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ความสัมพันธ์ระหว่างภาวะปากมดลูกสั้นกับผลลัพธ์ของการตั้งครรภ์ในมารดาครรภ์แรกและครรภ์หลังความเสี่ยงต่ำในโรงพยาบาลชัยภูมิ

The Relationship between Short Cervix and Pregnancy Outcome on Nulliparous and Low Risk Multiparous Pregnancy in Chaiyaphum Hospital

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บทคัดย่อ

หลักการและเหตุผล : ศึกษาความสัมพันธ์ของภาวะปากมดลูกสั้นในหญิงตั้งครรภ์แรกหรือครรภ์หลังความเสี่ยงต่ำ กับการคลอดก่อนกำหนดและผลลัพธ์ของการตั้งครรภ์

วิธีการศึกษา : การศึกษาติดตามไปข้างหน้า เก็บข้อมูลในหญิงตั้งครรภ์ที่มาฝากครรภ์และคลอดในโรงพยาบาลชัยภูมิ ตั้งแต่วันที่ 1 เมษายน พ.ศ. 2566 ถึง วันที่ 29 กุมภาพันธ์ พ.ศ. 2567 จำนวน 144 คน เก็บข้อมูลโดยการวัดความยาวปากมดลูกในช่วงอายุครรภ์ 16 ถึง 24 สัปดาห์และติดตามไปจนคลอด ทดสอบความสัมพันธ์ของข้อมูลโดยใช้สถิติ Chi-squared test หรือ Fisher's exact test

ผลการศึกษา : พบว่า ค่าเฉลี่ยของความยาวปากมดลูกในกลุ่มครรภ์แรกมีค่าเท่ากับ 34.0 ± 0.7 มิลลิเมตร ในกลุ่มครรภ์หลังความเสี่ยงต่ำมีค่าเท่ากับ 38.0 ± 0.9 มิลลิเมตร กลุ่มครรภ์แรกตรวจพบภาวะปากมดลูกสั้น 12 คน คิดเป็นร้อยละ 16.7 กลุ่มครรภ์หลังความเสี่ยงต่ำตรวจพบภาวะปากมดลูกสั้น 6 คน คิดเป็นร้อยละ 8.3 พบว่าภาวะปากมดลูกสั้นมีความสัมพันธ์กับการคลอดก่อนกำหนดในประชากรกลุ่มที่ตั้งครรภ์แรกและมีความสัมพันธ์กับภาวะแทรกซ้อนของมารดาขณะคลอด เช่น ภาวะทารกน้ำหนักต่ำกว่าเกณฑ์และภาวะขาดออกซิเจนในทารกแรกเกิด

สรุปผล : ค่าเฉลี่ยความยาวปากมดลูกของประชากรทั้ง 2 กลุ่ม มีค่าไม่แตกต่างกันทางสถิติ แต่การตรวจพบภาวะปากมดลูกสั้นในไตรมาสที่สองของการตั้งครรภ์ถือว่ามีประโยชน์ต่อสตรีตั้งครรภ์ โดยเฉพาะในกลุ่มตั้งครรภ์ครั้งแรก ทั้งนี้เพื่อช่วยให้แพทย์มีความตระหนักในเรื่องความเสี่ยงต่อการคลอดก่อนกำหนด นำไปสู่การรักษาด้วยยากลุ่มโปรเจสเตอโรนในครรภ์นี้และป้องกันการเกิดการคลอดก่อนกำหนดในครรภ์ต่อไป

คำสำคัญ : ปากมดลูกสั้น

ABSTRACT

Background : To investigate the relationship between short cervixes in women with low-risk first or subsequent pregnancies with preterm birth and pregnancy outcomes.

Methods : The research employs a prospective cohort study. Data were collected on pregnant women who received prenatal care and gave birth at Chaiyaphum Hospital between April 1st., 2023, and February 29th., 2024, a total of 144 women were recruited. Data were collected by measuring cervical length between 16 and 24 weeks of gestation and tracking until delivery. The researcher used the Chi-squared test or Fisher's exact test to determine the relationship between data points.

Results : The results demonstrate that the average cervical length in the first pregnancy group was 34.0 ± 0.7 mm. In the low-risk pregnancy group, it was 38.0 ± 0.9 mm. In the first pregnancy group, a short cervix was observed in 12 people, accounting for 16.7 percent. In the low-risk pregnancy group, 6 people were diagnosed with a short cervix, accounting for 8.3 percent. In addition, it was found that a short cervix was associated with premature birth in the group with first pregnancy, and there were relationship with maternal complications during delivery such as underweight infants and hypoxia in newborns.

Conclusion : The mean cervical lengths of the two populations were found to be statistically comparable. However, finding a short cervix in the second trimester of pregnancy is thought to be favorable to pregnant women, particularly those in their first pregnancy. This can assist doctors and patients in becoming aware of the danger of premature birth, which can lead to progesterone medication in this pregnancy and avoid the incidence of premature birth in future pregnancies. Healthy pregnancy results can minimize infant mortality and disability rates.

Keywords : Short cervix.

Introduction

Preterm birth is a major cause of neonatal mortality, morbidity, and prenatal hospitalization in pregnant women.[1] The condition results in numerous short and long-term complications for preterm infants, which are more common than in full-term infants, such as abnormal nervous system (cerebral palsy, sensory deficit), delayed development, abnormal breathing (respiratory illness), infection (bacterial sepsis in the newborn), congenital heart disease (congenital malformation of the heart, congenital malformation of the musculoskeletal system, etc.).[2] Furthermore, preterm birth has a physical and mental impact

on pregnant women, as well as on the economic status of their families and the country's public health system. This is because it takes a long time to maintain and treat preterm infants and is highly costly.

According to World Health Organization data, the rate of preterm birth, defined as birth under 37 weeks of gestation, ranges between 5 and 18 percent worldwide, with an average of 13 percent in Southeast Asian and Oceania countries.[3] Furthermore, the number of premature births is on the rise, with an average of 12 million cases every year. In Thailand, the number of preterm births has been estimated to be 8 - 12 percent, or around 80,000 cases per year.[4] Specifically in Chaiyaphum Province, a northeastern province of Thailand, it was discovered that the rate of preterm births causes adverse pregnancy outcomes in 10.7 percent of all live births (as of September 30th., 2021).

Premature infants are more likely to experience a variety of issues. It has found that approximately 75 percent of these infants become disabled or death. In addition, two out of three newborns weighing less than normal are preterm infants.[5] As a result, this group of infants must be cared for in the pediatric critical care unit when they are delivered, with the estimated cost for 170,000 baht per case. In terms of the cost of caring for premature children at the national level, it has been estimated that Thailand is spending no less than 2,300,000,000 baht per year to care for around 15,000 premature babies. This number does not yet cover the cost of continuous care for babies with impairments or developmental delays.

To solve the issue, the American College of Obstetrics and Gynecologists (ACOG) recommendation for screening pregnant women at risk of labor and premature birth recommends that all asymptomatic pregnant women be screened. However, there are risk factors such as pregnant women who have previously given birth prematurely, women with uterine structural abnormalities, or women who had their cervix removed. These factors need to be considered for the aforementioned groups of women, but for women at minimal risk, the approach of the ACOG may be appropriate.[6] A meta-analysis reveals that screening for cervix length and treating women in the low-risk group can lower the rate of premature birth by up to 40%, which is worth further investigating.[7]

As a result, the researcher acknowledged the importance of this issue. I conducted an experiment using existing equipment. This study is based on the American College of Obstetrics and Gynecologists' (ACOG) recommendation to measure cervical length in pregnant women between 16 and 24 weeks to determine if it can reduce premature birth. This study utilizes this information to create a guideline for preventing premature delivery and caregiving for patients with a short cervix. In Chaiyaphum Hospital has not yet had a clear policy for cervical examination among pregnant women. Therefore, the researcher saw the importance of this. Therefore, research on this matter was made. To be used as a guideline for providing quality care for pregnant women in hospitals. Finally, the goal of this study is to help mothers with short cervixes while also reducing infant mortality and disability rates. This finding has the potential to improve the lives of pregnant women.

Materials and Methods

The study was approved by the institution's Ethics Committee for Research with Human Subjects. The pregnancy patients who had antenatal care (ANC) and delivery at Chaiyaphum Hospital between April 1st., 2023 and February 29th., 2024 were identified. Exclusion criteria were they have a history of cervical incompetence, a history of childbirth or premature rupture of membrane in a previous pregnancy, a history of cervical surgery by Loop Electrosurgical Excision (LEEP) or Conization, including an abnormal fetus or chromosomal abnormalities in the current pregnancy, abnormal vaginal discharge, or being diagnosed with an infection of the genital tract within 3 weeks and not treated before the vaginal ultrasound exam.

Data obtained were age, body weight, pre-pregnancy Body Mass Index (BMI), height, weight, menarche, education, occupation, income, gestational age (GA), parity, hemoglobin (Hb), hematocrit (HCT), serology, cervical length (CL), funneling characteristic, the first GA for ANC, primary complaint, GA at the time of delivery, route of delivery, birth weight (BW), APGAR score at 1.5 and 10 minutes, and obstetric complication.

The primary data used in this article is cervical length obtained by transvaginal ultrasonography at GA 16 to 24 weeks and assessed in the lithotomy position with the bladder empty. The researcher put the probe at the anterior fornix without applying pressure to the cervix and rotated it to produce an image along the sagittal plane of the cervix, which showed the whole cervical canal from the inner to outer openings. The researcher next implanted a marker to measure the distance between the two holes, avoiding measuring while the uterus was contracting. This can cause the length of the cervix to vary. Measurements were taken three times in total, and the smallest measured value was chosen.[3,9]

This study is prospective cohort study. How to estimate sample size from the formula for estimating sample size for a prospective cohort analysis study. The sample size was calculated from the previous studies. The study that shows the power of education up to 90 percent. From the formula for calculating the population above. The population per group can be calculated at 43 people per group, adding 10 percent to the calculation in the case of missing follow up. The population will be 48 people per group, but the creator has collected population data for a total of 72 people per group to make the statistics more likely and accurate. Finally, There were 167 participants in the project and 23 people were excluded. They agreed to participate in this study divided into two groups. The first group consisted of 72 women with their first pregnancy and the second group consisted of 72 women who became low risk multiparous pregnancy.

The data were analyzed with SPSS statistical software version 22.0 (SPSS, Chicago, IL). Descriptive statistics were employed to analyze demographic data, and the results were summarized as numbers with percentages or medians with ranges. The association between short cervix, preterm birth, and obstetric complications was examined using the Chi-square test and the Fisher exact test.

Results

Table 1. Demographic Data.

Factors	Nulliparous pregnant (n=72)	Low Risk Multiparous pregnant (n=72)	p-value <0.001
Age (year)	24.6 ± 6.1	29.2 ± 6.3	0.236
Pre-pregnancy BMI (Kg/cm^2)	25.8 ± 5.1	24.4 ± 4.6	0.704
Education			
Primary level	6 (8.3%)	8 (11.1%)	
Secondary level	45 (62.5%)	46 (63.9%)	0.145
University	19 (26.4%)	18 (25%)	
Others	2 (2.8%)	0 (0%)	
Occupations			
Educationist	13 (18.1%)	4 (5.6%)	
Employee	29 (40.3%)	21 (43.1%)	0.905
Housewife	15 (20.8%)	23 (31.9%)	
Others	15 (20.8%)	14 (19.4%)	
Income			
Non	14 (19.4%)	7 (9.7%)	
Less than 5,000 baht/ month	35 (48.6%)	38 (52.8%)	0.896
5,000-20,000 baht/month	21 (29.2%)	15 (20.8%)	
More than 20,000 baht/month	2 (2.8%)	12 (16.7%)	
Menarche (Year)	11.2 ± 1.0	12.1 ± 1.4	0.638
Gestation at the first ANC	12.3 ± 6.1	13.3 ± 5.3	0.325
Hemoglobin (Hb) at the first ANC (mg/dl)	11.3 ± 1.4	11.2 ± 1.1	0.979
Weight at the first ANC (Kg.)	61.3 ± 14.0	66.4 ± 12.3	0.885
Serology			
Negative	67 (93.0%)	62 (86.1%)	
HBV infection	3 (4.2%)	4 (5.6%)	<0.001
Syphilis	2 (2.8%)	4 (5.6%)	
HIV infection	0 (0%)	2 (2.8%)	
Presented of funneling cervix	9 (12.5%)	5 (6.9%)	0.388
Short cervix	12 (16.7%)	6 (8.3%)	0.259
GA at delivery (week)			
Less than 34 weeks	4 (5.6%)	4 (5.6%)	
GA 34^{+1} to GA 36^{+6} weeks	16 (22.2%)	15 (20.8%)	0.349
More than 37 weeks	52 (72.2%)	53 (73.6%)	
Chief complaint			
Labor pain	37 (51.4%)	37 (51.4%)	
Mucous bloody show	11 (15.3%)	14 (19.4%)	0.635
PROM	5 (6.9%)	7 (9.6%)	
Other	19 (26.4%)	14 (19.4%)	

Table 1. Demographic Data. (continuos)

Factors	Nulliparous pregnant (n=72)	Low Risk Multiparous pregnant (n=72)	p-value <0.001
Duration of Delivery (hour.)	8.2 (±8.4)	8.2 (±6.3)	0.159
Birth weight (gram)	2,837.3 (±484.7)	2,865.3 (±394.7)	0.574
Low Birth Weight (LBW)			
Non	13 (18.1%)	10 (13.9%)	0.113
Yes	59 (81.9%)	62 (86.1%)	
Route of delivery			
Normal Delivery (ND)	39 (54.2%)	45 (62.5%)	0.116
Cesarean Section (C/S)	30 (41.7%)	26 (36.1%)	
Vacuum Extraction (V/E)	3 (4.2%)	1 (1.4%)	
Maternal complication			
Non	65 (90.3%)	67 (93.1%)	0.454
Yes	7 (9.7%)	5 (6.9%)	
Birth asphyxia			
Non	68 (94.4%)	66 (91.7%)	0.542
Yes	4 (5.6%)	6 (8.3%)	

Table 2. Pregnancy Outcomes of Short Cervix*

Pregnancy outcomes	Nulliparous pregnant (n=72)	p-value <0.001	Low risk multiparous pregnant (n=72)	p-value <0.001
Preterm labor†	20 (27.8%)	<0.001	19 (26.4%)	0.002
Maternal complication	7 (9.7%)	0.330	5 (6.9%)	0.361
Low birth weight‡	13 (18.1%)	<0.001	10 (13.9%)	0.192
Birth asphyxia§	4 (5.6%)	<0.001	6 (8.3%)	0.075

*Short cervix : cervical length less than 25 mm.
†Preterm labor : Preterm labor is labor occurring between after 20 and before 37 weeks gestation.[5]
‡Low birth weight : It is a condition in which the birth weight of the newborn is less than 2,500 grams.
§Birth asphyxia : It is a condition in which a baby does not receive enough oxygen before, during, or directly after birth. This condition is expressed by the low APGAR at one minute which will have less than seven score.

Between April 1st., 2023 and February 29th., 2024, 144 pregnant patients received antenatal care (ANC) (72 nulliparous pregnant and 72 low-risk multiparous). The mean ages of nulliparous and multiparous pregnant women were 24.6 years (range 13 to 37 years, SD 6.1) and 29.2 years (range 16 to 42 years, SD 6.3), respectively. The mean cervical length (CL) was 34.0 ± 0.7 and 38.0 ± 0.9 mm. The incidence of short cervix was 16.7 and 8.3 percent, respectively. Most factors were not substantially different, with the exception of serology factors, as indicated in Table 1.

The pregnancy outcome is connected to a short cervix. It was discovered that a short cervix was solely connected with premature delivery low birth weight and birth asphyxia in the first pregnancy group. As shown in Table 2,

there was no link with preterm birth in low-risk multiparous pregnancy, nor was it associated with maternal problems such as postpartum hemorrhage (PPH) during delivery, from either group.

Tables 1 and Table 2 show that women with later pregnancies had fewer short cervixes than women with first pregnancies (8.3 per cent and 16.7 per cent, respectively), but had a greater rate of premature delivery up to 26.4 percent, indicating the reason for premature birth. Other causes include pre-eclampsia, urinary tract infection, or a disease known as premature rupture of membrane (PROM).

Discussion

A study on the length of the cervix during 16-24 weeks of gestation discovered that the length values at the 5th, 10th, and 90th percentiles were 27, 30, and 45 millimeters, respectively[8] and the cutoff value was used to determine the cervix. The length will depend on the gestational age.[10] The cervical length value found to be associated with an increased rate of labor pain and premature birth was less than 25 mm.[8] but it was decided to begin progesterone therapy to prevent premature birth pain in women less than 24 weeks pregnant with a singleton pregnancy and no history of premature labor. The Society for Maternal-Fetal Medicine (SMFM) recommends a cutoff value of less than or equal to 20 mm.[11]

The findings of a study on pregnant women who received prenatal care and gave birth at Chaiyaphum Hospital revealed that the average cervix in women in their first and subsequent pregnancies was low risk. The average measurements were 34.0 and 40.0 mm., respectively. In the first pregnancy group, only 12 peoples had short cervixes, accounting for 27.8 percent of the cases of premature delivery. Statistically significant ($P<0.001$) with link to other pregnancy outcomes such as low birth weight and birth asphyxia. The condition that occurred probably has a cause related to premature birth from short cervix. Other factors that may come into play include having a threatening miscarriage while pregnant, beliefs, religion, status, the mother's daily life, food, exercise, sleep, and genetics. Other infections during pregnancy such as TORCH infection or congenital illnesses, as well as medical problems like SLE and Thyrotoxicosis.

This is caused by the length of the cervix. It is crucial in predicting preterm delivery and is used in planning and treating to avoid premature birth, including minimizing pregnancy problems. Reduce newborn disabilities and deaths. All asymptomatic pregnant women should be screened for labor and premature birth, according to the guidelines of the American College of Obstetrics and Gynecologist (ACOG). However, risk factors exist, such as pregnant women with a history of premature birth and uterine structural abnormalities. Another factor is having the cervix removed. However, for women at low risk, this approach may be appropriate. A meta-analysis of studies indicated that screening for cervix length and treating women in the low-risk group reduced the rate of premature birth by up to 40% while being more cost-effective.[12]

Conclusion

Detecting a short cervix in the second trimester of pregnancy is thought to benefit both categories of pregnant women, particularly those in their first pregnancy. This is to make clinicians and patients more aware of the dangers of premature birth. It can lead to proper treatment and prevention in the future for successful pregnancy outcomes, as well as a reduction in infant mortality and disability rates.

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