± 5.9	24.0 ± 5.7	0.096
Gestational age at first ANC (weeks)	19.6 ± 7.5	18.6 ± 6.7	0.286
ANC visit (times)	5.2 ± 2.2	6.6 ± 2.9	< 0.001
Gestational age at delivery (weeks)	37.3 ± 3.3	38.9 ± 2.5	< 0.001
Gravidity	2.2 ± 1.0	1.7 ± 0.9	< 0.001
Normal time to reach the hospital (minutes)	57.5 ± 39.0	50.1 ± 37.9	0.065
Duration between onset and delivery (minutes)	174.3 ± 163.9	702.3 ± 457.0	< 0.001
Duration between onset and house leaving (minutes)	167.9 ± 102.0	236.3 ± 236.7	< 0.001
Duration between delivery and hospital arrival (minutes)	75.9 ± 310.5	-	-
Duration of third stage (minutes)	31.3 ± 18.5	8.6 ± 4.9	< 0.001

Table 2. Maternal and infant characteristics after delivery.

Characteristics	Study group (N = 160)	Control group (N = 160)	P-value
Duration of maternal admission in hospital (days)	3.9 ± 2.5	3.6 ± 1.3	0.018
Duration of infant admission in hospital (days)	5.1 ± 6.5	3.3 ± 1.7	< 0.001
Birth weight (grams)	2,753.4 ± 594.1	3,016.6 ± 405.0	< 0.001
Body temperature of the newborn (degree Celsius)	36.2 ± 0.6	37.0 ± 0.4	0.03

Table 3. Maternal and infant outcome.

Outcome	Study group (N=160)	%	Control group (N=160)	%	Odds ratio	95% CI*	P-value
Puerperal morbidity							
Yes	6	3.7	7	4.4	0.85	0.25-2.97	0.77
No	154	96.3	153	95.6			
Low birth weight (birth weight less than 2,500 grams)							
Yes	34	21.2	14	8.7	2.81	1.38-5.79	0.001
No	126	78.8	146	91.3			
Perinatal death							
Yes	4	2.5	0	0	-	-	-
No	156	97.5	160	100			
Infant morbidity							
Yes	57	35.6	4	2.5	21.58	7.23-72.27	< 0.001
No	103	64.4	156	97.5			

* CI = confidence interval

Table 4. Characteristics of infant morbidity.

Infant morbidity	Study group (N=57)	%	Control group (N=4)	%
Neonatal jaundice	17	29.8	0	
Polycythemia	15	26.3	1	25
Premature infant	12	21.1	0	
Fever and sepsis	8	14.0	0	
Asphyxia	3	5.3	0	
Meconium aspiration syndrome	2	3.5	0	
Others (anomalies, hypothermia, TEV, etc.)	0		3	75

Table 4 shows the description of infant morbidity, which required more intervention than normal observation.

DISCUSSION

One of the health problems, which is quite common, is birth before arrival. Because of the poor outcome of both the mother and the baby, whose delivery took place in an unsuitable situation or place, many studies have shown a significant increase in the neonatal mortality of infants born unplanned out-of-hospital[4-6]. Bhoopalam[7] reported in 1991 that infants born before hospital arrival had a six-fold increase in neonatal mortality compared with in-born infants. Bateman and O'Bryan[8] also reported the increase of neonatal morbidity and mortality, especially the problem of hypothermia, hypoglycemia and polycythemia in out-born-infants. The increased neonatal mortality rate for infants born out of hospital (20.3 *vs* 7.3 per 1,000 live births) was due to an excess of infants weighing 500-999 grams[8].

When the authors specified the mortality rate of infants, who were born before arrival at Siriraj Hospital, 4 deaths were found in the study group compared to none in the control group. Perinatal mortality rate in birth before arrival group is around 25 per 1,000 births. Unfortunately, the perinatal mortality rate could not be compared between both groups statistically. However, the perinatal mortality rate of Siriraj Hospital, which included stillbirths and neonatal deaths in 1999, was 7.18 per 1,000 births[9]. So the present result shows a higher mortality rate of infants who were born before hospital arrival than in-born hospital infants.

Beeram et al[10] also reported poor maternal and infant outcome in the birth before arrival group. There was a two-fold increase in morbidity (requiring neonatal intensive care admissions) and a 11-fold

increase in mortality among out-born infants. The important problems were low birth weight and hypothermia.

An increase in premature infants was also noted in some studies. Potter et al[11] investigated this problem in 1980 in Cape Town, South Africa and found that the prevalence of out-born infants was 8 per cent. These infants had lower birth weights and higher morbidity than in-born controls.

In the present study, the prevalence of birth before arrival was 0.62 per cent. Some factors can be demonstrated such as, gravidity, which has predisposed to precipitate labor or easy delivery. There is significantly more gravidity in the study group than in the control group. Duration between onset of labor and delivery, in mothers who delivered before admission to Siriraj labor room, were 174.3 ± 163.9 minutes, which is shorter than the control group. But the duration between onset of labor and house leaving in the study group is 167.9 ± 102.0 minutes. That means the mothers might have detected or recognized true labor too late.

When considering maternal outcome, the present result did not confirm an increase in maternal morbidity. The mothers who delivered outside the labor room had to stay longer in the hospital. However, from Table 3, the ratio of the mothers who had fever or puerperal febrile is not statistically different between both groups.

For the babies, the present result is the same as other report[10]. There was an increase in low birth weight and infant morbidity in the present study. Infant morbidity in the birth before arrival group was significantly higher than the control group. The frequent problems are neonatal jaundice, polycythemia, premature infant, fever, asphyxia and meconium aspiration syndrome respectively.

In conclusion, the authors confirm the higher mortality and morbidity rate of infants who were born unexpectedly before hospital admission. It is hoped that this research result can be used to establish proper intervention to reduce infant mortality to the irreducible value.

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ภาวะทุพพลภาพและการตายจากการคลอดก่อนถึงโรงพยาบาล ณ โรงพยาบาลศิริราช

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วัตถุประสงค์ : ศึกษาถึงภาวะทุพพลภาพและการตายที่เกิดจากการคลอดก่อนถึงโรงพยาบาล ณ โรงพยาบาลศิริราช

รูปแบบการวิจัย : การวิจัยเชิงวิเคราะห์แบบมีกลุ่มเปรียบเทียบ

สถานที่ทำการวิจัย : ภาควิชาสูติศาสตร์-นรีเวชวิทยา คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล

กลุ่มตัวอย่าง : สตรีที่มาคลอดบุตร ณ โรงพยาบาลศิริราช จำนวน 320 ราย โดยแบ่งเป็น 2 กลุ่ม กลุ่มที่ 1 เป็นกลุ่มศึกษา คือสตรีที่คลอดบุตรก่อนถึงห้องคลอดโรงพยาบาลศิริราชจำนวน 160 ราย ส่วนกลุ่มที่ 2 เป็นกลุ่มควบคุม คือสตรีที่คลอดบุตรปกติในห้องคลอดโรงพยาบาลศิริราชจำนวน 160 ราย และสตรีทั้ง 2 กลุ่ม ได้รับไว้เป็นผู้ป่วยของโรงพยาบาลศิริราชในช่วงเวลาเดียวกัน

วิธีดำเนินการวิจัย : ทำการสัมภาษณ์สตรีที่มาคลอด ณ โรงพยาบาลศิริราช ร่วมกับการทบทวนเวชระเบียนของมารดาและทารกจากทั้งกลุ่มศึกษาและกลุ่มควบคุม เพื่อรวบรวมข้อมูลที่ต้องการ จากนั้นนำข้อมูลที่ได้มาทำการวิเคราะห์โดยการใช้โปรแกรม EpiInfo

ตัวชี้วัดที่สำคัญ : ลักษณะของมารดาและทารกภายหลังคลอด, ผลจากการคลอดที่มีต่อมารดาและทารก (ภาวะทุพพลภาพของมารดาหลังคลอด, การตายของทารกปริกำเนิด และภาวะทุพพลภาพของทารกแรกเกิด)

ผลการวิจัย : จากการศึกษาพบว่ามารดาของกลุ่มศึกษาจำเป็นต้องรับไว้ในโรงพยาบาลนานกว่ากลุ่มควบคุม (3.9 $\pm$ 2.5 วัน เปรียบเทียบกับ 3.6 $\pm$ 1.3 วัน, $p < 0.05$) เช่นเดียวกับทารกของกลุ่มศึกษาจำเป็นต้องอยู่โรงพยาบาลนานกว่ากลุ่มควบคุม (5.1 $\pm$ 6.5 วัน เปรียบเทียบกับ 3.3 $\pm$ 1.7 วัน, $p < 0.001$) น้ำหนักทารกแรกเกิดในกลุ่มศึกษาน้อยกว่าในกลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ (2753 $\pm$ 594.1 กรัม เปรียบเทียบกับ 3016.6 $\pm$ 405.0 กรัม, $p < 0.001$) เช่นเดียวกับอุณหภูมิกายของทารกแรกเกิดในกลุ่มศึกษาน้อยกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ (36.2 $\pm$ 0.6 องศาเซลเซียส เปรียบเทียบกับ 37.0 $\pm$ 0.4 องศาเซลเซียส, $p < 0.05$)

เมื่อพิจารณาเกี่ยวกับผลจากการคลอดที่มีต่อมารดาและทารก พบว่าทารกแรกเกิดน้ำหนักน้อย การตายของทารกปริกำเนิด และภาวะทุพพลภาพของทารกแรกเกิดในกลุ่มศึกษามีมากกว่ากลุ่มควบคุมอย่างมีนัยสำคัญทางสถิติ ($p < 0.05$) ยกเว้นภาวะทุพพลภาพของมารดาหลังคลอดซึ่งพบว่าไม่แตกต่างกันในทั้ง 2 กลุ่ม ($p = 0.77$)

สรุป : จากการศึกษานี้ พบว่าทารกที่คลอดก่อนถึงโรงพยาบาลมีภาวะทุพพลภาพและอัตราตายมากกว่าทารกที่คลอดในโรงพยาบาลอย่างชัดเจน อย่างไรก็ตามกลับพบว่า ภาวะทุพพลภาพของมารดาในทั้ง 2 กลุ่มไม่แตกต่างกัน

คำสำคัญ : ภาวะทุพพลภาพของมารดา, ภาวะทุพพลภาพของทารกแรกเกิด, การตายของทารกปริกำเนิด, การคลอดก่อนถึงโรงพยาบาล

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