
OBSTETRICS

Comparison of the Cervical Length during Second Trimester of Pregnancy between Teenage and Adult Primigravidae

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ABSTRACT

Objective: To compare cervical length at midgestation (18⁺⁰ - 23⁺⁶ weeks of gestation) between primigravida teenage (<19 years) and adult (≥19 years) pregnant women.

Study design: Prospective cohort study

Material and methods: A transvaginal ultrasound measurement of cervical length at midgestation was performed in each primigravida teenage or adult pregnant woman who attended our antenatal clinic between June 2014 and February 2015. Cervical length as well as prevalence of shortened cervix (≤ 25 mm) were compared between both groups of women.

Results: A total of 44 teenage and 46 adult pregnant women completed the study. The mean cervical length in the teenage group was not significantly different from that in the adult group (34.42 ± 6.71 mm. VS 36.89 ± 7.83 mm; P = 0.112). The prevalence of shortened cervix were also not significantly different between both groups (6.8% VS 6.5%; P = 0.995). Women who had a shortened cervix had a significantly higher prevalence of preterm delivery than those with a normal cervix (83.3% VS 13.1%; P = 0.001).

Conclusion: There were no significant differences in cervical lengths and the prevalence of shortened cervix at midgestation between primigravidae teenage and adult pregnant women.

Keywords: cervical length, adolescent, second trimester, preterm delivery

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Introduction

In recent statistics, teenage pregnancy shows the steady increasing number worldwide, and Thailand is not except from this situation⁽¹⁾. In 2013, teenage fertility rate for a live birth rate were of 47 per 1,000 Thai woman aged 15 to 19 years old, compare to the rate of

40 in the past 5 years^(2,3). Teenage pregnancy can lead to many obstetrics complications. The most common is preterm labor which increased perinatal morbidity and mortality rate, and affected the quality of living for all family members in the long term⁽⁴⁻⁶⁾. This problem impact the government's healthcare budget which

needed to be allocated in supporting the patients. It is assumed that teenagers are possible to have preterm labor easier than adult due to growth of female genital system and pelvis has not reach the certain level to support the full term of pregnancy. The studies imply that the increase of preterm labor in teenagers will be higher if taking such factors into account - gynecologic age (defined as duration between age of menarche and age of first conception), malnutrition, smoking before pregnancy, receiving late antenatal care, not regularly receive antenatal care and no receive antenatal care^(4,6,7).

Immaturity of the reproductive system and pelvis of a female teen may cause the cervical length of teenage to be less than a female adult. In other words, this may lead to a short cervix during pregnancy. Short cervix is one of the crucial factors that can increase the risk of preterm labor and preterm birth in teenage. Statistics confirm that teenage with shorter cervix have more preterm labor and preterm birth than adult pregnancy^(7,8).

In the past 10 years, there have been many studies to figure out how to predict and prevent preterm labor and preterm birth. The studies found that screening and providing care for at risk pregnant women in early gestation can significantly reduce perinatal morbidity and mortality. In recent studies, cervical length measurement during pregnancy is one of the methods to identify woman at risk for preterm delivery⁽⁹⁻¹¹⁾. Data suggests that there is a possibility that the length of the cervix seems to be associated with preterm labor and preterm birth in female teenage. This is also caused by the fact that ultrasound assessment of cervical length becomes more reliable and prevalent.

This research mainly focus on comparing the cervical length between teenage and adult with primigravidae, which the data in Southeast Asia population, especially in Thailand are limited. The secondary objective is to determine the relationship among a shortened cervix and preterm labor and birth.

Material and Methods

The prospective cohort study was collected data

from 1st June 2014 to 28th February 2015 at antenatal care unit, department of Obstetrics and Gynecology, Faculty of Medicine Vajira hospital, Navamindradhiraj University, Bangkok, Thailand. The study was conducted by primigravidae whom began receiving antenatal care prior to the 24th weeks of gestation. The gestational age was estimated by last menstrual periods (LMP) or size of uterus. In addition, women with singleton gestations-, who have not chronic medical conditions and intended to deliver at Vajira Hospital, were eligible to participate. Women with uterine anomalies, fetal anomalies, history of cervical procedure, multiple gestations, correction of gestational age more than 23⁺⁶ weeks, and failed follow up antenatal care, were excluded from this study. (Fig.1) The study was approved by the office of Vajira Institute review board and informed consent was obtained before performing transvaginal ultrasound examination.

The sample size calculated based on a previous study⁸ that shows 90 percent power of study. Finally, 104 primigravidae joined the program and 90 screened participants agreed to participate in this study and then divided in 2 groups by age at the time of delivery- the first group are 44 primigravidae under 19 and the second group are 46 primigravidae at 19 and over. All participants had engaged in a transvaginal ultrasound examination between 18⁺⁰ and 23⁺⁶ weeks of gestation. The examination was performed with 4-9 MHz transvaginal real-time ultrasound transducer (GE, Voluson, Austria). All participating sonographers were trained with the cervical length measurement technique, thus decreasing the intra- and inter-observer variability. Each sonographic examination was performed according to protocol: First, after emptied bladder, patient was placed in a dorsal lithotomy position. Second, the transvaginal probe was inserted and placed in the anterior fornix of the vagina, without exerting any pressure on cervix. Third, the sagittal view of the cervix was obtained with the echogenic endocervical mucosa exposed along the entire cervical length. Fourth, the cervical length was measured with electric calipers as a linear distance between the external os and the internal os. The cervical length measurement was performed three times, then the shortest value was

recorded.^{12,13} A shortened cervical length was defined as ≤ 25 mm., in length.¹⁰ Finally, all participants were closely followed up until they were delivered, -then gestation age at time of delivery were recorded. A preterm birth was defined as delivery before 37 completed weeks.

Data was analyzed using SPSS version 22.0

(IBM corporation, Armonk, NY, USA). The descriptive data were showed in mean with standard deviation or total number and percent. Student T-test and Chi-square test were used to compare cervical length between two groups. Finally, Fisher exact test was analyzed association of short cervix and preterm birth.

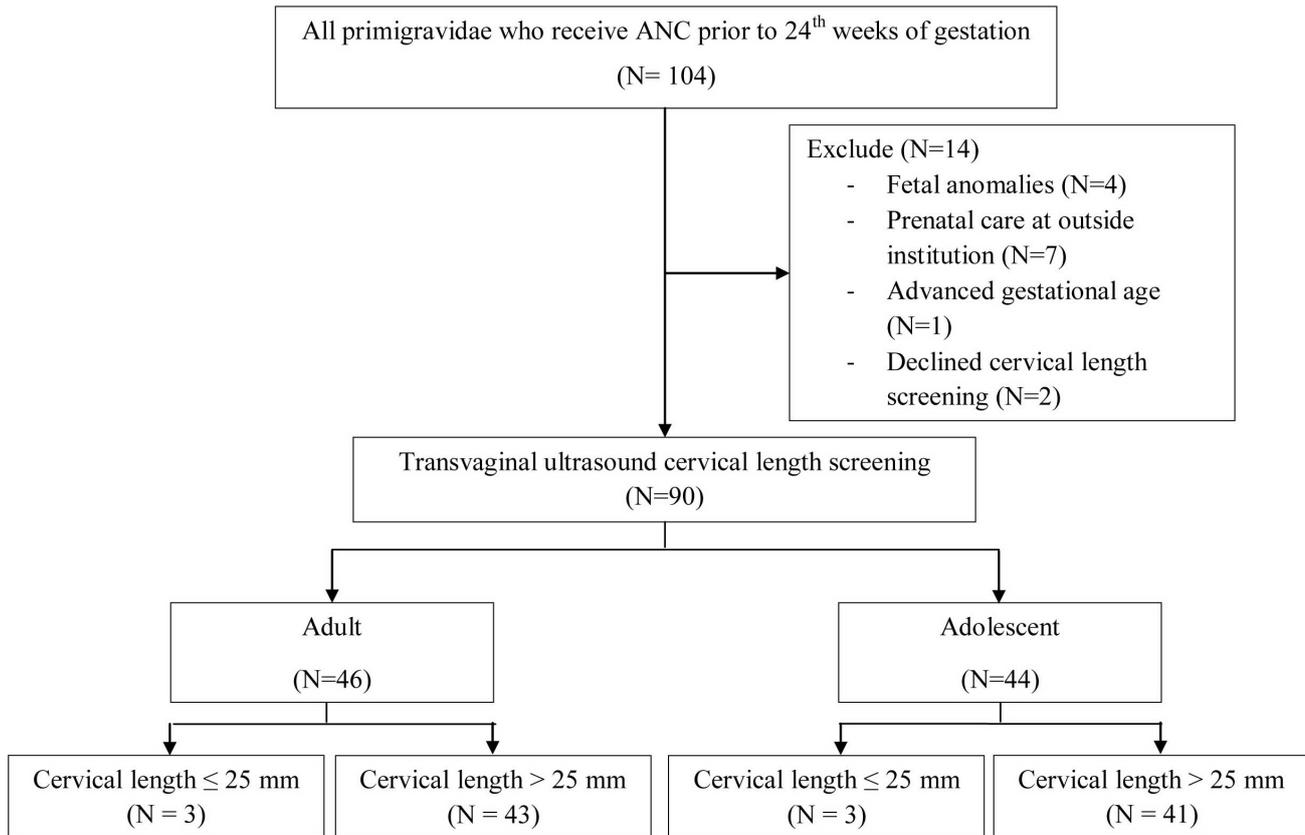


Fig.1. Diagram of study

Results

During the study, 104 patients were recruited, 14 (8 teenagers and 6 adults) of the patients were lost to follow up and declined to participate. The remaining participants, primigravidae, were 90-including 44 teenagers and 46 adults.

The demographic data is showed in Table 1. Significant data of 2 group differences includes: age, gynecologic age, number of antenatal care, education levels and weeks of gestation at first antenatal care unit. The results of cervical length of 90 participants, the

mean±SD of cervical length was 35.68 ± 7.37 mm, the teens were 34.42 ± 6.71 mm., and the adults were 36.89 ± 7.83 mm. ($P = 0.112$) The data shows that teens had a shortened cervical length ≤ 25 mm. as same as adult, were 3 (6.8%) and 3 (6.5%), respectively ($P = 0.955$) Table 2.

Table 3 shows that there is statistically significant difference in labor outcome of short cervix and normal cervix-. Women with short cervix have higher preterm birth prevalence than women with normal cervix, 83.3% and 13.1%, respectively ($P = 0.001$)

Table 1. Demographic data.

Factors	Adolescent (N=44)	Adult (N=46)	P
Age (years)	16.8 ± 1.0	26.5 ± 5.5	< 0.001
GA at 1 st antenatal care (weeks)	16.8 ± 3.3	13.9 ± 4.5	0.001
Pre-pregnancy BMI (kg/m ²)	19.94 ± 3.83	20.91 ± 3.53	0.215
Height (cm)	159.34 ± 6.30	157.76 ± 5.30	0.2
Gynecologic age (years)	2.61 ± 1.15	11.04 ± 5.17	< 0.001
History of smoking (years)	2 (4.50)	3 (6.50)	1
Number of antenatal care (times)	7.6 ± 2.8	9.1 ± 2.3	0.008
Hemoglobin levels (g/dl)	11.84 ± 0.96	12.04 ± 0.89	0.311
Educational levels			
- Elementary school	0 (0.0)	2 (2.2)	
- High school	29 (32.2)	1 (1.1)	< 0.001
- Vocation/college/university	15 (16.7)	43 (47.8)	

Data presented as mean ± standard deviation or N (%), GA; gestational age, BMI; body mass index

Table 2. Cervical length and proportion of short cervix in adolescent and adult nulliparous women.

	Adolescent (N=44)	Adult (N=46)	P
Cervical length (mm)	34.4 ± 6.7	36.8 ± 7.8	0.112*
Short cervix ¹	3 (6.8)	3 (6.5)	0.955 [§]

Data presented as mean ± standard deviation or N (%), ¹Cervical length 25 mm or less, *Independence T-test, [§]Fisher's Exact test

Table 3. Labor outcomes compared between short and normal cervix.

Labor outcomes	Short cervix	Normal cervix	P
Preterm [§]	5 (83.3)	11(13.1)	0.001*
Term	1 (16.7)	73 (86.9)	

Data presented as N (%), [§]Spontaneous labor before 37 weeks of gestational age, *Fisher's Exact test

Discussion

The study revealed that the average of cervical length in the second trimester of pregnant participants was around 35.68 mm. This result was less than the value of the previous study in Chiang Mai (mean = 42.30 mm)⁽¹⁴⁾. The result of this study was affected by low average age of pregnant woman. This study was divided into two main populations. It indicated that adult pregnancy had the same average of cervical length

compared to the two previous studies, which was 36.89, 39.00 and 33.00 mm respectively^(7,8). However, teenage pregnancy in this study showed the higher average of cervical length than Europe and South Africa: 34.42 compared to 29.90 and 28.00 mm^(7,8), possibly, was caused from the lower average age of population, which was less than 16 years old.

According to the previous study, immaturity of the reproductive organs in teenage women is caused

by short cervical length. On the other hand, the study shown no statistical significance of cervical length between two group pregnant samples. In addition, proportions of shortened cervix in both groups were found to be relatively comparable. However, the shortened cervix in any age was associated with preterm labor and preterm birth among teenage pregnancy^(7,8). Therefore woman with shortened cervix in the second trimester has higher possibility of preterm labor and preterm birth than normal cervical length significantly, which is 83.3 percent compared to 13.7 percent respectively (P= 0.001). The result is a resemble to previous studies^(7,8).

Using transvaginal ultrasonography scanning could measure the cervical length in the second trimester of pregnancy, but it could not provide a promising analysis of shortened cervix and the risk of preterm labor and preterm birth among teenage pregnancy. On the other hand, pregnant woman with shortened cervix might receive the benefits from the physicians to observe, analyze or cure the preterm labor and preterm birth on the right time.

Possible causes of negative outcomes in this study could be due to the limitation of various factors such as insufficient participants and no periodical measurement of cervical length. For risk identification, earlier diagnose and prevention of preterm labor and preterm birth in early gestation, further studies should be performed with the higher number of participants and the cervical length need to be measured periodically in order to find out the appropriate cervical length

In conclusion, teenage and adult pregnant women had no significant differences in cervical lengths measured by transvaginal ultrasound during second trimester. Short cervical length was related to preterm labor and preterm birth. The result could be implemented to improve the treatment planning for pregnant woman and might be applied to find out the risk of preterm labor and preterm birth, which had to be reviewed in the future.

References

1. Chanda-Mouli V, Camacho AV, Michaud PA. WHO

2. World Health Organization. Adolescent pregnancy [internet]. 2014 [cited 2015 May 15]. Avialable from: <http://www.who.int/mediacentre/factsheets/fs364/en>
3. Areemit R, Thinkhamrop J, Kosuwon P, Kiatchoosakun P, Sutra S, Thepsuthammarat K. Adolescent pregnancy: Thailand's national agenda. *J Med Assoc Thai* 2012; 95(suppl7):S134-42.
4. Thaitate S, Thato R. Obstetric and perinatal outcomes of teenage pregnancies in Thailand. *Adolesc Pediatr Gynecol* 2011;24:342-6.
5. Thato S, Rachukul S, Sopajaree C. Obstetrics and perinatal outcome of Thai pregnant adolescents: a retrospective study. *Int J Nurs Stud* 2007;44:1158-64.
6. Chen XK, Wen SW, Fleming N, Demissie K, Rhoads GG, Walker M. Teenage pregnancy and adverse birth outcomes: a large population based retrospective cohort study. *Int J Epidemiol* 2007;36:368-73.
7. Stevens-Simon C, Barret J, McGregor JA, French J, Persutte W. Short cervix: a cause of preterm delivery in young adolescents?. *J Matern Fetal Med* 2000;9:342-7.
8. D'Agostini C, de Oliveira M, D'Souza-Li L. Comparison of cervical length in adult and adolescent nulliparae at mid-gestation. *J Pediatr Adolesc Gynecol* 2013;26:209-11.
9. Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Gilstrap LC, Wenstrom KD. Preterm birth. In: Cunningham FG, editor. *Williams Obstetrics*. 23rd ed. New York: McGraw-Hill; 2010:804-31.
10. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin. Assessment of risk factors for preterm birth. Clinical management guidelines for obstetrician-gynecologists. *Obstet Gynecol* 2001;98: 709-16.
11. Society for Maternal-Fetal Medicine Publications Committee. Progesterone and preterm birth prevention: translating clinical trials data into clinical practice. *Am J Obstet Gynecol* 2012;206:376-86.
12. Ressel GW. ACOG releases bulletin on managing cervical insufficiency. *Am Fam Physician* 2004;69:436-9.
13. Lim K, Butt K, Crane JM. SOGC Clinical Practice Guideline. Ultrasonographic cervical length assessment in predicting preterm birth in singleton pregnancies. *J Obstet Gynaecol* 2011;33:486-99.
14. Tongsong T, Kamprapanth P, Pitaksakorn J. Cervical length in normal pregnancy as measured by transvaginal sonography. *Int J Gynaecol Obstet* 1997;58:313-5.

ความแตกต่างของปากมดลูกในช่วงไตรมาสที่สองของการตั้งครรภ์ในสตรีวัยรุ่นและวัยรุ่นผู้ใหญ่ที่ ตั้งครรภ์แรก

นุชนารถ พัฒนาปัญญาสัตย์, สมณมิตร เหลืองรัศมีรุ่ง, ไพบุลย์ เจริญชัยนนท์

วัตถุประสงค์: เพื่อศึกษาหาความแตกต่างของค่าความยาวปากมดลูกระหว่างสตรีวัยรุ่นและสตรีวัยรุ่นผู้ใหญ่ที่ตั้งครรภ์แรก

วัสดุและวิธีการ: การศึกษานี้เป็นการศึกษาไปข้างหน้า โดยทำการศึกษาที่ภาควิชาสูติศาสตร์-นรีเวชวิทยา คณะแพทยศาสตร์วชิรพยาบาล มหาวิทยาลัยนวมินทราธิราช ตั้งแต่วันที่ 1 มิถุนายน 2557 จนถึง 28 กุมภาพันธ์ 2558 โดยทำการตรวจคลื่นเสียงความถี่สูงทางช่องคลอดให้กับสตรีตั้งครรภ์แรกที่มาฝากครรภ์ในช่วงไตรมาสที่สองของการตั้งครรภ์ (อายุครรภ์ระหว่าง 18-23⁺6 สัปดาห์) และนำข้อมูลที่ได้ไปวิเคราะห์

ผลการวิจัย: จากการศึกษาได้ทำการวัดความยาวปากมดลูกให้กับสตรีตั้งครรภ์ทั้งหมด 90 ราย โดยค่าความยาวปากมดลูกเฉลี่ยเท่ากับ 35.68 ± 7.37 มิลลิเมตร โดยค่าเฉลี่ยของความยาวปากมดลูกในสตรีตั้งครรภ์กลุ่มวัยรุ่นและวัยรุ่นผู้ใหญ่มีค่าเท่ากับ 34.42 ± 6.71 มิลลิเมตร และ 36.89 ± 7.83 มิลลิเมตร (ระดับความเชื่อมั่นร้อยละ 95 เท่ากับ 0.112) และพบภาวะปากมดลูกสั้นในสตรีวัยรุ่นและวัยรุ่นผู้ใหญ่คิดเป็นร้อยละ 6.8 และ 6.5 ตามลำดับ (ระดับความเชื่อมั่นร้อยละ 95 เท่ากับ 0.995) ทั้งนี้ยังพบว่าสตรีที่มีภาวะปากมดลูกสั้นมีความสัมพันธ์กับการเกิดการเจ็บครรภ์และการคลอดกำหนดอย่างมีนัยสำคัญทางสถิติเมื่อเทียบกับสตรีที่มีความยาวปากมดลูกปกติ โดยคิดเป็นร้อยละ 83.3% และ 13.1 (ระดับความเชื่อมั่นร้อยละ 95 เท่ากับ 0.001)

สรุป: ในกลุ่มประชากรไทย โดยเฉพาะในการศึกษานี้ยังไม่พบค่าความแตกต่างของความยาวปากมดลูกและภาวะปากมดลูกสั้นในประชากรทั้ง 2 กลุ่ม แต่พบว่าการพบภาวะปากมดลูกสั้นนั้นมีความสัมพันธ์กับการเกิดการเจ็บครรภ์และการคลอดกำหนด ซึ่งข้อมูลดังกล่าวสามารถนำไปใช้วางแผนในการรักษาสตรีตั้งครรภ์ในอนาคตต่อไป