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## GYNAECOLOGY

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# Prevalence of Abnormal Papanicolaou Smear in Pregnant Women at Phramongkutklo Hospital

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### ABSTRACT

**Objective** To determine the prevalence of abnormal Papanicolaou smear in pregnant women who attended the antenatal care clinic at Phramongkutklo Hospital, the prevalence of risk factors of cervical cancer in pregnant women and the results of the organism on Papanicolaou smear with pregnancy outcome.

**Material and Method** A prospective analysis was performed on 384 pregnant women who attended the antenatal care clinic at Phramongkutklo hospital between 1 September 2006 and 1 May 2007. Participants were recruited for Papanicolaou smear, and followed until delivery. Data collection included demographic characteristics, risk factors of cervical cancer, results of Papanicolaou smear and outcomes of pregnancy.

**Results** From 384 cases, the prevalence of abnormal Pap smear was 38%; candida spp. 23.4%, bacterial vaginosis 14.0%, trichomonas spp. 0.2%, and low-grade squamous intraepithelial lesion (LSIL) or LSIL with HPV 0.4 %. Risk factors found in pregnant women with preinvasive lesion were husband with multiple partners and smoking. Pregnant women with preterm birth and PROM occurred in women with candida spp 21.9% and 5.9% whereas bacterial vaginosis 9.4 % and 4.4%.

**Conclusion** Prevalence of abnormal Pap smear was 38%.

**Keywords:** abnormal papanicolaou smear, outcomes of pregnancy, LSIL, LSIL with HPV, bacterial vaginosis, candida spp., trichomonas spp.

Cervical cancer is the leading cause of cancer related morbidity and mortality among women in developing countries and also the most common cause of cancer related death among women in Thailand. Incidence of cervical cancer in Thailand is 23.4 per 100,000 populations<sup>(1)</sup> which is higher than

other countries in South East Asia and South Asia. Because of a long preinvasive stage<sup>(2)</sup>, available cervical cytology screening, and effective treatment of pre-invasive lesion, invasive cervical cancer is considered as a preventable disease.

There are several risks of cervical cancer such

as young age at first intercourse (less than age 16), multiple sexual partners, cigarette smoking, high parity, low socioeconomic status, race.<sup>(2)</sup> Papanicolaou smear (Pap smear) is one of the cervical screening methods which is convenient, painless, sensitive and widely accepted. American College of Obstetricians and Gynecologists<sup>(3)</sup> recommends that cervical screening should begin approximately 3 years after first sexual intercourse, but not later than age 21 and those with 3 consecutive normal Pap smears could have their next Pap smear after 3 years. Pap smear is not indicated for women more than age 65 who have had normal smears consistently. Sensitivity of Pap smear is 80%. Of those who have 3 consecutive normal Pap smears, sensitivity of Pap smear increases up to 86.8%, while false negative is less than 1%.<sup>(4)</sup> The causes of less than optimum smears are thick smear with an abundance of red blood cells or inflammatory cells, application of vaginal tablet or tampon 48 hours before an exam, sexual intercourse and vaginal douche 48 hours before an exam, inadequate scraping or absence of endocervical cells and poor fixation, often caused by air drying.<sup>(5,6)</sup>

Invasive cervical cancer typically occurs in the reproductive years of life.<sup>(7)</sup> Prevalence of abnormal Pap smear in Thai pregnant women was 8/1,000<sup>(8)</sup>, thus Pap smear should be obtained at first prenatal visit to detect cervical cancer or preinvasive lesions.<sup>(9)</sup> In addition, Pap smear also gave information about reproductive tract infections such as bacteria, fungus, virus, etc., which could be associated with poor pregnancy outcomes.<sup>(10-13)</sup>

The primary objective of this study was to determine the prevalence of abnormal Pap smear in pregnant women who attended antenatal care clinic at Phramongkutklao Hospital. The secondary objective were the prevalence of risk factors of cervical cancer in pregnant women and the results of the organism on Pap smear with pregnancy outcome.

## Materials and Methods

The protocol was approved by the ethics

committee of Phramongkutklao Hospital. This prospective study recruited all pregnant women who had their first antenatal visits between 1 September 2006 and 1 May 2007. The study included the pregnant women less than 28 weeks of gestation and excluded those who lost to follow up, had abnormal vaginal bleeding, or were not able to be in lithotomy position. After informed consent was obtained, the pregnant women would fill up the questionnaire asking about demographic characteristics and risk factors of cervical cancer.<sup>(2)</sup>

Pap smear was obtained from all recruited pregnant women. Specimens were collected by scraping at posterior fornix and transformation zone with Ayre's spatula. Then, endocervical specimens were obtained by cotton swab. All specimens were smeared on glass slide as thin as possible, immediately fixed with 95% alcohol, and examined by the same cytopathologist. Pap smear was reported using the Bethesda classification system.

Abnormal Pap smear in this study included infections, epithelial cell abnormalities, and other malignant neoplasms. The patients with Pap smear demonstrating atypical squamous cells (ASC-US), atypical squamous cells cannot exclude HSIL (ASC-H), low grade squamous intraepithelial lesion (LSIL) and high grade squamous intraepithelial lesion (HSIL) were assigned for colposcopy to confirm diagnosis. Those with Pap smear demonstrating pathological organisms were treated accordingly. All patients were followed by clinical until delivery.

Data collection included demographic characteristics, risk factors of cervical cancer, results of Pap smear and outcomes of pregnancy which were analyzed with computerized program and presented as mean and percent.

## Results

Pap smear was obtained from 400 pregnant women but 16 women were excluded from the study due to loss to follow up during antenatal period. Data from 384 pregnant women were analyzed in this study. The demographic data of the women was shown on Table 1 with mean age of 26 years old.

146 out of 384 patients (38%) had abnormal Pap smear which included 144 cases (37.6%) of infection and 2 cases (0.4%) of LSIL. Both cases with LSIL were assigned for colposcopy which revealed only cervical inflammation (Table 2). Neither ASCUS nor HSIL was found in this study

Table 3 showed a proportion of pregnant women who had risk factors of cervical cancer. Young age at first intercourse (<16 years), multiple sexual partners, and cigarette smoking were found in only small proportion but nearly one-fifth of participants had husband with multiple sexual partners. One pregnant woman had 5 children and 35 pregnant women (9.1%) had an income of less than 5,000 baht per month. Risk factors found in pregnant women with preinvasive lesion were husband with multiple partners and smoking.

Among 32 cases of preterm birth, 7 cases (21.9%) occurred in candida spp. and 3 cases (9.4%) in bacterial vaginosis whereas 68 cases of premature rupture of membrane (PROM), 4 cases (5.9%) occurred in candida spp. and 3 cases (4.4%) in bacterial vaginosis (Table 4).

## Discussion

The screening of cervical cancer with Pap smear was a reliable and standard method. Pap smear was used to detect preinvasive and early stage of cervical cancer before the abnormal symptoms appear and, therefore, disease could be treated before turning into advanced stage. Pap smear could reduce incidence of cervical cancer which was the common cause of death in Thai women. In spite of the low rate of preinvasive and cervical cancer rates in pregnant women<sup>(8,14)</sup>, cervical cancer screening in this reproductive age group may be beneficial for those who had never been examined before pregnancy.

This study recruited 384 pregnant women who attended the antenatal care clinic at Phramongkutklao Hospital. 146 cases (38%) had abnormal Pap smear which comprised 144 cases (37.6%) of infections and 2 cases (0.4%) of LSIL and LSIL with HPV change. Both pregnant women with

LSIL were assigned for satisfactory colposcopy which revealed only cervical inflammation. The prevalence of epithelial cell abnormalities in this study was similar to Sueblinvong T, et al<sup>(8)</sup> in which Thai pregnant women were studied and demonstrated 0.8% of ASCUS or LSIL that were finally diagnosed cervicitis and HPV infection by colposcopic biopsies. The prevalence was lower when compared the studies in other countries<sup>(15,16)</sup> that may probably due to the differences in culture and risk factors.

The inconsistency of the result of Pap smear and colposcopy found in this study was comparable to previous studies that showed the less validity of Pap smear screening in pregnant women than normal population.<sup>(8,14,17)</sup> This was the consequence of an increasing amount of mucus from endocervical glands and squamous metaplasia related to the changes of estrogen and progesterone levels during pregnancy as well as the contamination from trophoblast.<sup>(14)</sup> Because of the difficulties of Pap smear interpretation, all pregnant women with abnormal Pap smear should be further investigated by colposcopy<sup>(15)</sup> and followed up 4-6 weeks during postpartum period. However, both cases with LSIL in this study lost to follow up after delivery.

Risk factor of cervical cancer found mainly in this study were husbands with multiple sexual partners (18%), young age at first intercourse (<16 years), multiple sexual partners and cigarette smoking present in 7.0%, 5.7% and 6.8% of cases, consecutively. Even none of women with risk factors had abnormal cervical cells, they should be checked up by Pap smear regularly due to their possibility of developing cervical cancer.

Pap smear also gave information about reproductive tract infections such as bacteria, fungus, virus, etc., and this study found infections in 144 cases including 90 cases (23.4%) of candida spp., 53 cases (14.0%) of bacterial vaginosis and 1 case (0.2%) of trichomonas spp. All women were treated accordingly regardless of the symptoms. Thomason JL<sup>(18)</sup> and Nelson DB<sup>(19)</sup> found bacterial vaginosis in 50% of pregnant women and more than one half were asymptomatic. So pregnant women

with bacterial vaginosis might not be diagnosed until adverse pregnancy outcomes occurred. According to Teresita A, et al<sup>(20)</sup>, Pap smear had low sensitivity to diagnose bacterial vaginosis but high specificity, positive predictive value (PPV) and negative predictive value (NPV), whereas, Enver V, et al<sup>(21)</sup> showed high sensitivity and specificity. However, Simoes JA, et al<sup>(22)</sup> found accuracy of clinical diagnosis of cervicovaginal infections was low with sensitivity between 50% and 65%, specificity around 60%. Whenever bacterial vaginosis was found during pregnancy, it should be treated since it was associated with preterm delivery and 3-5 folds increased risk of abortion<sup>(12,13)</sup>. Carey JC, et al<sup>(23)</sup> found treatment of asymptomatic pregnant women whose showed infection especially bacterial vaginosis with metronidazole did not reduce the risk of preterm delivery.

There were 3 cases of preterm delivery, 3

cases of PROM but no abortion among 53 pregnant women with bacterial vaginosis in this study. This small number of adverse pregnancy outcomes might be partly the effect of treatment with metronidazole. Many factors such as abnormalities of uterus and cervix, drug addicts or other infections, could be the causes of adverse pregnancy outcome in the cases whose Pap smear showed no organism.

## Conclusion

Prevalence of abnormal Pap smear in pregnant women at Phramongkutklao Hospital was 38% including 37.6% of infections and 0.4% of LSIL which were further examined by colposcopy and diagnosed only cervical inflammation. Adverse pregnancy outcomes in pregnant women with bacterial vaginosis in this study were lower than previous studies probably as the result of treatment.

**Table 1.** Demographic characteristics of pregnant women presenting for antenatal care clinic at Phramongkutklao Hospital (N=384)

| Characteristics       | Cases (%)              |
|-----------------------|------------------------|
| Age (years)           | 26.61±6.08 (Mean ± SD) |
| Gravidity             |                        |
| Nulliparous           | 162 (42.2)             |
| Multiparous           | 222 (57.8)             |
| <b>Marital status</b> |                        |
| Single                | 92 (24)                |
| Married               | 290 (75.5)             |
| Divorced              | 2 (0.5)                |
| <b>Education</b>      |                        |
| Primary school        | 99 (25.8)              |
| Secondary school      | 77 (20.1)              |
| High school           | 106 (27.6)             |
| Diploma               | 30 (7.8)               |
| Bachelor              | 67 (17.4)              |
| No education          | 5 (1.3)                |

| <b>Occupations</b> |            |
|--------------------|------------|
| Housewife          | 115 (29.9) |
| Employee           | 187 (48.7) |
| Private business   | 51 (13.3)  |
| Government officer | 29 (7.6)   |
| Student            | 2 (0.5)    |

**Table 2.** Results of Pap smear (N=384)

| <b>Pap smears</b>                                      | <b>Case (%)</b> |
|--|-----------------|
| Reactive cellular changes associated with inflammation | 238 (62)        |
| Abnormal Pap smear *                                   | 146 (38)        |
| Candida spp.   | 90 (23.4)       |
| Bacterial vaginosis                                    | 53 (14.0)       |
| Trichomonas spp.                                       | 1 (0.2)         |
| LSIL   | 1 (0.2)         |
| LSIL with HPV  | 1 (0.2)         |

\* In this study, abnormal Pap smear included infections, epithelial cell abnormalities and other malignant neoplasms.

**Table 3.** Risk factors of cervical cancer (N=384)

| <b>Risk factors</b>                                | <b>Case (%)</b> |
|--|-----------------|
| Young age at first intercourse (<16 years)         | 27 (7.0)        |
| Multiple sexual partners (>1 partner)              | 22 (5.7)        |
| Husband with multiple sexual partners (>1 partner) | 69 (18.0)       |
| Cigarette smoking (ever & current use)             | 26 (6.8)        |

**Table 4.** Results of organisms on Pap smear by outcomes of pregnancy (N=384)

| Outcomes of pregnancy                |                          | Pap smears (cases/%) |                     |                  |
|--------------------------------------|--------------------------|----------------------|---------------------|------------------|
|                                      |                          | Candida spp.         | Bacterial vaginosis | Trichomonas spp. |
| Gestational age at delivery          | <20 week<br>(14 cases)   | 1 (7.1)              | 0 (0.0)             | 0 (0.0)          |
|                                      | 20-36 week<br>(32 cases) | 7 (21.9)             | 3 (9.4)             | 0 (0.0)          |
|                                      | ≥37 week<br>(338 cases)  | 82 (24.3)            | 50 (14.8)           | 1 (0.3)          |
| Premature rupture of membrane (PROM) | PROM<br>(68 cases)       | 4 (5.9)              | 3 (4.4)             | 0 (0.0)          |
|                                      | No PROM<br>(316 cases)   | 86 (27.2)            | 50 (15.8)           | 1 (0.3)          |

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## ความชุกของการตรวจพบความผิดปกติจากการตรวจคัดกรองมะเร็งปากมดลูกด้วยวิธี Papanicolaou smear ในสตรีตั้งครรภ์ที่มาฝากครรภ์ที่โรงพยาบาลพระมงกุฎเกล้า

นันทก เงามารวงศ์, จุฑาวดี วุฒิมวงศ์, พีระพรรณ พันธุ์ภักดีคุณ, นรุญณ์ ทองสอน

**วัตถุประสงค์ :** ศึกษาความชุกของการตรวจพบความผิดปกติจากการตรวจคัดกรองมะเร็งปากมดลูกด้วยวิธี Pap smear ในสตรีตั้งครรภ์ที่มาฝากครรภ์ที่โรงพยาบาลพระมงกุฎเกล้า, ความชุกของปัจจัยเสี่ยงของการเกิดมะเร็งปากมดลูกในสตรีตั้งครรภ์และผลของการตรวจพบการติดเชื้อจาก Pap smear ต่อการตั้งครรภ์

**วิธีการวิจัย :** สตรีที่มาฝากครรภ์ที่โรงพยาบาลพระมงกุฎเกล้า ตั้งแต่วันที่ 1 กันยายน 2549 ถึงวันที่ 1 พฤษภาคม 2550 ซึ่งตรงตามเกณฑ์เข้าร่วมการวิจัย (inclusion criteria) จะได้รับการตรวจภายในและตรวจคัดกรองมะเร็งปากมดลูกด้วย Pap smear และตอบแบบสอบถาม โดยผลการศึกษาทั้งหมดจะบันทึกในแบบบันทึกข้อมูลและวิเคราะห์ข้อมูลทางสถิติ โดยใช้โปรแกรม SPSS version 11.5

**ผลการวิจัย :** สตรีตั้งครรภ์ที่เข้าร่วมโครงการวิจัยจำนวน 384 ราย พบความชุกของความผิดปกติจากการตรวจด้วย Pap smear ร้อยละ 38 แบ่งเป็นเชื้อราในช่องคลอด (candida spp.) ร้อยละ 23.4, ติดเชื้อแบคทีเรียในช่องคลอด (bacterial vaginosis) ร้อยละ 14.0, เชื้อพยาธิในช่องคลอด (trichomonas spp.) ร้อยละ 0.2, และมะเร็งปากมดลูกระยะก่อนลุกลาม LSIL และ LSIL with HPV ร้อยละ 0.4 ซึ่งสตรีที่มี LSIL และ LSIL with HPV มีปัจจัยเสี่ยงของการเกิดมะเร็งปากมดลูก คือ สามมีคู่นอนหลายคนและสูบบุหรี่ สตรีที่คลอดก่อนกำหนดและสตรีที่น้ำเดินก่อนเจ็บครรภ์คลอดพบว่า Pap smear เป็นเชื้อรา (candida spp) ร้อยละ 21.9 และ ร้อยละ 5.9 ตามลำดับ พบแบคทีเรียในช่องคลอด (bacterial vaginosis) ร้อยละ 9.4 และร้อยละ 4.4 ตามลำดับ

**สรุปผลการวิจัย :** ความชุกของความผิดปกติจากการตรวจคัดกรองมะเร็งปากมดลูกด้วยวิธี Pap smear ร้อยละ 38

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