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Hypertensive disorders and obstetric complications in women aged 35 or older at Chonburi Hospital

Uraiwan Laksanavilai MD*,
Chaisit Sritongchai MD*.

Department of Obstetrics and Gynecology, Chonburi Hospital, Chonburi, Thailand

ABSTRACT

Objective To assess the prevalence of hypertensive disorders in women aged 35 years or older and compare maternal and neonatal complications of women aged 35 years or older with women aged 20-24 years.

Material and Method The retrospective study conducted at the Department of Obstetrics and Gynecology, Chonburi Hospital, Thailand. The study group consisted of women aged 35 years or older who gave birth at Chonburi Hospital from March 1, 2005 to February 28, 2006. The control group consisted of women aged 20 – 24 years who gave birth during the same period. Demographic, maternal and neonatal complications information were collected and compared between the study and control groups.

Result The study group consisted of 647 women and the control group consisted of 1,247 women. This study found that the prevalence of hypertensive disorders in women aged 35 years or older at Chonburi Hospital was 10.66%. Women aged 35 years or older were found to have significantly higher rates of diabetes mellitus, placenta previa, and placental abruption than women aged 20-24 years. Preterm delivery and low birth weight infant rates in women aged ≥ 35 years we re higher than the control group significantly. Cesarean section was the major route of delivery in the study group (73.42%).

Conclusion The prevalence of hypertensive disorders in women aged 35 years or older at Chonburi Hospital was 10.66%. Pregnancy in women of aged 35 years or older was associated with higher maternal and neonatal complications than the control group.

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Keywords: Women aged 35 or older, Hypertensive disorders, Obstetric complications

Advanced Maternal age, defined as age 35 years or older at estimated date of delivery[1], has become increasingly common. From 2000 – 2004, live births among women aged 35 years or older at Chonburi Hospital increased from 9.5% to 11.5% of all live births. Effective birth control, advances in

assisted reproductive technology, delayed marriage, increasing rates of divorce followed by remarriage, and women's pursuit of higher education and career advancement all contribute to this trend.[2-3]

It is well established that advancing maternal age is associated with subfertility, chromosomal abnormalities, and multiple gestation.[4] A large body of literature exists describing the impact of advanced maternal age on maternal and fetal outcomes.[5-7] Unfortunately, the data are conflicting.

As the number of advanced maternal age gravidas continues to grow, obstetric care providers would benefit from up to date outcome data to enhance their preconceptual and antenatal counseling. The aims of this study were to determine the prevalence of hypertensive disorders in women aged 35 years or older and assess the specific maternal and neonatal complications in advanced maternal age at Chonburi Hospital.

Material and Method

The retrospective study was conducted at the Department of Obstetrics and Gynecology, Chonburi Hospital, Thailand. The inclusion criteria included women aged 35 years or older at estimated date of delivery defined as the study group and women aged 20 – 24 years defined as the control group. Both the study group and the control group consisted of women who gave birth at Chonburi Hospital from March 1, 2005 to February 28, 2006.

The exclusion criteria were multiple pregnancies, miscarriages prior to the 24th week of gestation and infants weighing less than 500 grams. The study and the control groups were extracted from the hospital, s labour room data baseby randomly according to computer-generated numbers. The research proposal was approved by Ethical Committee of Chonburi Hospital.

Demographic data, including maternal age , gravidity, parity, gestational age at delivery and numbers of antenatal care were recorded. The obstetric complications included preterm delivery, placenta previa, placental abruption, postpartum hemorrhage and hypertensive disorders in pregnancy ; gestational hypertension (blood pressure ≥140/90 mmHg on at least 2 occasions greater than 6 hours apart without evidence of chronic hypertension or significant proteinuria), preeclampsia (criteria for gestational hypertension and significant proteinuria), superimposed preeclampsia, chronic hypertension. Neonatal complications included low birth weight (less than 2,500 grams), very low birth weight (less than 1,500 grams) and birth asphyxia (Apgar scores <7). Also medical complications such as pregestational diabetes ,and gestational diabetes (50 grams oral glucose challenge test ≥ 140 mg% followed by ≥ 2 abnormal values on 100 grams oral glucose tolerance test; fasting ≥105 mg%, 1 hour ≥190 mg%, 2 hour ≥ 165 mg%, 3 hour ≥145 mg%) were collected.

Statistical analysis was undertaken using SPSS computer software (SPSS version 11.5 for Microsoft Windows, SPSS Inc , Chicago , USA). Data was analysed using descriptive statistics and expressed in terms of mean, median, standard deviation and percentage. To test the difference of categorical variables, the chi–square test were used. For continuous variables, comparisons were carried out with the student t test. Multiple logistic regression analysis was used to determine the significant independent risk factors of hypertensive disorders in woman aged 35 or older by calculating adjusted odds ratios together with 95 % confidence intervals. P-value less than 0.05 were considered statistically significant.

Result

From March 1, 2005 to February 28, 2006, there were 5,395 total births at Chonburi Hospital, of which women aged 35 years or older (the study group) represented 647 birth cases and women aged 20 – 24 years (the control group) represented 1,247 birth cases. The incidence of advanced maternal age during the study period therefore averaged 12%. Maternal demographic characteristics were presented in Table 1. The mean of maternal age in the study group was 37.85 ± 2.23 years (range 35-47 years) and in the control group was 22.04 ± 1.19

years (range 20-24 years). Gravidity and parity were higher in the study group (p=0.001,p=0.001). Table 2 shows comparison of obstetric complications between two groups. The occurrence of hypertensive disorders, preterm delivery, gestational diabetes, pregestational diabetes , placenta previa , and abruptio placentae were significantly higher in the study group than in the control group. There was no significant difference between two groups in postpartum hemorrhage (p=0.535).

Table 3 classifies the various types of hypertension encountered. The prevalence of hypertensive disorders in women aged 35 years or older was 10.66%. The occurrence of eclampsia was not significantly different, whereas gestational hypertension (p=0.001), preeclampsia (p=0.001), chronic hypertension (p=0.001) and superimposed preeclampsia (p=0.001) were statistically higher in the study group.

Table 4 shows comparison of the route of delivery between two groups, cesarean delivery rate (73.42%) was increased in women aged 35 years or older compared with the control group (p<0.001).

Table 5 shows neonatal outcomes, low birth weight (1,500-2,500 grams) was higher in the study group (18.24% vs 14.03%,p=0.043), whereas very low birth weight (less than 1,500 grams) was not significantly different between two groups (p=0.500). There was no significant difference between two groups in first and fifth minutes Apgar scores.

Table 6 shows the adjusted odds ratio with 95% confidence interval estimating the effect of advanced maternal age compared with control group, women aged 20-24 years, for each of the obstetric outcomes. As anticipated, advancing maternal age was significantly associated with an increased risk for gestational hypertension(adjOR 1.4, 95%CI 1.2-2.4), preeclampsia (adjOR 1.3,95%CI 1.2-3.1), chronic hypertension (adjOR1.8, 95%CI 1.3-3.1) and superimposed preeclampsia (adjOR 1.6, 95%CI 1.4-2.1). Advancing maternal age was also significantly associated with preterm delivery(adjOR1.3, 95%CI 1.2-1.7), gestational diabetes mellitus (adjOR1.8, 95%CI 1.5-2.1), pregestational diabetes (adjOR 1.2, 95%CI 1.1-1.5), placenta previa (adjOR 1.4, 95%CI 1.2-1.8),placental abruption (adjOR 1.3, 95%CI 1.2-2.1) ,low birth weight (adjOR 1.2 , 95%CI 1.1-1.8)and cesarean delivery rate(adjOR 2.1, 95%CI 1.1-4.5). No statistically significant differences were noted among the groups for postpartum hemorrhage, very low birth weight, low Apgar scores at first and fifth minutes and operative vaginal delivery rate.

The results of multivariate logistic regression analysis are presented in Table7. The significant independent risk factors for hypertensive disorders in women aged 35 or older were nulliparity (adjOR 2.11 ,95%CI 1.31-6.78) and BMI ≥ 35 kg/m^2 (adjOR 5.66, 95%CI 1.67-15.34).

Table 1. Maternal demographic data

Characteristics	Study group n=647	Control group n=1247	p-value
Maternal age (years)*	37.85±2.23	22.04±1.19	<0.001
Body mass index (kg/m2)*	25.3±5.2	24.9± 5.3	<0.001
Years of education *	11.1±2.6	12.3±2.1	<0.001
Smoker (n,%)	8(1.2%)	18(1.4%)	0.00
Alcohol consumption (n,%)	8(1.2%)	20(1.6%)	0.001
Gravidity**	4(1-7)	2(1-4)	0.001
Parity**	3(1-6)	1(0-3)	0.001
Gestational age at delivery(weeks)*	38.31±3.92	39.19±3.01	0.001
Antenatal care visit (n,%)			
ANC < 4 times (n,%)	167(25.81%)	330(26.46%)	0.177
ANC ≥ 4 times (n,%)	480(74.19 %)	917(73.54%)	0.161

*Mean± SD

**Median (minimum-maximum)

Table 2. Obstetric complications

Obstetric complications	Study group n=647	Control group n=1247	p-value*
Hypertensive disorders	69(10.66%)	54(4.33%)	<0.001
Preterm delivery	60(9.27%)	94(7.53%)	0.021
Gestational DM	31(4.79%)	20(1.60%)	<0.001
Pregestational DM	7(1.08%)	12(0.96%)	0.001
Placenta previa	11(1.70%)	15(1.20%)	0.001
Placental abruption	4(0.62%)	5(0.40%)	0.001
Postpartum hemorrhage	14(2.16%)	26(2.08%)	0.535

Data presented as n (percentage)

*p-value by chi-square compared between the study and the control groups

Table 3. Classification of hypertensive disorders in pregnancy

Hypertensive disorders	Study group n=647	Control group n=1247	p-value*
Gestational hypertension	8(1.24%)	9(0.72%)	0.001
Preclampsia			
Mild	11(1.70%)	8(0.64%)	0.001
Severe	35(5.41%)	26(2.89%)	<0.001
Eclampsia	0	2(0.16%)	0.370
Chronic hypertension	8(1.24%)	5(0.40%)	0.001
Superimposed preeclampsia	8(1.24%)	4(0.32%)	0.001
Total	69(10.66%)	54(4.33%)	<0.001

Data presented as n (percentage)

*p-value by chi-square compared between the study and the control groups

Table 4. Route of delivery

Route of delivery	Study group n=647	Control group n=1247	p-value*
Normal delivery	105(16.23%)	744(59.66%)	<0.001
Operative vaginal delivery	67(10.36%)	170(13.63%)	<0.001
Cesarean section	475(73.42%)	333(26.70%)	<0.001

Data presented as n (percentage)

*p-value by chi-square compared between the study and the control groups

Table 5. Neonatal complications

Neonatal complications	Study group n=647	Control group n=1247	p-value*
Birth weight <1,500 grams	7(1.08%)	14(1.12%)	0.500
Birth weight 1,500-2,500 grams	118(18.24%)	175(14.03%)	0.043
Birth weight >2,500 grams	522(80.68%)	1058(84.84%)	0.112
Apgar Score at 1 min < 7	29(4.48%)	40(3.20%)	0.160
Apgar Score at 5 min < 7	10(1.55%)	12(0.96%)	0.200

Data presented as n (percentage)

*p-value by chi-square compared between the study and the control groups

Table 6. Maternal and neonatal complications by maternal age : Adjusted models*

Outcome	Age ≥35 vs Control Group**	p-value
	AdjOR (95% CI)	
Gestational hypertension	1.4(1.2-2.4)	0.02
Preclampsia	1.3(1.2-3.1)	0.003
Eclampsia	0.9(0.7-1.2)	0.39
Chronic hypertension	1.8(1.3-3.1)	<0.001
Superimposed preeclampsia	1.6(1.4-2.1)	0.001
Preterm delivery	1.3(1.2-1.7)	0.001
Gestational DM	1.8(1.5-2.1)	<0.001
Pregestational DM	1.2(1.1-1.5)	0.001
Placentae previa	1.4(1.2-1.8)	0.001
Placental abruption	1.3(1.2-2.1)	0.002
Postpartum hemorrhage	1.0(0.7-1.1)	0.15
Low birth weight	1.2(1.1-1.8)	0.003
Very low birth weight	0.9(0.7-1.2)	0.39
APGAR score at 1 min < 7	1.3(0.9-1.4)	0.54
APGAR score at 5 min < 7	1.2(0.8-1.7)	0.57
Operative vaginal delivery	0.7(0.6-1.2)	0.422
Cesarean delivery	2.1(1.1-4.5)	<0.001

AdjOR,adjusted odds ratio;CI,confidence interval.

*Adjusted models controlled for the effects of body mass index, parity, maternal education, smoking, drinking during pregnancy and antenatal care visit.

**Control group includes women aged 20-24 years at expected date of delivery.

Table 7. Analysis of risk factor exposures using odds ratio by Stepwise Logistic Regression

Risk factors	Adjusted Odds Ratio	95%Confidence interval	p-value
Nulliparity	2.11	1.31-6.78	0.009
Gestational DM	1.26	0.28-5.79	0.76
Pregestational DM	1.55	0.54-8.11	0.28
BMI ≥ 35 kg/m2(Pre-pregnancy)	5.66	1.67-15.34	0.004

BMI = Body mass index

Discussion

From this study, the incidence of pregnant women aged 35 years or older was found to be 120 per 1,000 total births, and shows that advanced maternal age was associated with substantial increased in hypertensive disorders (gestational hypertension, preeclampsia, chronic hypertension, superimposed preeclampsia), gestational diabetes and pregestational diabetes mellitus. This is in agreement with most published results of studies on advanced maternal age and pregnancy outcomes.[1-5] The influence of socioeconomic and health status on

pregnancy outcome in the older woman is illustrated by two studies involving different populations of women. Berkowitz et al described outcomes of women aged 35 years and older who were cared at Mount Sinai Hospital in New York City.[10] These authors reported only slightly increased risks of gestational diabetes, pregnancy-induced hypertension, placenta previa or abruption, and cesarean delivery. The women did not have an increased incidence of preterm delivery, growth-restricted infants, or perinatal death. In contrast, Cunningham et al[8] which included nearly 900 socioeconomically disadvantaged women older than 35 years of age, identified a significantly increased incidence of hypertension, diabetes, placenta previa and abruption, preterm delivery, and perinatal mortality. The disparate outcomes in these two groups of women are likely attributable to socioeconomic status, which influences lifestyle and access to health care and thus health status.

Hypertensive disorders are common complication in women aged 35 or older at Chonburi Hospital. The prevalence of hypertensive disorders among advanced maternal age was 10.66 %, Similar to that observed by Cleary et al.[1] The increased frequency of chronic hypertension, diabetes mellitus is evidently related to the aging process in these mothers.[6] Premature separation of the placenta could be precipitated by aging of the uterine blood vessels and could also be related to chronic hypertensive disorders.[8]

The increased frequency of these pregnancy complications in advanced maternal age are responsible for higher rates of preterm birth and low birth weight infants. Apgar scores at first and fifth minutes were examined in order to evaluate the perinatal status of the neonate.[7] This study found lack of significantly different in lower Apgar scores at first and fifth minutes between two groups, similar to that observed by Ales et al.[9]

In this study found that cesarean section rate was also higher among women aged 35 years or older. Our explanation for this observation is that advanced maternal age were primarily associated with elective operations or history of prior cesarean section or they had a higher proportion risk of pregnancy complications (eg, hypertensive disorders, placenta previa ,placental abruption) are probably reflections of the efficacy of obstetric intervention. Older women may be at increased risk for abnormalities of the course of labor , perhaps secondary to the physiology of aging. It is possible that decreased myometrial efficiency occurs with aging.[1]

The key advantage of this study is its large number of subjects and therefore the associated statistical reliability of its results. The key disadvantage of this study is that it is retrospective by design and therefore there is no control over the collection of the data for the purposes of the study. The inability to specify the design of the study means that confounding factors cannot be controlled (i.e factors that are associated with pregnancy outcomes such as marital and socioeconomic static). Another disadvantage of the study is that our control group may not represent all adult pregnancy (20-34 years). Thus,a wider sample would provide a better comparison between adult and advanced maternal age.

In summary, pregnancy in women of aged 35 years or older is associated with a high obstetric and neonatal complications. Therefore, pregnant women aged 35 years or older should be informed of potential complications, and they should be monitored more frequently and attentively.

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ความดันโลหิตสูงและภาวะแทรกซ้อนทางสูติกรรมของสตรีตั้งครรภ์อายุตั้งแต่ 35 ปี ขึ้นไปที่โรงพยาบาลชลบุรี

อุไรวรรณ ลักษณะวิลัย, ชัยสิทธิ์ ศรีทองชัย

วัตถุประสงค์ *: เพื่อประเมินความชุกของภาวะความดันโลหิตสูงในสตรีตั้งครรภ์อายุตั้งแต่ 35 ปีขึ้นไป ที่มาคลอด ณ โรงพยาบาลชลบุรี ตั้งแต่ 1 มีนาคม 2548 ถึง 28 กุมภาพันธ์ 2549 โดยมีวัตถุประสงค์รองเพื่อศึกษาเปรียบเทียบภาวะแทรกซ้อนทางสูติกรรมของมารดาและทารกระหว่างสตรีตั้งครรภ์อายุตั้งแต่ 35 ปี ขึ้นไปและสตรีตั้งครรภ์อายุ 20-24 ปี*

วัสดุและวิธีการ *: เป็นการศึกษาวิจัยแบบย้อนหลัง กลุ่มศึกษาประกอบด้วยสตรีตั้งครรภ์ที่มีอายุตั้งแต่ 35 ปีขึ้นไป ที่มาคลอด ณ โรงพยาบาลชลบุรี ตั้งแต่ 1 มีนาคม 2548 ถึง 28 กุมภาพันธ์ 2549 กลุ่มเปรียบเทียบคือสตรีตั้งครรภ์อายุ 20-24 ปี ที่มาคลอดช่วงเวลาเดียวกัน โดยศึกษาข้อมูลทั่วไปของมารดา และเปรียบเทียบภาวะแทรกซ้อนทางสูติกรรมของมารดาและทารกระหว่างกลุ่มทั้งสอง*

ผลการศึกษา *: มีสตรีตั้งครรภ์อายุตั้งแต่ 35 ปี ขึ้นไป 647 ราย และสตรีตั้งครรภ์อายุ 20-24 ปี จำนวน 1,247 ราย ความชุกของภาวะความดันโลหิตสูงในสตรีตั้งครรภ์อายุตั้งแต่ 35 ปีขึ้นไป เท่ากับร้อยละ 10.66 กลุ่มศึกษามีภาวะแทรกซ้อนทางสูติกรรมมากกว่ากลุ่มเปรียบเทียบอย่างมีนัยสำคัญทางสถิติ ได้แก่ เบาหวานในระหว่างตั้งครรภ์ รกเกาะต่ำ รกลอกตัวก่อนกำหนด การคลอดก่อนกำหนดและทารกแรกคลอดน้ำหนักน้อย การผ่าท้องคลอดเป็นวิธีการคลอดที่พบได้บ่อยที่สุดในกลุ่มศึกษา (ร้อยละ 73.42)*

สรุป *: ความชุกของภาวะความดันโลหิตสูงในสตรีตั้งครรภ์อายุตั้งแต่ 35 ปี ขึ้นไป คิดเป็นร้อยละ 10.66 กลุ่มสตรีตั้งครรภ์อายุตั้งแต่ 35 ปีขึ้นไปมีความเสี่ยงที่จะเกิดภาวะแทรกซ้อนทางสูติกรรมได้มากกว่าสตรีตั้งครรภ์ อายุ 20-24 ปี*