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## GYNAECOLOGY

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# The Appropriate Time for Cytology Examination to Screen for Cervical Cancer after Childbirth

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### ABSTRACT

**Objectives:** To compare the rate of satisfactory Pap smear for postpartum checkup between at 6<sup>th</sup> and 8<sup>th</sup> week.

**Materials and Methods:** This was a randomized controlled trial study. The data were collected from the participants who came to postpartum clinic at the 6 and 8 weeks after childbirth in Phrapokklao hospital from February to May 2020. Satisfactory specimen was evaluated as defined by Bethesda reporting system (2014).

**Results:** The participants (144) who came for examination at 6 and 8 weeks after childbirth were divided into two groups. First group of 72 participants was at 6 weeks postpartum and the second group of 72 participants was at 8 weeks postpartum. From the results, 17 participants (23.6%) with vaginal bleeding were found in the first group, while only 2 (2.7%) in the second group. For the satisfactory of the specimen, the second group had no vaginal bleeding and showed more satisfactory specimen for cytologic screening of cervical cancer result than the participants in the first group (70 (97.3%) vs 55 (76.4%)). The difference between the two groups were statistical significance ( $p < 0.001$ ).

**Conclusion:** Timing of postpartum checkup at 8<sup>th</sup> week was appropriate than at 6<sup>th</sup> week because of less vaginal bleeding and showed more satisfactory of cytologic screening for cervical cancer. Changing the period of appointment to the same as her neonatal vaccine program schedule also might get benefit from decreasing expense and number of hospital visit.

**Keywords:** postpartum pap smear, time for postpartum care.

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## ระยะเวลาเหมาะสมต่อการตรวจเซลล์วิทยาเพื่อคัดกรองมะเร็งปากมดลูกหลังคลอด

ณัฐวดี ศรีแสนยงค์, ชุติกร ศรีตนไชย

### บทคัดย่อ

**วัตถุประสงค์:** เพื่อเปรียบเทียบสเมียร์ที่สามารถให้การแปลผลทางเซลล์วิทยาของการตรวจคัดกรองมะเร็งปากมดลูก ในช่วงสัปดาห์ที่ 6 และ 8 หลังคลอด

**วัสดุและวิธีการ:** เป็นการศึกษาแบบสุ่มที่มีกลุ่มควบคุม เก็บรวบรวมข้อมูลของหญิงหลังคลอดที่มาตรวจที่คลินิกหลังคลอดที่ระยะเวลา 6 และ 8 สัปดาห์ภายหลังคลอด ระหว่างเดือนกุมภาพันธ์ถึงพฤษภาคม พ.ศ.2563 โดยที่ความสามารถในการให้การแปลผลทางเซลล์วิทยาของการตรวจคัดกรองมะเร็งปากมดลูกพิจารณาตามกำหนดของ Bethesda System 2004

**ผลการศึกษา:** มีหญิงหลังคลอดจำนวน 144 คน ที่เข้าร่วมในงานวิจัย โดยแบ่งออกเป็นสองกลุ่ม คือกลุ่มแรกถูกนัดมาตรวจใน 6 สัปดาห์ และ กลุ่มที่ 2 ถูกนัดมาตรวจที่ 8 สัปดาห์หลังคลอด มีผู้เข้าร่วมงานวิจัยในกลุ่มแรกจำนวน 72 คน เช่นเดียวกับในกลุ่มที่สอง จากผลการวิจัยพบผู้เข้าร่วมวิจัย 17 คน (ร้อยละ 23.6) ในกลุ่มที่นัดมาตรวจที่ 6 สัปดาห์หลังคลอด มีเลือดออกทางช่องคลอดในขณะที่พบเพียง 2 คน (ร้อยละ 2.7) ในกลุ่มที่สอง เมื่อพิจารณาในเรื่องความเหมาะสมของสิ่งส่งตรวจเพื่อคัดกรองมะเร็งปากมดลูกพบว่า กลุ่มที่สองที่ไม่มีเลือดออกทางช่องคลอดมีคุณภาพของสิ่งส่งตรวจที่น่าพอใจมากกว่ากลุ่มแรก (70 (ร้อยละ 97.3) vs 55 (ร้อยละ 4)) ความแตกต่างระหว่างทั้งสองกลุ่มมีนัยสำคัญทางสถิติ ( $p < 0.001$ )

**สรุป:** การนัดตรวจหลังคลอดในสัปดาห์ที่ 8 มีความเหมาะสมกว่าที่ 6 สัปดาห์หลังคลอด เนื่องจากพบมีเลือดออกทางช่องคลอดน้อยกว่า และพบว่ามีคุณภาพที่ดีกว่าของสิ่งส่งตรวจเพื่อคัดกรองทางเซลล์วิทยาสำหรับมะเร็งปากมดลูก การเปลี่ยนระยะเวลาการนัดหมายให้เหมือนกับตารางโปรแกรมวัคซีนทารกแรกเกิดอาจได้รับประโยชน์จากค่าใช้จ่ายที่ลดลงและลดจำนวนครั้งของการมาโรงพยาบาล

**คำสำคัญ:** การคัดกรองมะเร็งปากมดลูกหลังคลอด, ระยะเวลาของการตรวจหลังคลอด

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## Introduction

The American Academy of Pediatrics and the American College of Obstetricians and Gynecologists (ACOG) (2017) recommended that the examination should be operated within 4 to 6 weeks after giving birth in order to monitor postpartum symptoms, plan for contraception, monitor and prevent mothers' complications after delivery<sup>(1)</sup>. There were many postpartum complications reported within 8 weeks after delivery such as fatigue (59%), breast problem (36%), anemia (25%), backache (24%), hemorrhoids (23%), headache (22%), postpartum blue (21%), constipation (20%), suture breakdown (20%) and abnormal vaginal discharge (15%)<sup>(1, 2)</sup>. The rate of complication was remained the same and acceptable for examination within 8 weeks period but there was no data about the complication beyond 8 weeks postpartum. Furthermore, the standard Thai vaccination for the babies were 2 months after birth that it can make the appointment for mother together with her child<sup>(3)</sup>.

According to the optimizing postpartum care, ACOG (2018) recommends the appointment for the examination of postpartum mothers could be scheduled from 3 to 12 weeks after childbirth delivery in order to evaluate psychological well-being<sup>(1, 2)</sup>. The evaluation included: mood and emotional well-being; infant care and feeding; sexuality, contraception and birth spacing; sleep and fatigue; physical recovery from birth; chronic disease management; and health maintenance<sup>(1)</sup>. The examination for cervical cancer screening after giving birth is one of the health maintenance domains. Previous studies were found that the incidence of abnormal cervical cells detection in pregnant and postpartum mothers was 5-8%<sup>(4, 5)</sup>, and the incidence of cancer among pregnant women in the period of 12 months after delivery was 13.5%<sup>(6, 7)</sup>. In addition, one study has shown that abnormal pap smear occurred in the postpartum women who previously showed normal result before pregnancy was 4.9%<sup>(8, 9)</sup>. Therefore, cervical cancer screening after giving birth is essential and should encourage in every postpartum woman.

At the postpartum clinic of Phrapokklao Hospital,

we assigned the appointment to every postpartum mother for examining and monitoring abnormal symptoms after delivery. Moreover, plan for contraception and cytologic screen for cervical cancer were performed at the same time. In general, the appointment would be scheduled at the 6 weeks after childbirth. However, the problem was the postpartum womens who scheduled to attend at the 6th week had vaginal bleeding (without any infections or complications). As we knew that blood could obscure the cytology result. So, the 6-week postpartum might not be suitable time for examination<sup>(10)</sup>. From the scope of view, this study aimed to postpone the postpartum appointment to another next two weeks to perform the checkup program. Rate of vaginal bleeding and satisfactory of cytologic specimen for cervical cancer were evaluated compare between conventional standard appointment and the extended period.

## Materials and Methods

The research was randomized controlled trial. The population were women who came for postpartum examination at 6 and 8 weeks after delivery between February and May 2020. The inclusion criteria were Thai, age > 18 years old, completed informed consent, childbirth at Phrapokklao hospital. Foreigner, lack of understanding in Thai language, and who planned to follow-up at other hospital were excluded. Primary outcome was rate of satisfactory Pap smear specimen between 6 and 8 weeks postpartum. The sample size was calculated from clinical observation at 6 weeks after delivery (standard appointment). In the clinical observation of 13 people, 5 participants were unable to screen for cervical cancer due to vaginal bleeding. Therefore, the proportion was 0.62 that Pap smear can be done. In conjunction with the reference study, it was 100% proportion of biopsies, that were appropriate for examination at 8 weeks after delivery<sup>(11)</sup>. The power of a test was set at 0.9. Then, calculation from the formular was used.

$$n \text{ per group} = \frac{2(z_{\alpha} + z_{\beta})^2 p(1-p)}{(pT - pC)^2}$$

The research was approved by human research ethics considerations, Chanthaburi Province / Health Zone 6, Project No. CTIREC 001/63. The sample size was 144 participants and additional with 10% loss follow up. Thus, the final number of sample size was 159 participants that divided into 2 groups (Fig. 1). The appointment was scheduled at 6 weeks and 8 weeks period. The standard checkup program was consisted of taking personal history, physical examination and pelvic examination to rule out abnormal uterine bleeding. Screening for cervical cancer with conventional Pap smear method were done by obstetrician on duty. The Pap smear specimens were sent for interpretation by one pathologist. Satisfactory for evaluation was depend on the presence or absence of endocervical/transformation zone component and any other quality indicators, e.g., partially obscuring blood, inflammation as defined by Bethesda reporting system (2014)<sup>(10)</sup>.

The standard examination composed of 5 steps as follows: 1) Setting the patient on lithotomy position

for pelvic examination, 2) Preparing equipment such as set flush for cleaning, speculum, Ayre spatula, etc., 3) After cleaning, applying the speculum passing through vaginal canal and identifying the cervix, 4) Using both sides of Ayre spatula by inserting into the cervix then rotating 360° for two complete rounds, 5) Smearing the collected specimen on slide then fix cell in 95% ethanol before sending to the pathologist.

The data were collected from medical history recording including age, weight and height calculated for body mass index (BMI), mode of delivery, infant weight after birth, term, breastfeeding after childbirth, birth complications, history of cervical surgery, cervical infection, and postpartum bleeding on the follow-up date.

Statistical Analysis

The data were analyzed by chi square statistics using SPSS Version 26 to compare between groups. The statistically significant difference of p value was less than 0.05.

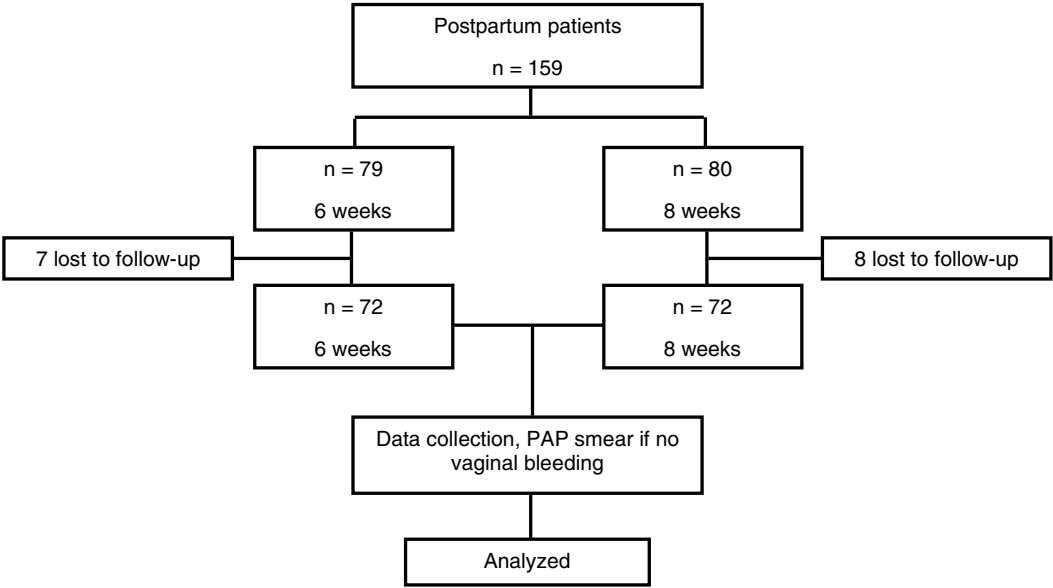


Fig. 1. The chart of population groups collection.

Results

The 159 participants were selected at the

postpartum ward and randomly divided in 2 groups of appointment, at 6 and 8 weeks postpartum. At

time of the appointment, the participants who lost to follow-up were 7 and 8 in first and the second group, respectively. So, there were 72 participants in each group. The study was implemented by comparing the difference in proportions of characteristics between the two groups (Table 1).

Although the 6-week group showed more case of term pregnancy, younger age and more case of successful breast feeding, it was not showed any statistical difference. Also, there were no statistical differences between BMI, neonatal birth weight and mode of delivery.

**Table 1.** Demographic and characteristic of the participants studied.

Characteristic	Schedule of appointment		p value
	6 <sup>th</sup> week (n = 72)	8 <sup>th</sup> week (n = 72)	
Age (years)	27.3 ± 6.3	28.2 ± 5.7	0.379
BMI (kg/m <sup>2</sup> )	24.3 ± 4.4	24.1 ± 4.1	0.731
Birth weight (grams)	2,926.4 ± 424.1	2,920.6 ± 278.5	0.923
Mode of delivery, n (%)			0.632
Normal delivery	41 (56.9)	46 (63.8)	
Cesarean section	29 (40.2)	25 (34.7)	
Vacuum extraction	2 (2.9)	1 (1.5)	
Term, n (%)	69 (95.8)	65 (90.2)	0.189
Preterm, n (%)	3 (4.2)	7 (9.8)	
Parity, n (%)			0.667
1	35 (48.6)	28 (38.8)	
2	29 (40.2)	33 (45.8)	
3	7 (9.7)	10 (13.8)	
4	1 (1.5)	1 (1.6)	
Breast feeding, n (%)			0.085
Yes	70 (97.2)	65 (90.2)	
No	2 (2.8)	7 (9.8)	
Complications, n (%)			0.460
Yes	11 (15.2)	8 (11.1)	
PPH (%)	0	12.5	
GDM (%)	72.7	75	
GHT (%)	18.1	12.5	
CHT (%)	0	0	
PROM (%)	9.2	0	
No	61 (84.8)	64 (88.9)	
Cervical infection, n (%)			0.559
Yes	1 (1.4)	2 (2.7)	
No	71 (98.6)	70 (97.3)	
Prior cervical surgery n (%)			0.559
Yes (MVA)	1 (1.4)	2 (2.7)	
No	71 (98.6)	70 (97.3)	

PPH: postpartum hemorrhage, GDM: gestational diabetes mellitus, GHT: gestational hypertension, CHT: chronic hypertension, PROM: premature rupture of membranes, MVA: manual vacuum aspiration.

Other risk factors and intrapartum complications such as postpartum hemorrhage, gestational diabetes mellitus, gestational hypertension, chronic hypertension, and premature rupture of membranes, cervical infection, prior cervical surgery showed no difference in statistical significance level ( $p > 0.05$ ).

Participants whose showed vaginal bleeding was found 17 (23.6%) in the 6 weeks postpartum group

compared to 2 (2.7%) in the 8 weeks postpartum group (Table 2).

The participants who had no vaginal bleeding and showed satisfactory Pap smear specimen were 55 (76.4%) in the 6 weeks postpartum group and 70 (97.3%) in the 8 weeks postpartum group. The difference in proportion between the two groups were significantly difference ( $p < 0.001$ ) (Table 2).

**Table 2.** Analysis of proportional differences of satisfied Pap smear specimen between 6<sup>th</sup> and 8<sup>th</sup> week postpartum period.

Outcomes	Schedule of appointment		p value
	6 <sup>th</sup> week (n = 72)	8 <sup>th</sup> week (n = 72)	
Bleeding per vagina, n (%)	17 (23.6)	2 (2.7)	< 0.001
Satisfactory Pap smear specimen, n (%)	55 (76.4)	70 (97.3)	

\* p value  $\leq 0.05$

## Discussion

Postpartum checkup is a medical schedule program that women get after childbirth to make sure they recovered well from labor and birth. Postpartum care is important because new mothers were at risk of serious and sometimes life-threatening health complications as mentioned previously<sup>(1, 2)</sup>. The time for postpartum is varied from 4 to eight weeks postnatal. By the time the reproductive organs should return to its pre-pregnancy status. Postpartum checkup is practiced by general assessment to reassure woman that she was well and coping with the early transition to motherhood. The program consisted of many aspects including physical examination, emotional support, contraception and breastfeeding support. Screening for cervical cancer in essential especially in developing country because the incidence of it was still high.

Papanicolaou smear is a conventional screening for cervical cancer. Although it was widely used worldwide especially in developing country. The sensitivity was only 51% and false negative rate was 49%<sup>(12)</sup>. One of the major pitfalls was from the inadequate specimen collection<sup>(13)</sup>.

Postpartum bleeding is divided to three stages<sup>(1)</sup>.

Lochia rubra is at days 2-4. Lochia serosa is at day 4 and lasts about 2 weeks. While lochia alba is from 2 to 6 weeks postpartum. Lochia alba is light yellow or yellowish white in color, with the bleeding virtually gone. It should smell like regular menstrual blood and no blood clots. If at the time of standard appointment for postpartum checkup, bleeding may be from menstruation or some type of infection because the shortest days after delivery to ovulation is 42 days<sup>(14)</sup>.

The result showed that the incidence of vaginal bleeding at 8 weeks postpartum was less than 6 weeks postpartum. Also, in the 8 weeks postpartum, it showed more quality of cytologic specimen collected for cervical cancer. Therefore, the differences in proportions between two groups of vaginal bleeding were analyzed and showed that the different proportions were significantly ( $p < 0.001$ ).

The prior study result: "Postpartum cervical cancer screening adequacy and results: comparison of results 2-3 versus 6-8 weeks postpartum" suggested that the rate of cytologic adequacy in the breastfeeding groups who had 6-8 weeks postpartum follow-up appointments was found more than those of 2-3 weeks postpartum. The finding supports our results, but the



our study was to specifically distinguish timing between 6 and 8 weeks.

The other advantage of this research was in economical aspect. Some participants<sup>(18)</sup> in the 8 weeks postpartum group had appointments with the pediatrician with their children to follow-up after birth and received vaccination at 2-month-old (8 weeks postpartum). Those included diphtheria, tetanus, and pertussis vaccine, oral polio vaccine and other complementary vaccines such as rotavirus vaccine (Rota 1) and pneumococcal vaccine<sup>(15, 16)</sup>. We suggest that mothers should be scheduled for examination and together with their children at 8 weeks postpartum. This may decrease hospital visit rate, expenses, and increase working time of the patients. The strength of this research was randomized controlled trial study with standardized examiners, and technique. The limitation of this research was no calculation about the cost and value of the program. Furthermore, vaginal bleeding may obscure the interpretation from conventional Pap smear but not the liquid-based cytology. Further appropriate research should be planned in the future.

## Conclusion

In conclusion, timing of postpartum checkup at 8<sup>th</sup> week was appropriate than at 6<sup>th</sup> week because of less vaginal bleeding and showed more satisfactory of cytologic screening for cervical cancer. Changing the period of appointment to the same as her neonatal vaccine program schedule also might get benefit from decreasing expense and number of hospital visit

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## Potential conflicts of interest

The authors declare no conflict of interest.

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