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ผลของอายุมารดาต่อการเกิดภาวะแทรกซ้อนทางสูติกรรมในสตรี
Impact of Maternal Age on Obstetric Complications among Women

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บทคัดย่อ

การวิจัยเชิงพรรณนาแบบย้อนหลังนี้มีวัตถุประสงค์เพื่อศึกษาผลของอายุมารดาต่อการเกิดภาวะแทรกซ้อนทางสูติกรรมในสตรี โดยเปรียบเทียบภาวะแทรกซ้อนระยะตั้งครรภ์ คลอด และหลังคลอด ของสตรีวัยรุ่นอายุ 19 ปี หรือน้อยกว่า จำนวน 1,117 คน และสตรีอายุ 35 ปี ขึ้นไป จำนวน 584 คน ศึกษาข้อมูลสตรีที่คลอด ณ โรงพยาบาลขอนแก่น จากฐานข้อมูลอิเลกทรอนิกส์ โดยใช้แบบบันทึกข้อมูลทั่วไป และภาวะแทรกซ้อนของมารดาและทารก วิเคราะห์ข้อมูลทั่วไปโดยการแจกแจงความถี่ ร้อยละ และวิเคราะห์ความสัมพันธ์ระหว่างอายุมารดากับภาวะแทรกซ้อนโดยคำนวณอัตราเสี่ยงสัมพัทธ์ (Odd Ratio) ผลการวิจัยพบว่า

เมื่อเปรียบเทียบกับมารดาวัยรุ่น มารดาอายุมากมีโอกาสเกิดภาวะเสี่ยงสูงในระยะตั้งครรภ์มากกว่า ต่อการเกิดภาวะความดันโลหิตสูง ไทรอยด์ฮอร์โมนสูง การผ่าตัดคลอดทางหน้าท้อง โรคเบาหวานขณะตั้งครรภ์ชนิดไม่พึ่งอินสุลินและพึ่งอินสุลิน รกเกาะต่ำ และทารกท่าก้น แต่มารดาอายุมากมีโอกาสเสี่ยงต่ำกว่าต่อการเกิดพาหะธาลัสซีเมีย และถุงน้ำแตกก่อนเจ็บครรภ์จริง ในระยะคลอดพบว่ามารดาอายุมากมีโอกาสเกิดภาวะเสี่ยงสูงมากกว่ามารดาวัยรุ่นต่อการเกิดทารกขาดออกซิเจน แต่มีโอกาสเสี่ยงต่ำกว่าต่อการเกิดทารกสูดสำลักน้ำคร่ำ สายสะดือพันคอ และทารกน้ำหนักตัวน้อย ส่วนในระยะหลังคลอดพบว่ามารดาอายุมากมีโอกาสเกิดภาวะเสี่ยงสูงมากกว่ามารดาวัยรุ่นต่อการเกิดมดลูกหดรัดตัวไม่ดี และระดับน้ำตาลในเลือดต่ำหลังคลอด แต่มีอัตราเสี่ยงสัมพัทธ์ต่ำกว่าอย่างมีนัยสำคัญทางสถิติในระยะหลังคลอดต่อการเกิดภาวะรกค้าง

การเฝ้าระวังและคัดกรองภาวะแทรกซ้อนในหญิงตั้งครรภ์วัยรุ่นและหญิงตั้งครรภ์อายุมากเป็นสิ่งสำคัญและจำเป็นในการป้องกันความเสี่ยงสูงที่อาจเกิดขึ้น

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Abstract

This retrospective research aimed to study the impact of maternal age on obstetric complications among women. The obstetric complications of 1,117 mothers aged 19 years or younger were analyzed and compared with those of 584 mothers aged 35 or older. Data were collected regarding women delivering in Khon Kaen hospital and retrieved from the electronic database of the hospital. The information was obtained from each record regarding characteristics, maternal and neonatal complications. The demographic data were analyzed by using frequency and percentage. The relationship between age and complications were analyzed using odd ratio.

The results showed that advanced maternal aged was correlated with severe pregnancy induced hypertension, hyperthyroidism, previous cesarean section, gestational diabetes mellitus class A1 and A2, placenta previa and breech presentation during pregnancy, but lower risk of thalassemia and premature rupture of membrane when compared to teenage group. During intrapartum, advanced maternal aged was correlated with fetal distress; however, thick meconium stained aspiration, nuchal cord and low birth weight constituted low risk. Moreover, advanced maternal aged was associated with uterine atony and hypoglycemia, but odds ratios were significantly decreased the risk of retained placenta in postpartum period.

Monitoring and screening obstetric complications in both teenage and advanced maternal age groups are importance and necessary to prevent high risks.

Keywords: Teenage Pregnancy, Advanced Maternal Age, Maternal Age, Pregnancy Outcomes, Obstetric Complications

Introduction

Teenage pregnancy and pregnant women of advanced maternal age have been regarded as high risk pregnancies (Mattson & Smith, 2016). Teenage pregnancy had significantly higher rates of preterm birth, growth restriction, and low birthweight (Traisrisilp, Jaiprom, Luewan, & Tongsong, 2015). Advanced maternal age pregnancy has a higher incidence of complications than teenage pregnancy. Some studies have reported that pregnancy at age 40 years or older has been associated with neonatal death (Narukhutrpichai, Khrutmuang, & Chattrapiban, 2016; Lisonkova, Potts, Muraca, Razaz, Sabr, Chan, et al., 2017)

The number of teenage and advanced maternal age pregnancies in Khon Kaen hospital Thailand has progressively increased when compared with other hospitals in health service region 7. Nearly 50% of all pregnant women were teenagers and 29.43% comprised advanced maternal age pregnancy (Obstetrics and Gynecology Department, 2015).

Pregnancy at an inappropriate age has been regarded as a risk factor for complications from pregnancy until the postpartum period. Teenage pregnancy was correlated with higher risk of hypertensive disorders of pregnancy, low weight gain during pregnancy, anemia, placenta previa, abruptio placenta, preterm labor, low birth weight (LBW) and neonatal death. It also involves the incidence of cesarean section and vacuum and forceps extraction (Azevedo, Diniz, Fonseca, Azevedo, & Evangelista, 2015; Mattson & Smith, 2016; Narukhutrpichai, Khrutmuang, & Chattrapiban, 2016). Traditionally, advanced maternal age pregnancy involves higher obstetric complications, such as

gestational diabetes mellitus (GDM), premature contraction, pregnancy induced hypertension (PIH), premature rupture of membrane (PROM), and postpartum hemorrhage. Their babies also present a higher frequency of fetal distress, preterm status, and LBW baby (Thaewpia, Howland, Clark, & James, 2013; Rendtorff, Hinkson, Kiver, Dröge, & Henrich, 2017).

Although the study of complications related to teenage pregnancy and advanced maternal age have been revealed worldwide, limited knowledge exists regarding explanation of associations between maternal age and obstetric outcomes among Thai pregnant women in Khon Kaen hospital.

Objective

This retrospective research aimed to study the impact of maternal age on obstetric complications during pregnancy, intrapartum and postpartum periods among pregnant women at Khon Kaen hospital.

Conceptual Framework

The conceptual framework on the causes of maternal and newborn deaths was used to illustrate obstetric complications that influenced by maternal age (Unicef, 2015). Teenage and advanced maternal age pregnancy were the basic causes at the societal level that impact maternal and fetal complications during antepartum intrapartum and postpartum period. The conceptual framework of maternal age on obstetric complications was presented as figure 1.

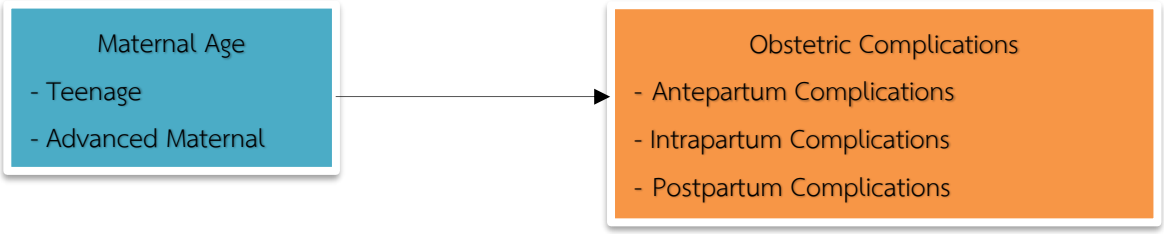

Figure 1 Conceptual Framework

Methods

Design

This research comprised a retrospective study for women delivered at Khon Kaen hospital from October 1, 2013 to September 30, 2014 with gestational ages at delivery of 28 weeks or greater. In this study, the researcher restricted the data to women who deliver in the year 2013-2014 because the information was complete and available onwards.

Population and sample

The total numbers of teenage and advanced maternal age delivery were corrected in this study. The obstetric records of 584 women, aged 35 or older at the time of delivery, were reviewed and compared with a control group consisting of 1,117 women aged 19 or younger delivering during the same period. Data including maternal age at the time of delivery, gravidity, gestational age, and

type of delivery. The research excluded mother aged between 21-34 because the incidence of obstetric complications among these age group was low. Obstetric complications including (1) antenatal complications (obesity, mild PIH, severe PIH, chronic hypertension, hyperthyroidism, HbE, previous cesarean section, GDMA1, GDMA2, overt DM, PROM, PPROM, placenta previa, viral precaution, oligohydramnios, breech presentation, heart disease, myoma uteri, twins, premature contraction, fetal distress), (2) intrapartum complications (birth weight, cephalopelvic disproportion (CPD), fetal distress, nuchal cord, LBW, thick meconium stained, transverse lie, birth before admission, APGAR <7 at 1 min, APGAR <7 at 5 min, preterm baby), (3) postpartum complications (uterine atony, retained placenta, cervical tear) and neonatal outcomes (low blood sugar, low Hct, neonatal death) were collected and compared with a control group.

Research Instrument

Data were collected via use of medical record forms. They consisted two parts of demographic data and obstetric complications. The demographic data included of age, gravida, gestational age, and type of delivery. The obstetric complications during antenatal, intrapartum, and postpartum period were recorded in medical record forms.

Validity and Reliability of the Research Instrument

The content validity of medical record forms was examined by three experts in obstetric medical and nursing (1 obstetric nurse, 1 maternal child and midwifery nursing instructor, and 1 obstetrician). Reliability of instrument was assessed by trying out with recording 30 teenage and advanced maternal age pregnancy cases from the data base to confirm the understanding in the content of each items.

Data collection

Data were collected from the database of the department of obstetrics and gynecology at Khon Kaen hospital and extracted for demographic characteristics, obstetrics complications, types of delivery, fetal and neonatal outcomes. The researchers checked for validity or missing values and corrected by reviewing the medical records.

Data analysis

Statistical analysis was performed using SPSS for Windows, Version 16.0, and the characteristic data were presented as number of subjects and percent. Odds ratio (OR) and 95% confidence intervals (CI) were presented to analyze the risk related with advanced maternal age, and $p<0.05$ was regarded as statistically significant.

Ethics considerations

Approval to conduct the study was obtained from Institutional Review Board of Khon Kaen Hospital on June 2, 2015 (Certificate number KE58056). To obtain data regarding the complication outcomes of the participants, the researcher recorded the medical record number and requested data of the obstetric complications for each participant. The medical record number was destroyed immediately upon receipt of this data,

Results

During the study period, a total of 5,807 women delivered at Khon Kaen hospital, of which, 584 were in the advanced maternal group (age 35 years or older) and 1,117 were in the younger group (aged 19 or younger). The mean score of age in teenage and advanced maternal groups were 16.10 and 37.80, respectively. The mean score of gestational age in both groups was 37.70 weeks. More than one half of teenage pregnancies experienced normal delivery (69.50%) while those in the advanced maternal group gave birth by caesarean section (53.20%)

With regard to maternal complications during antepartum period, the advanced maternal group had significantly higher rates of obstetric complications including severe PIH, chronic hypertension, hyperthyroidism, previous caesarean section, GDM class A1 and GDM class A2, breech presentation, pregnancy with myoma uteri and premature contraction. In contrast, the younger group had significantly higher rates of Hemoglobin E and PROM (Table 1).

Table 1 Obstetric Complication during Antepartum Period (N = 1,701)

Complications	≤19 years (%)	≥35 years (%)	*p*-value
Obesity	0.4	0.2	>0.05
Mild PIH	1.1	1.4	>0.05
Severe PIH	3.4	6.5	<0.05
Chronic hypertension	0.4	2.4	<0.05
Hyperthyroidism	0.2	2.7	<0.001
Hemoglobin E	3.0	0.9	<0.05
Previous cesarean section	1.5	17.8	<0.001
Gestational diabetes mellitus A1	0.4	10.8	<0.001
Gestational diabetes mellitus A2	0.4	4.1	<0.001
Overt diabetes mellitus	0.0	1.0	<0.05
Premature rupture of membrane	7.3	1.5	<0.001
Preterm PROM	2.8	2.7	>0.05
Placenta previa	0.8	2.9	<0.05
Viral precaution	0.8	1.7	>0.05
Oligohydramnios	2.1	2.1	>0.05
Breech presentation	2.6	8.2	<0.001
Heart disease	0.4	0.7	>0.05
Myoma uteri	0.0	2.6	<0.001
Twins	1.5	1.9	>0.05
Premature contraction	0.0	11.8	<0.001
Fetal distress	1.1	0.9	>0.05

Obstetric complications during intrapartum period were significant higher in the advanced maternal group including CPD and fetal distress. However, the younger group had significantly higher rates of LBW, nuchal cord and thick meconium stained aspiration. The mean birth weight was slightly lower in the younger group (Table 2).

The incidence of poor uterine contraction after birth and low blood sugar among neonates in the postpartum period was significantly higher in the group of advanced maternal age than in the younger group. On the other hand, retained placenta significantly occurred more frequently in the younger group than in the advanced maternal group (table 2).

Table 2 Obstetric Complication during Intrapartum and Postpartum period **(N = 1,701)**

Complications	≤19 years (%)	≥35 years (%)	*p*-value
Intrapartum Complications			
Birth weight (gm)	2838.6	2964.5	< 0.001
Mean ± SD	±567.5	±586.1	
Cephalo pelvic disproportion	11.4	16.6	<0.05
Fetal distress	0.2	6.0	< 0.001
Nuchal cord	11.4	4.6	< 0.001
Low birth weight	22.1	14.9	<0.05
Thick meconium stained	11.1	5.7	<0.05
Transverse lie	0.2	1.2	>0.05
Birth before admision	0.0	0.7	>0.05
APGAR < 7 at 1 min	7.7	8.2	>0.05
APGAR < 7 at 5 min	3.4	2.7	>0.05
Preterm Baby	16.6	12.5	>0.05
Postpartum Complication			
Maternal complications			
Uterine atony	0.8	2.9	<0.05
Retained placenta	2.4	0.7	<0.05
Cervical tear	0.2	0.3	>0.05
Newborn baby complications			
Low blood sugar	1.7	5.1	<0.05
Low Hematocrit	1.5	1.7	>0.05
Baby death	2.1	1.0	>0.05

The results also demonstrated that the antenatal complication of severe PIH [OR (95%CI) 2.3 (1.3-4.2)] (p<0.01), hyperthyroidism [OR (95%CI) 14.6 (1.7-125.8)] (p<0.05), previous cesarean section [OR (95%CI) 16.0 (7.6-33.7)] (p<0.001), GDMA1 [OR (95%CI) 32.4 (7.8-134.9)] (p<0.001) GDMA2 [OR (95%CI) 16.7 (3.8-74.6)] (p<0.001) placenta previa [OR (95%CI) 3.8 (1.2-12.1)] (p<0.05) and breech presentation [OR (95%CI) 3.9 (2.1-7.3)] (p<0.001) were higher in the advanced maternal group. The rate of fetal distress in intrapartum period and uterine atony in postpartum period [OR (95%CI) 3.9 (1.3-11.6)] (p<0.05) and newborn baby low blood sugar [OR (95%CI) 3.1 (1.4-6.5)] (p<0.05) were also higher in the advanced maternal group [OR (95%CI) 33.9 (4.6-249.1)] (p<0.01) (table 3).

Table 3 Multivariable Odds Ratios (OR) of Obstetric Complications (N=584)

Obstetric complications	Advanced maternal age women			*P-value*
	%	OR	95% CI	
Antenatal Complications				
Severe PIH	6.5	2.3	(1.3-4.2)	<0.05
Chronic HT	2.4	3.2	(0.6-15.8)	>0.05
Hyperthyroidism	2.7	14.6	(1.7-125.8)	<0.05
HbE	0.9	0.2	(0.1-0.7)	<0.05
Previous cesarean section	17.8	16.0	(7.6-33.7)	<0.001
Gestational diabetes mellitus A1	10.8	32.4	(7.8-134.9)	<0.001
Gestational diabetes mellitus A2	4.1	16.7	(3.8-74.6)	<0.001
Premature rupture of membrane	1.5	0.3	(0.1-0.6)	<0.05
Placenta previa	2.9	3.8	(1.2-12.1)	<0.05
Viral precaution	1.7	2.7	(0.8-9.2)	>0.05
Breech presentation	8.2	3.9	(2.1-7.3)	<0.001
Intrapartum Complications				
Cephalopelvic disproportion	16.6	1.4	(0.9-2.0)	>0.05
Transverse lie	1.2	6.4	(0.8-53.2)	>0.05
Fetal distress	6.0	33.9	(4.6-249.1)	<0.05
Thick meconium stained	5.7	0.4	(0.3-0.7)	<0.05
Nuchal cord	4.6	0.4	(0.2-0.6)	<0.001
Preterm Baby	12.5	1.0	(0.6-1.5)	>0.05
Low birth weight	14.9	0.6	(0.4-0.9)	<0.05
Postpartum Complications				
Uterine atony	2.9	3.9	(1.3-11.6)	<0.05
Retained placenta	0.7	0.3	(0.1-0.9)	<0.05
Newborn baby low blood sugar	5.1	3.1	(1.4-6.5)	<0.05
Baby death	1.0	0.5	(0.2-1.4)	>0.05

Discussion

The prevalence of teenage pregnancy was 19.27%, which was higher than the preventing teenage mothers criteria set by the Thai Ministry of Public Health (10%) and also higher than many studies (Kittipiboon, 2010; Wanakosit 2012). This may have been due to a lack of safe sex knowledge and contraceptive use, ease to access alcoholic beverages, provocative media and marriage at the early age (Unicef, 2015). However, this study found that the prevalence of advanced maternal age pregnancy was lower than the total of that of all advanced maternal age pregnancies in 2016 (15.20%) and lower than those of many study (Lawaratanakorn, 2012; Promlungka, et al., 2014). This delayed childbearing may be due to changes in society such as obtaining higher levels of education, marrying later and advances in fertility technology (Thaewpia & Tanglakmankhong, 2017). Regarding the type of delivery, the advanced maternal group exhibited a significantly higher cesarean section delivery rate than the teenage group, which was consistent with many studies (Kittipiboon, 2010; Lawaratanakorn, 2012). This

significantly higher rate of cesarean section delivery may be related to fetal distress, fetal malpresentation, or myoma uteri which is regarded as the cause of cesarean section and the majority in the advanced maternal age group who experienced a previous cesarean section. We also found that the teenage group exhibited a significantly higher normal delivery rate than the advanced maternal group and was consistent with other studies (Kittipiboon, 2010; Lawaratanakorn, 2012). It may have been because most of the teenage pregnancies experienced preterm labor and gave birth to LBW babies (Blomberg, Tyrberg, & Kjølhede, 2014).

Our study confirmed a significantly higher incidence of complications during pregnancy including PIH, GDM, hyperthyroidism, myoma uteri and premature contraction (Ates, Batmaz, Sevket, Molla, Dane, & Dane, 2013; Blomberg et al., 2014; Khalil, Syngelaki, Maiz, Zinevich, & Nicolaides, 2013; Promlungka, Boonyatarp, Khamsripon, Laohawat, Kovjiriyapan, & Chandeying, 2014; Thaewpia et al., 2013) and demonstrated the incidence to present other obstetrical complications in the advanced maternal group, including previous cesarean section and breech presentation. In contrast, the advanced maternal age group seemed to have a lower prevalence of thalassemia trait and PROM.

Regarding PIH and GDM, the overall prevalence rate in the advanced maternal age group was 2.1 times higher than that in the teenage pregnancy group, and may have been because of decreasing blood vessel elasticity in mothers with old age especially becoming pregnant at age 40 or older (Gaillard, Bakker, Steegers, Hofman, & Jaddoe, 2011). Concerning hyperthyroidism, the prevalence rate was higher in the advanced maternal age group compared with that in the teenage group. It may have been because they have had thyroid disease before the onset of gestation. A new diagnosis of hyperthyroidism is uncommon in early pregnancy, as untreated disease is associated with reduced fertility (Marx, Amin, & Lazarus, 2008).

The major complication during labor in the teenage mother group was LBW (22.2%) and preterm baby (16.6%). These were the causes of neonatal morbidity and mortality, for instance, respiratory distress syndrome and intraventicular hemorrhage (Phupong, 2012), corresponding to that found in related studies (Sananpanichkul & Leaungsomnapa, 2015; Blomberg et al., 2014). The high risk during labor at advanced maternal age was CPD (16.6%), which was the cause of fetal distress and lead to C/S. In addition, the LBW and preterm baby also risks in this group were related to the results in other studies (Blomberg et al., 2014; Khalil et al., 2013; Koo Ryu, Yang, Lim, Lee, Kim et al., 2012). This may be due to having stress or poor health condition that has been reported in the literature (Perry, Hockenberry, Lowdermilk, Wilson, Alden, & Cashion, 2018). The prevalence rate of fetal distress in advanced maternal age was significantly higher than that among teenagers [OR (95%CI) 33.9 (4.6-249.1)]. This caused an increasing low rate of APGAR scores (<7) at 1 minute after birth (Thaewpia, 2013).

Concerning postpartum complications, the study found a significantly higher rate of uterine atony and retained placenta in the advanced maternal age group, which was the major cause of postpartum hemorrhage. It may be because unobserved factors, for instance, the overdistension of the uterine muscles by multiple pregnancies, fetal macrosomia and polyhydramnion as well as a protracted delivery. Moreover, experiencing curettages and previous cesarean sections cause the retained placenta (Lao, Sahota, Cheng, Law, & Leung, 2014).

Regarding newborn baby complications, we found the rate of low blood sugar among babies after birth in the advanced maternal age group was higher than those in the teenage mother group. The explanation for low blood sugar after birth is possibly related to the advanced maternal age group having an incidence rate of GDM that caused low and high blood sugar levels during the postpartum period (Phupong, 2012).

In conclusion, both teenage pregnancy and advanced maternal age groups presented higher complications of pregnancy. The complications can occur to maternal and fetal in antepartum, intrapartum, and postpartum period.

Limitations

Before using the study's findings, its limitations must be considered. Some demographic characteristic of the subjects that may have been associated with pregnancy outcomes should be considered when conducting future research regarding the impact of maternal age on maternal outcomes, for instance, education level, marital status, occupation and income levels. In addition, the study involved only one hospital, so that the results are not generalizable.

Implication of the Results

Based on the research findings, nurses can provide care at Antenatal Care Clinics by focusing on the maternal age group as followed.

1. Counseling and assessing about medical complications and obstetric risks in both teenage and advanced maternal age groups are necessary. Regarding teenage pregnancy, nurses must check for PROM, PIH and thalassemia. On the other hand, the advanced maternal age group must be counseled about preterm labor, GDM, PIH, hyperthyroid, placenta previa and breech presentation.

2. Monitoring fetal distress and observing prolonged labor progression from nuchal cord and CPD in both groups during the postpartum period are recommended for the nurses in the labor room. These could lead to better prepared and more appropriate caesarean section from dystocia.

3. Preventing and observing postpartum hemorrhage from retained placenta in the teenage group and uterine atony, low blood sugar in newborn baby in the advanced maternal age group constitute important roles for nurses in the postpartum unit.

Recommendation for Further Study

The findings support that both teenage pregnancy and advanced maternal age groups related higher complications of pregnancy. However, there is the need for further exploration of study. Using multiple hospitals, located in various geographic areas throughout Thailand, could generate more generalizable results to examine. In addition, considering comparing the teenage and advanced maternal groups with an adult pregnancy group (aged 20-35 years old) could more significantly demonstrate odd ratio test results.

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