Retrospective Review of The Relationship Between Parity and Pregnancy Outcomes at Siriraj Hospital

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ABSTRACT

Objective: To determine the effect of parity to pregnancy outcomes.
Methods: A retrospective study was conducted among 976 singleton pregnant women during July to October 2007 at Siriraj Hospital. Two groups of patients were recruited in this study, the first group was nulliparity (488 patients) and the second group was multiparity (488 patients). The adverse pregnancy outcomes including antepartum hemorrhage (APH), gestational diabetes (GDM), pre-eclampsia, preterm birth, premature rupture of membranes (PROM), mode of delivery, postpartum hemorrhage (PPH) and neonatal morbidity were studied comparatively.
Results: The adverse pregnancy outcome in the aspects of pre-eclampsia, PROM, preterm birth, operative obstetrics and neonatal phototherapy in nulliparity were significantly higher than multiparity with odds ratio 2.43 (95%CI 1.05-5.61), 1.79 (95%CI 1.07-2.98), 1.91 (95%CI 1.23-2.96), 11.20 (95%CI 2.60-48.13), and 2.10 (95%CI 1.40-3.14) respectively. APH was increased in the multiparity group but not significant different by statistics, with odds ratio 5.04 (95%CI 0.59-43.31). There were no significant differences for the prevalence of GDM, PPH, low birth weight and macrosomia in these two groups.
Conclusion: Increased risk of pre-eclampsia, PROM, preterm birth, operative obstetrics and neonatal phototherapy in nulliparity compared with multiparity.

Keywords: Parity, pregnancy outcome

Siriraj Med J 2010;62:14-17
E-journal: http://www.sirirajmedj.com

The issue of parity and risk of pregnancy outcomes has been controversial for many decades. Parity refers to the number of previous pregnancies with gestational age more than 28 weeks. Several studies have looked for the adverse outcomes that are associated with parity such as pre-eclampsia, premature rupture of membranes, gestational diabetes mellitus, postpartum hemorrhage, prematurity, birth asphyxia and neonatal jaundice.[1-8] Some studies concluded that multiparity was not a risk for the adverse outcomes of pregnancy,[1,5-7] but some found an increased risk in multiparous pregnancy.[2-4,8] Various data from different demographic areas show a lack of this enhancing risk agreement. Therefore, it is important to focus on each population, especially for the different ethnicity or background.

The purpose of this study was to compare the pregnancy complications and neonatal outcomes in nulliparous with multiparous pregnancy who delivered at Siriraj Hospital.

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MATERIALS AND METHODS

The data were collected from the labor records, perinatal records and patient's record forms from the department of Obstetric and Gynecology, Siriraj Hospital during July to October 2007. The subjects were classified into 2 groups equally according to the parity; nulliparity refer to women who never had delivered at gestational age or more than 28 weeks and multiparity refer to women who had a history of one or more infants delivered. According to the previous studies, the overall incidence of pre-eclampsia were 2.03% to 2.8%,[9-12] The sample sizes were calculated using the odds ratio 2.7 times in nulliparity with 5% type I error and 20% type II error. Total charts of 488 nulliparity and 488 multiparity patients were selected for evaluation. The charts were reviewed for demographic information, past medical illness and obstetric history. The data were recorded including age, gravidity, parity, gestational age at delivery, prepregnancy body mass index (BMI) using weight before pregnancy or during first trimester (when there was insufficient data on prepregnancy weight),

hematocrit and substance abuse of tobacco, alcohol and amphetamine. Anemia in pregnancy was defined as hemoglobin concentration less than 10.5 g/dl or hematocrit level less than 33% in third trimester. Any medical problems which occurred before the current pregnancy, positive blood test of anti-HIV antibody and multifetal gestation were excluded from the study.

We compared only the common adverse outcomes that were reported to be associated with parity. Maternal complications such as pre-eclampsia, premature rupture of membranes, mode of delivery and postpartum hemorrhage were collected. Postpartum hemorrhage was defined by blood loss ≥ 500 ml on vaginal delivery or blood loss ≥ 1,000 ml on cesarean section. The perinatal adverse outcomes included low birth weight infant, birth asphyxia, neonatal jaundice who received phototherapy and perinatal mortality were also reviewed. Birth weight was categorized into three groups; less than 1,000 gm is extremely low birth weight infant, 1,000-1,499 gm is very low birth weight infant and 1,500-2,499 gm is low birth weight infant. According to the American College of Obstetricians and Gynecologists (2004), birth asphyxia is defined by (1) profound metabolic or mixed acidemia (pH < 7.00) determined on an umbilical cord arterial blood sample, (2) persistent Apgar score of 0 to 3 for longer than 5 minutes, and (3) evidence of neonatal neurological sequelae such as seizure, coma, hypotonia, or dysfunction of one or more of the following systems: cardiovascular, gastrointestinal, hematological, pulmonary, or renal system. The still birth was diagnosed if the baby did not breathe or did not show any sign of life.

SPSS version 13.0 was used to analyse the data. The variables were compared between the two groups using unpaired student's t-test and Pearson Chi-square test. Odds ratio and 95% confident interval of these complications were calculated. The level of significance was p value less than 0.05.

This present study had been reviewed and approved by the Siriraj Institutional Review Board, Faculty of Medicine Siriraj Hospital, Mahidol University (Si 502/2008).

RESULTS

During the study periods, 976 records were selected which consisted of 488 nulliparous and 488 multiparous patients. The maternal characteristics in both groups were shown in Table 1. The mean age of the nulliparous group was 26.3 + 5.5 years and the mean age of multiparous group was 29.6 + 6.1 years. The average gestational age at delivery was about 38 weeks in both groups, but more preterm delivery in nulliparous group. Substance abuse of tobacco, alcohol and amphetamine were found higher among the nulliparous group. Total weight gain and hematocrit level were significantly higher in the nulliparous group.

The pregnancy complications (Table 2), neonatal outcomes (Table 3) and odds ratio for various outcomes were compared between the two groups (Table 4). In the nulliparous group, there was a significant higher risk of preeclampsia (3.9% vs. 1.6%; odds ratio 2.43, 95% CI 1.05-5.61), preterm birth (12.6% vs. 7.2%; odds ratio 1.91, 95% CI 1.23-2.96), premature rupture of membranes (8.8% vs. 5.1%; odds ratio 1.79, 95% CI 1.07-2.98), vacuum extraction (3.3% vs. 0.2%, odds ratio 16.87, 95% CI 2.23-127.89) and phototherapy in neonatal jaundice (15.8% vs. 8.2%, odds ratio 2.10, 95% CI 1.40-3.14). In contrast, the multiparous group had higher significant anemia (6.9% vs. 3%, odds ratio 3.04, 95% CI 1.60-5.79). The differences for gestational diabetes mellitus, postpartum hemorrhage and delivery by cesarean section between the two groups were not statistically significant.

TABLE 1. Demographic characteristics compared between two groups.

Characteristics	Nulliparity n = 488 (%)	Multiparity n = 488 (%)
Age (year)	26.28 ± 5.52[a]	29.63 ± 6.06[a]
Age group		
<20	65 (13.3)	11 (2.3)
20-35	398 (81.6)	345 (70.7)
>35	25 (5.1)	132 (27)
Gestational age (wk)	38.57 ± 1.94	38.47 ± 1.52
GA group		
Preterm	61 (12.6)	34 (7.2)
Term	413 (85.0)	424 (90.0)
Postterm	12 (2.5)	13 (2.8)
Hct (%)	35.04 ± 3.44[a]	34.52 ± 3.25[a]
Anemia	14 (3.0)	32 (6.9)
Thalassemia trait	120 (24.6)	110 (22.5)
BMI (kg/m^2)	22.51 ± 4.37[a]	23.21 ± 4.46[a]
Weight gain (kg)	13.76 ± 4.99[a]	12.44 ± 4.39[a]
Educational level		
No	14 (2.9)	44 (9.2)
≤ primary	79 (16.3)	142 (29.6)
≤ middle	121 (24.9)	135 (28.1)
≤ high	164 (33.7)	91 (19.0)
≤ bachelor	108 (22.2)	68 (14.2)
Smoke	12 (2.5)	1 (0.2)
Alcohol	9 (1.8)	1 (0.2)
Amphetamine	7 (1.4)	2 (0.4)

[a]Mean ± SD *statistical significance
BMI = (Pre-pregnancy) body mass index

DISCUSSION

The concept of a risk threshold for the relationship between parity and pregnancy outcomes has been of concern for decades. In some studies, associations have been found between parity and adverse pregnancy outcomes; others concluded that multiparity was not a risk for pregnancy. Many of the existing studies which originated from diverse populations showed different pregnancy outcomes. This study surveyed between parity and adverse pregnancy outcomes in Bangkok, Thailand, represented by the population delivery in Siriraj Hospital. From this study, we found that different parity has different adverse pregnancy outcomes in pregnant women at Siriraj Hospital.

Pre-eclampsia is a multisystemic pregnancy-specific disorder that is diagnosed by new-onset hypertension and proteinuria after 20 weeks of gestation. It is a leading cause of morbidity and death among mothers and infants worldwide.[13] When we compared the obstetric outcomes in both group, nulliparity had 2.43 times increased risk of pre-eclampsia (95% CI 1.05-5.61). Our results were similar with the study of Chen CL, et al[11] that nulliparity was a risk factor for developing pre-eclampsia. The combination of the high, and increasing

TABLE 2. Maternal outcomes compared between two groups.

Outcome	Nulliparity n = 488 (%)	Multiparity n = 488 (%)	p value
Pre-eclampsia	19 (3.9)	9 (2.0)	0.032*
GDM	5 (1.0)	8 (1.6)	0.402
Preterm	61 (12.6)	34 (7.2)	0.004*
Non elicit drug used	53/476 (11.1)	33/485 (6.8)	0.019*
PROM	43 (8.8)	25 (5.1)	0.024*
Non elicit drug used	40/476 (8.4)	25/485 (5.2)	0.045*
APH	1 (0.2)	5 (1.0)	0.025*
Mode of delivery			
Normal labor	344 (70.5)	367 (75.2)	
Vacuum extraction	16 (3.3)	1 (0.2)	
Cesarean section	123 (25.2)	119 (24.4)	0.002*
Breech extraction	3 (0.6)	1 (0.2)	
Forcep extraction	2 (0.4)	0 (0.0)	
Third stage complication			
No	467 (95.7)	464 (95.1)	
Uterine atony	6 (1.2)	10 (2.0)	
Retained placenta	2 (0.4)	5 (1.0)	0.253
Tear birth passage > 2nd degree	10 (2.0)	9 (1.8)	
Bladder atony	3 (0.6)	0 (0.0)	
PPH	9 (1.9)	9 (1.9)	0.982
Estimate blood loss (cc)			
Vaginal route	210.96 ± 95.92[a]	211.19 ± 223.96[a]	0.986
Cesarean section	415.04 ± 167.42[a]	465.97 ± 208.80[a]	0.038

[a]Mean ± SD *statistical significance
GDM = Gestational diabetes mellitus, PROM = Premature rupture of membranes, APH = Antepatum hemorrhage, PPH = Postpartum hemorrhage

incidence of preterm labor and the substantial cost to both the healthcare system and society make it one of the greatest obstetric problems. Moreover, prematurity is the leading cause of neonatal morbidity and mortality. The nulliparous group had preterm birth (odds ratio 1.91, 95% CI 1.23-2.96) and premature rupture of membranes (odds ratio 1.79, 95% CI 1.07-2.98) higher than the multiparous group and we found more substance abuse (tobacco, alcohol and amphetamine) in the nulliparous group that may be associated with increased risk of preterm delivery. Nicholson W, et al[13] studied 900 women and found that 27% (247 cases) had preterm delivery and substance abuse had an odds ratio of 2.2 for preterm delivery (95% CI 1.2-5.1) and concluded that maternal substance abuse is associated with preterm labor and delivery. However, in our study when we did subgroup analysis we also found that in non illicit drug use, the nulliparous group also had preterm birth and premature rupture of membranes higher than the multiparous group (11.1% vs. 6.8% and 8.4% vs. 5.2%). The result also showed that infants of the nulliparous group had the higher incidence of neonatal jaundice which received phototherapy (odds ratio 2.10, 95% CI 1.40-3.14). This may be related to the finding that nulliparity had a higher incidence of obstetric operations by vacuum extraction. However, when subgroup analysis was performed, we found that normal labor and cesarean section in the nulliparous group also had a higher incidence of neonatal jaundice (who received phototherapy) than the multiparous group (16.9%

TABLE 3. Perinatal outcomes compared between two groups.

Outcome	Nulliparity n = 488 (%)	Multiparity n = 488 (%)	p value
Birth weight (gm)	2992.56 ± 454.90[a]	3104.95 ± 480.28[a]	<0.001*
Birth weight group			
<1500 gm	5 (1.0)	2 (0.4)	
1,500-2,500 gm	46 (9.4)	45 (9.2)	0.892
2,501-4,000 gm	424 (86.9)	427 (87.5)	
>4,000 gm	13 (2.7)	14 (2.9)	
Asphyxia			
Apgar score at 5 min < 7	3 (0.3)	2 (0.4)	0.563
Apgar score at 5 min < 3	0 (0.0)	0 (0.0)	N/A
Phototherapy	77 (15.8)	40 (8.2)	<0.001*
Normal labor	58/344 (16.9)	32/367 (8.7)	<0.001*
Cesarean section	15/123 (12.2)	7/119 (5.9)	0.088

[a]Mean ± SD
*statistical significance, N/A = not available

TABLE 4. Odds ratio for various outcomes of nulliparity compared with nulliparity.

Outcome	Odds ratio (95%CI)
Anemia	0.42 (0.22-0.79)*
Preterm	1.91 (1.23-2.96)*
PROM	1.79 (1.07-2.98)*
Preeclampsia	2.43 (1.05-5.61)*
GDM	0.62 (0.20-1.91)
APH	0.20 (0.02-1.70)
Mode of delivery	
Vacuum extraction	16.87 (2.23-127.89)*
Cesarean section	1.04 (0.78-1.39)
PPH	0.99 (0.39-2.51)
Phototherapy	2.10 (1.40-3.14)*

*statistical significance

PROM = Premature rupture of membranes, GDM = Gestational diabetes mellitus, APH = Antepartum hemorrhage, PPH = Postpartum hemor-rhage

vs. 8.7% and 12.2% vs. 5.9%). Therefore, was increased phototherapy in nulliparity in every mode of delivery.

When we compared this study with the previous studies, our study was similar to the study of Bai J, et al[2] who found that nulliparous women had an increased risk of obstetric complications over the multiparous women.

No statistically significant difference in gestational diabetes mellitus, postpartum hemorrhage, low birth weight and macrosomia were observed in this study. According to the study of Rizk DE, et al,[1] diabetes mellitus (both overt and gestational) was significantly more common in grand multipara, but there was no significant increase in either the incidence of other obstetric complications or in perinatal mortality rate. In the study of Goldman GA, et al,[7] the grandmultiparity no longer needed to be considered as a high-risk category in their population, but their age may explain the higher incidence of their antenatal medical disorders, such as diabetes mellitus and hypertensive disease. However, in our study, there was no grandmultiparity, so we cannot conclude about obstetric outcome and neonatal outcome in this group.

The limitation of this study was the retrospective method which lacked some adequate data. For a better outcome, it should be done in a prospective way and analysed in subgroup analysis or multiple logistic regression.

CONCLUSION

Nulliparity is one of the important risk factors for pre-eclampsia, preterm birth, premature rupture of membranes, obstetric operation by vacuum extraction and phototherapy in neonatal jaundice. Nulliparity also has a higher rate of substance abuse that may lead to adverse pregnancy outcomes. If obstetricians are aware about the risks, such problems may be prevented by early detection and immediate management with effective antenatal care.

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