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ORIGINAL RESEARCH – QUANTITATIVE

Gynecologic age is an important risk factor for obstetric and perinatal outcomes in adolescent pregnancies

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ABSTRACT

Background: Adolescent pregnancy is an important public health problem. Physiological maturity affects obstetric and perinatal outcomes. Almost all assessments of adolescent pregnancies are based on chronological age. Gynecologic age (GA) is defined as age in years at conception minus age at menarche and it is an indicator of physiological maturity.
Aim: To compare obstetric and perinatal outcomes between adult and adolescent pregnancies as categorized according to GA.
Methods: In this retrospective study, 233 adolescent pregnant women were divided into two groups based on GA $\leq$ 3 years (101 women) and GA > 3 years (132 women). Their obstetric and perinatal results were compared with 202 adult pregnancies who gave birth in the same period.
Findings: Gestational age at delivery, APGAR scores, birth weight, and incidence of preterm birth, admission to neonatal intensive care unit (NICU), intrauterine growth restriction, low birth weight, and premature rupture of membranes were significantly different between the study groups. Compared to adolescent pregnancies with GA > 3 years, adolescent pregnancies with GA $\leq$ 3 years had significantly lower birth weight, gestational age, APGAR scores, and significantly higher incidence of intrauterine growth restriction, low birth weight and admission to NICU.
Conclusion: Low GA is associated with an increased rate of obstetric and perinatal complications in adolescent pregnancies. Although the main aim is the prevention of adolescent pregnancies, a detailed evaluation of such pregnancies including determination of the gynecological age together with a multidisciplinary approach may decrease potential complications.

1. Introduction

Adolescent pregnancy is an important public health problem with its medico-legal, emotional, financial and social results.[1] Getting married at an early age, low educational level (and related low contraception information level) and low socioeconomic status are all related with an increasing rate of adolescent pregnancy.[2–4] Several studies have shown that adolescent pregnancies are associated with increased risks of adverse obstetric and perinatal outcomes such as maternal mortality,[5,6] preterm delivery,[7,8] low birth weight,[9,10] preeclampsia,[11] and neonatal death.[10]

The obstetric and perinatal outcomes of adolescent pregnancies are affected by biological maturity as well as various socio-demographic factors.[12] Menarche is the most important step in biological development and attainment of reproductive capacity. Many studies on adolescent pregnancy have used chronological age as the basis while disregarding the biological maturation of the subjects. The difference in the age of menarche even between regions required individualization of the subjects' biological maturation. The "gynecological age (GA)" concept reflects the biological maturation of the adolescent pregnant woman and enables numerical documentation that is used to increase accuracy

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of observations and provide standardization. GA is calculated by subtracting the chronological age at menarche from the chronological age at the time of conception. Zlatnik and Burrneister defined “low gynecological age” as an objective criterion of adolescent development in 1997.[13]

Adolescent pregnancies are recorded and monitored with special attention in our clinic (Department of Obstetrics and Gynecology of Adiyaman University School of Medicine). The study groups have been selected in the same population. We record the medical, surgical, obstetric and gynecological history besides the sociodemographic features. Social services are also notified for underage pregnancies (<18 years).

We aimed to compare obstetric and perinatal outcome of adolescent pregnancies that were followed up and delivered at our clinic with outcome of adult pregnancies. Our detailed records enable us to retrospectively calculate GA for adolescent pregnancies. We also compared adolescent pregnancies where GA was ≤3 or >3 years.

2. Methods

2.1. Study population and definitions

This retrospective chart review includes 233 adolescent first pregnancies (10–19 years of age) that were followed up and delivered at the Department of Obstetrics and Gynecology of Adiyaman University School of Medicine, between January 2013 and January 2014. A total of 202 adult (20–35 years of age) first pregnancies that were followed up and delivered at the same clinic in the same time period were randomly selected as the control group. Information regarding GA, perinatal outcome and maternal outcome were collected. GA was calculated by subtracting the age at menarche from the age at conception. Adolescent pregnancies were divided into two groups according to GA: ≤3 years (101 patients) and >3 years (132 patients). Perinatal outcomes included admission to neonatal intensive care unit (NICU), Apgar scores at 1 and 5 min, intrauterine growth restriction (IUGR), gestational age at birth, and birth weight. The maternal outcomes included preeclampsia, mode of delivery, total weight gain during pregnancy, gestational diabetes mellitus (GDM), preterm delivery, premature rupture of membranes (PROM), and postpartum hemorrhage (PPH).

2.2. Sample selection

Inclusion criteria were identified as adolescent female, single pregnancy, and a complete patient chart. Exclusion criteria were identified as previous uterine surgery or elective Cesarean birth plan for the current pregnancy and undefined first menstruation date (as we were then unable to calculate the GA). An addition, the patients who had medical or surgical disorders were excluded (Fig. 1).

2.3. Descriptions

PPH was defined as estimated blood loss of >500 mL following vaginal or >1000 mL following Cesarean birth. PROM was defined as rupture of membranes prior to the onset of labor. Preterm delivery was defined as delivery at <37 weeks of gestation, IUGR as <10th percentile for gestational age, low birth weight (LBW) as <2500 g, and very low birth weight (VLBW) as <1500 g. Gestational age was based on fetal biometric measurements by ultrasonography at the time of first examination. The gestational age at birth was calculated based on the last menstrual date if the woman did not have any antenatal care or ultrasonographic examination previously. When gestational age by the last menstrual period and ultrasonographic biometry were inconsistent, the gestational age at birth was calculated according to the earliest ultrasonographic measurement.

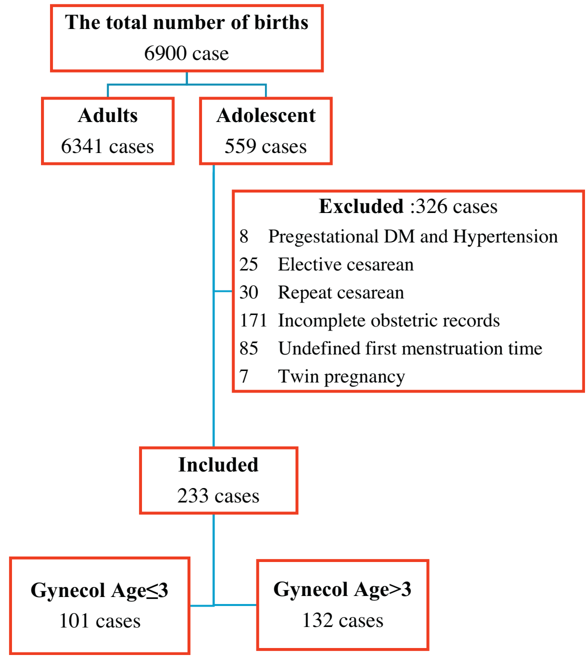

Fig. 1. Flow chart of the cases.

Study approval was obtained from the Adiyaman University School of Medicine's Ethics Committee (Reference number: 57831858/82).

2.4. Statistical analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences software, version 13.0 (SPSS Inc., Chicago, IL, USA). Continuous variables were defined with mean ± standard deviation. Depending on distribution characteristics and number of groups, independent samples *t* test, one-way analysis of variance (ANOVA), Mann–Whitney *U* and Kruskal–Wallis tests were used for comparisons as appropriate. Categorical variables were defined with numbers and percentages. Chi-square test and its derivatives were used for comparison of categorical variables. A *p* value <0.05 was considered to denote statistical significance. Statistical analysis was not adjusted for multiple comparisons, as the *p* values were very low, and clearly would remain significant even after conservative adjustments such as Bonferroni correction.

2.5. Sample size calculation

We included all eligible cases within the study period without an a priori sample size calculation. An underpowered study would risk false negative hypothesis tests, despite clinically significant differences between the study groups. However, our study seems to be adequately powered, as clinically significant differences also reached statistical significance.

3. Results

Files of all adolescent women were successfully evaluated. We found that 559 of the 6900 pregnant women who delivered at our hospital during the study period were aged 19 years or younger. Overall, the rate of adolescent pregnancies in this hospital was 8.1%. The mean age of adolescent pregnant women was 18.05 (range 15–19, SD: 1.17) years. The mean birth weight of 566 newborns (7 twins) in adolescent women was 3035.5 ± 444.2 g (range 500–4360 g); the mean gestational age was 36.6 ± 2.1 weeks (range 20–42 weeks); and