CLINICAL ARTICLE

# Adverse pregnancy outcomes in cases involving extremely young maternal age

Panicha Chantrapanichkul, Saifon Chawanpaiboon *

*Division of Maternal-Fetal Medicine, Department of Obstetrics and Gynecology, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand*

## A R T I C L E   I N F O

## A B S T R A C T

*Objective:* To assess pregnancy outcomes among adolescent girls 16 years old or younger and their newborns. *Methods:* A cohort study was carried out at Siriraj Hospital, Mahidol University, Bangkok, Thailand, using completed charts for 1061 girls aged 16 years or younger (study group) and 1100 women aged 20 to 29 years (reference group) delivered at that hospital between January 1, 2006, and December 31, 2010. Demographic data, maternal laboratory investigations, maternal complications, placental complications, medications administered in hospital, and neonatal outcomes were recorded. *Results:* Anemia (odds ratio [OR], 1.86; confidence interval [CI], 1.52–2.26); heart disease (OR, 0.38; CI 0.15–0.90), thyroid disorder (OR, 0.054; CI, 0.01–0.40), pulmonary disease (OR, 0.89; CI, 0.41–1.93); medical and obstetrics complications including gestational diabetes mellitus (OR, 0.04; CI, 0.01–0.29), placenta previa (OR 1.04, CI 0.06–16.60), preterm labor (OR, 1.98; CI, 1.55–2.53), as well as mean neonatal weight ($2830.77 \pm 81.31$ g and $3038.53 \pm 482.23$ g; $P = 0.001$) were different in the 2 groups and the differences were statistically significant. *Conclusion:* Adverse maternal and neonatal outcomes were common in the study group. Extensive education about contraception and safe sex on the one hand, and an effective care plan if pregnancy occurs, should be provided to teenage girls to reduce these poor outcomes.

© 2012 International Federation of Gynecology and Obstetrics. Published by Elsevier Ireland Ltd. All rights reserved.

## 1. Introduction

A recent study from Canada reported on adverse outcomes among the newborns of nulliparous adolescents 19 years and younger (2.6% of the study population), and among the newborns of nulliparous women aged 20 through 39 years [1]. In that study, the risk of preterm delivery was 4.5 times higher, and the risks of birth defects and infant death were 1.8 and 3.8 times higher, in the teenage group than in the older group.

Teenage pregnancies continue to be a major health burden in Thailand and other low-income countries, where around 85% of them occur and 25% of mothers are in their teens [2,3]. Thailand has the second-highest rate of teenage pregnancy in the world [2], a ranking that may be due to environmental degradation, low family income, a poorly educated population, and a lack of familial warmth and care. When parents need to work long hours, as most do in Thailand, to feed their families, teenaged girls receive no information or guidance about sex and pregnancy prevention and many become pregnant [4].

A type of study was missing about teenage pregnancy in Thailand, one focusing on associations between extremely young maternal age and adverse pregnancy outcomes. The present study hypothesized that, for both mother and newborn, the incidence of adverse pregnancy outcomes would be higher in a teenaged group than in a reference group of women aged 20 to 29 years. To distinguish the adverse outcomes more specifically associated with extremely young maternal age, the study group consisted only of girls 16 years old or younger.

## 2. Materials and methods

The present cohort study was carried out at Siriraj Hospital, Mahidol University, Bangkok, Thailand, using the completed charts of maternity patients delivered at that hospital between January 1, 2006, and December 31, 2010. The study was approved by the Ethics Committee of the Faculty of Medicine of Siriraj Hospital; informed consent was not needed, however, because the design was retrospective.

The incidence rates of common adverse outcomes were first calculated for each group. Then, using Power And Precision software (Biostat, Englewood, NY, USA), sample sizes were estimated from the rates for preterm labor, gestational hypertension, gestational diabetes mellitus, cesarean delivery, anemia, low birth weight, structural congenital abnormalities, and admission to the neonatal intensive care unit (NICU) of Siriraj Hospital. The largest sample size calculated (approximately 1100 patients per group) was the one chosen. It was based on the incidence rates of NICU admissions. For the 5 years considered, the charts were complete for 1061 girls aged 16 years or younger (study group) and 20 776 women aged 20 to 29 years (reference group). Systematic sampling of the charts in the reference group was therefore performed. The first of every 18 successive charts (1, 19, 37, 55,...19 801) was retained until 1100 were collected. The

* Corresponding author at: Department of Obstetrics and Gynecology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand. Tel.: +66 2 419 7000x4777 4888; fax: +66 2 418 2662.
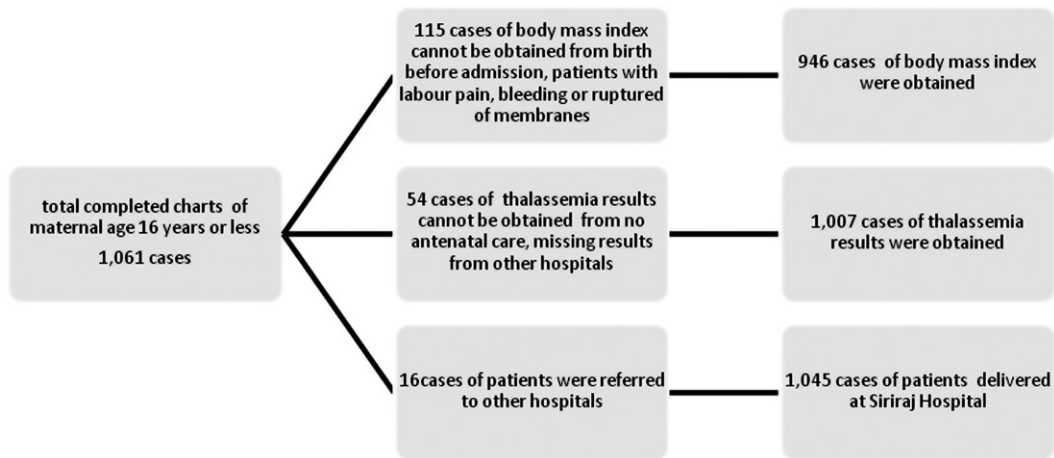   *E-mail address:* siscw@mahidol.ac.th (S. Chawanpaiboon).

**Fig. 1.** Reasons why some entries were missing from the patients' charts in the study group.

reasons why some entries were missing in some of the charts are provided in Figs. 1 and 2.

Demographic data, maternal investigations and complications, medications received in hospital, placental complications, and neonatal outcomes were entered in the specially designed data record form. The adverse maternal and neonatal outcomes eventually considered were the following: anemia, high blood pressure and hypertensive disorders of pregnancy, diabetes, placental abruption, and placenta previa.

Anemia was defined as a hemoglobin concentration less than 11.0 g/dL or a hematocrit less than 33% [5]. High blood pressure was defined as 2 systolic blood pressure readings of 140 mm Hg or greater, or 2 diastolic blood pressure readings of 90 mm Hg or greater, obtained at least 6 hours apart. Hypertensive disorders experienced during pregnancy were grouped into 4 types: pre-eclampsia, chronic hypertension, chronic hypertension with superimposed pre-eclampsia, and pregnancy-induced hypertension [6].

Diabetes was diagnosed as follows: All patients were first screened by means of the glucose challenge test, in which blood glucose level is measured 1 hour after drinking a beverage containing 50 of glucose. Patients with a positive result then underwent the oral glucose tolerance test, in which they drank a beverage containing 100 g of glucose. The patients testing positive for this diagnostic test were asked if they could bring their blood glucose level to normal by dietary means alone. If they responded that they could, they were recorded as having gestational diabetes $A_1$; and if insulin

therapy had been considered during their pregnancy, they were recorded as having gestational diabetes $A_2$ [7].

Placental detachment before delivery was recorded as placental abruption, and a placenta placed near or over the internal cervical os was recorded as placenta previa [8]; a birth occurring at a gestational age between 24 weeks and 0 days and 36 weeks and 6 days was recorded as preterm [9]; stillbirths and neonatal deaths were both recorded as neonatal deaths; and a birth weight less than 2500 g was considered low [10].

Data were analyzed using SPSS version 14 (IBM, Armonk, NY, USA). The $\chi^2$ test and analysis of variance were used to compare categorical variables and continuous variables, respectively, between the 2 groups. Results were reported as number, percentage, or mean and standard deviation. $P < 0.05$ was considered significant.

## 3. Results

From January 1, 2006, to December 31, 2010, the charts of 1061 patients aged 16 years or younger (study group) and the randomly obtained charts of 1100 patients aged 20 through 29 years (reference group) were collected. Outcomes in the 2 groups were then compared.

Body mass index (BMI, calculated as weight in kilograms divided by the square of height in meters) was available for 946 of the 1061 patients in the study group and 1010 of the 1100 patients in the reference group. The reasons for BMI unavailability were delivery before admission, and the patient experiencing labor pains or bleeding or having
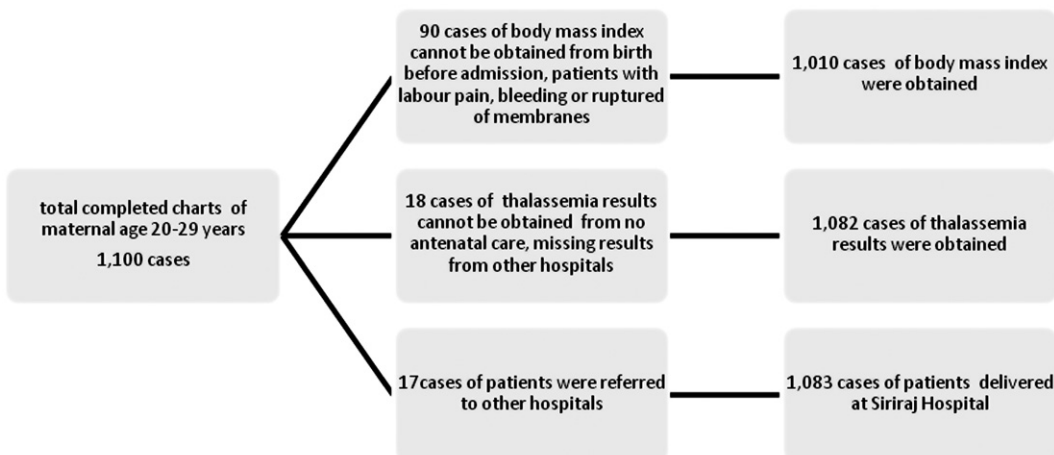


**Fig. 2.** Reasons why some entries were missing from the patients' charts in the reference group.