

## อวช.4 แบบแสดงผลงานวิชาการ

### ลำดับที่ 1

เรื่อง การตรวจหาเซลล์ปากมดลูกและเซลล์ทวารหนักที่ผิดปกติโดยวิธี  
แปปเทสต์ในกลุ่มประชากรที่มีพฤติกรรมเสี่ยงทางเพศที่มารับบริการ  
คลินิกโรคติดต่อทางเพศสัมพันธ์ (โรงพยาบาลบางรัก)

Determined of cervical and anal cytological abnormalities by  
Pap test in high risk sexual behavior population group among  
attending at STD clinic (Bangrak hospital)

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### Abstract

**Objective:** To determine the percentage of cervical and anal cytological abnormalities by Pap test in high-risk sexual behavior populations among attending at sexually transmitted disease (STD) clinic at Bangrak hospital, Bangkok Thailand.

**Methods:** Cross-sectional descriptive study was performed on 366 participants from the STD clinic (Bangrak Hospital), Thailand during January – September, 2016. They were divided into 2 groups; female sex worker (FSW; n=134) and men who have sex with men (MSM; n=232). Cytological abnormalities of cervical and anal swab from all participants were determined using Papanicolaou (Pap) test.

**Results:** Median age was 29 years (range 16-67). The prevalence of cervical cytological abnormalities was found in 12% of FSW participants and we found abnormal anal cytology in MSM was 17.7% no statistically significant difference between these group ( $p=0.068$ ).

**Conclusions:** This study reported highest prevalence of cytological abnormality in MSM, who was identified as high-risk sexual behavior population for sexual transmitted infections (STIs). All abnormal cytology cases; high-grade squamous intraepithelial cells (HSIL) would encourage retesting, follow-up and/or treatment. The outcome of prevalence data of abnormal cytology finding might be useful for evaluate the program prevention and control pre-cancerous lesions in Thailand.

**Keywords:** Cytology, Papanicolaou (Pap) test, Cervical, Anal, Female sex worker, Men who have sex with men

### III

#### บทคัดย่อ

**วัตถุประสงค์:** เพื่อหาค่าร้อยละของความผิดปกติของเซลล์ปากมดลูกและทางทวารหนักโดยการตรวจ Pap test ในประชากรที่มีพฤติกรรมทางเพศที่มีความเสี่ยงสูงในกลุ่มที่เข้ารับการรักษาที่คลินิกโรคติดต่อทางเพศสัมพันธ์ (STD) โรงพยาบาลบางรัก กรุงเทพมหานคร ประเทศไทย

**วิธีการศึกษา:** เป็นการศึกษาแบบบรรยายภาคตัดขวางดำเนินการในอาสาสมัครจำนวน 366 คนจากคลินิก STD โรงพยาบาลบางรัก ระหว่างเดือนมกราคม - กันยายน 2559 แบ่งเป็น 2 กลุ่ม คือ หญิงขายบริการทางเพศ (FSW; n = 134) และชายที่มีเพศสัมพันธ์กับชาย (MSM; n = 232) ความผิดปกติทางเซลล์วิทยาของปากมดลูกและทวารหนักจากผู้เข้าร่วมทั้งหมดได้รับการพิจารณาจากการทดสอบ Pap test

**ผลการศึกษา:** อายุเฉลี่ย (Median) ของอาสาสมัคร เท่ากับ 29 ปี (16-67 ปี) ความชุกของความผิดปกติทางเซลล์วิทยาของปากมดลูกพบใน 12% ของ FSW และพบ 17.7% มีเซลล์วิทยาทางทวารหนักผิดปกติในกลุ่มชายรักชาย ไม่พบความแตกต่างอย่างมีนัยสำคัญทางสถิติระหว่างกลุ่มนี้ ( $p = 0.068$ )

**สรุปผลการศึกษา:** การศึกษานี้รายงานความชุกของความผิดปกติทางเซลล์วิทยาสูงสุดในกลุ่มชายรักชายซึ่งถูกระบุว่าเป็นประชากรที่มีพฤติกรรมทางเพศที่มีความเสี่ยงสูงสำหรับการติดเชื้อทางเพศสัมพันธ์ (STIs) กรณีเซลล์ผิดปกติ intraepithelial cells ชนิด high grade squamous intraepithelial cells (HSIL) จะทำการทดสอบซ้ำติดตามผลและ/หรือได้รับการรักษาผลของข้อมูลความชุกของการค้นพบเซลล์วิทยาที่ผิดปกติอาจเป็นประโยชน์ในการประเมินโปรแกรมการป้องกันและควบคุมโรคก่อนมะเร็งในประเทศไทย

**คำสำคัญ:** เซลล์วิทยา, Pap test, ปากมดลูก, ทวารหนัก, พนักงานบริการหญิง, ชายที่มีเพศสัมพันธ์กับชาย

## IV

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## VII

### LIST OF ABBREVIATIONS

ADC	Adenocarcinoma
AIN	Anal intraepithelial neoplasia
ASC	Atypical squamous cells
ASC-H	Atypical squamous cells cannot exclude a high-grade squamous intraepithelial abnormality
ASC-US	Atypical squamous cells of undetermined significance
ASR	Age-standardized incidence rates
CIN	Cervical intraepithelial neoplasia
FSW	Female sex worker
HIV	Human immunodeficiency virus
HPV	Human papillomavirus
HSIL	High-grade squamous intraepithelial lesion
ICC	Invasive cervical carcinoma
LSIL	Low-grade squamous intraepithelial lesion
MSM	Men who have sex with men
SCC	Squamous cell carcinomas
SPSS	Statistical Package for the Social Sciences
TBS	The 2014 Bethesda system
USA	United States of America

## **Chapter 1**

### **Introduction**

Cervical cancer is the fourth most commonly found in women worldwide, especially in the developing countries.<sup>1</sup> In 2008, the globally mortality of cervical cancer was approximately 275,000 cases. The incidence case of human papillomavirus (HPV) infection in female was approximately 530,000 cases while, in 2012, approximately 572,624 cases were reported as incident cases of cervical cancer in worldwide.<sup>2</sup>

The incident rate of cervical cancer in Thailand was 19.8 per 100,000 women with approximately 6,300 cases per annum.<sup>3</sup> The age-standardized incidence rates (ASR) during year 2010-2012 ranged from 10.2 to 24.6 per 100,000 women in different provinces of Thailand.<sup>4</sup>

HPV prevalence in general women in Thailand has been reported ranging from approximately 9%-83%, depending on the study location or sample population assessed.<sup>5</sup> One consistency reported in Thai patients has been that the oncogenic HPV genotypes 16 and 18 have been detected more frequently in high-risk groups.<sup>6</sup>

HPV prevalence data in HIV-negative heterosexual men in developing countries are emerging and vary considerably depending on geography and anatomical site sampled.<sup>7</sup> Still, the HPV prevalence data for HIV-negative MSM and MSM sex workers seem to be substantially higher than those for heterosexual men.<sup>8</sup>

Most anal cancers are squamous cell carcinomas (SCC) causally related to high-risk types of HPV, which is most prevalent in populations which, practice receptive anal intercourse, such as men who have sex with men (MSM).<sup>9</sup> The incident rate of anal SCC among MSM in United States of America (USA) was approximately 35 per 100,000 persons each year, which was higher than those of cervical cancer in women (24 per 100,000 person).<sup>10</sup> The previous study, Nittaya P, et al. (2013), they have reported a high prevalence of anal HPV infection among Thai MSM people 85% among HIV positive higher than HIV negative MSM 58.5%.<sup>11</sup>

Although the incidence of cervical cancer has been decreasing globally over recent decades, the incidence of anal carcinoma, for which effective screening programs and data are lacking, seems to have been rising over the last 2 decades. The risks of HPV infection depend on sexual behaviors including the number of partners and age of first sexual activity.

Compared with female sex workers and MSM groups are at higher risk for HPV infection. As such, MSM have a high risk for developing HPV-associated anal intraepithelial neoplasia (AIN) or anal squamous cell cancer.<sup>12</sup>

HPV infection is considered as sexually transmitted diseases. Risks of HPV infection depend on sexual behaviors, including age at first sexual activity, numbers of sex partner and lifetime history of sex partner<sup>13</sup>. Multiple sex partners and unprotected sexual activities were also reported as risk factors of HPV infection in both female sex workers and MSM group.<sup>14,15</sup> Asymptomatic HPV infection may persist for many years, and induces cell abnormalities as well as development of cervical and anal cancers in women and MSM, respectively.<sup>16</sup> More than 50 percents of sexually active adults in USA were reported to be infected with one or more HPV genotypes.<sup>17</sup>

Papanicolaou (Pap) test is a gold standard method for detecting cell abnormalities which may develop to either cervical cancer in worldwide.<sup>18</sup> The sensitivity and specificity of Pap test are 61.3% and 82.4%, respectively.<sup>19</sup> The 2014 Bethesda system (TBS) is a system used for reporting cervical and anal cytological diagnoses with Pap test results.<sup>20</sup>

**CHAPTER II**  
**OBJECTIVE**

The aim of this study was to determine the percentage of abnormal cytology identified by Pap test in female sex worker (FSW) group and men who have sex with men (MSM) group as identified high-risk sexual behavior populations.

### CHAPTER III

#### LITERATURE REVIEW

The Pap smear test is the most widely used for cancer screening test that involves scraping a sample of epithelial cells from the cervical transformation zone using a spatula. The primary aim of the cervical smear test is to detect pre-cancerous lesions, when proper management could be offered before the development of invasive cancer.<sup>21</sup>

Additionally, there are numerous convincing epidemiological data which show that since the introduction of Pap in countries with well organized screening programs, and with wide population coverage, both incidence and mortality from cervical cancer has significantly decreased.<sup>22</sup>

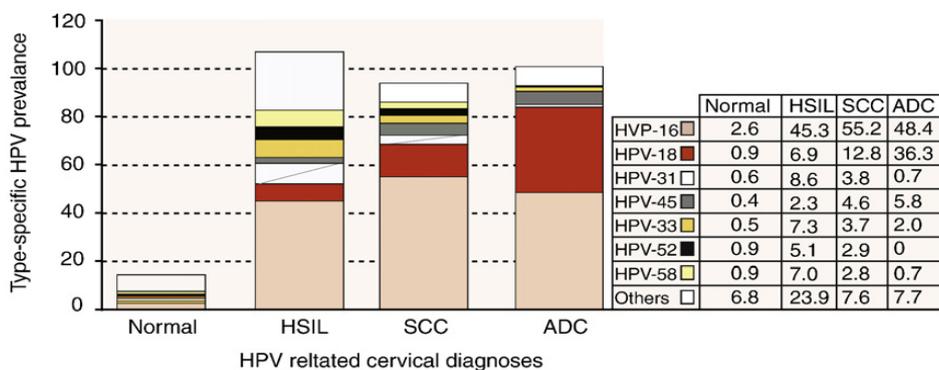
Organized cervical screening by Pap smear testing led to dramatic decrease in the incidence and mortality from cervical cancer in developed countries (Centers for Disease Control and Prevention, 2014). This reduction has not been possible in most low and middle income countries largely due to the lack of a systemic screening program (WHO, 2012).<sup>23</sup>

Female sex workers worldwide are considered a high-risk population for abnormal cytology results, and most likely have a higher risk for HPV infection from having multiple sexual partners and unprotected sexual activities. Thai female sex workers have been shown to have significantly higher HPV prevalence than do control women.<sup>24,25</sup> Thai female sex workers have been shown to have significantly higher HPV prevalence than do control women.<sup>26</sup>

Sankaranarayanan R, *et al.*, 2008 reported the prevalence of HPV genotypes in women with normal cytology compared between women with abnormal cytology, high-grade squamous intraepithelial lesion (HSIL), squamous cell carcinomas (SCC) and adenocarcinoma (ADC).<sup>27</sup>

The prevalence of type-specific HPV 16 and 18 genotypes were found in HSIL, SCC and ADC more than any types. HPV 16 was first the predominant type along the spectrum of cervical lesions and dominates in adenocarcinoma.<sup>28</sup> HPV 45 an uncommon infection among women with normal cytology shows a prevalence of 2.3% in HSIL and its frequency doubles to 4.6–5.8% in invasive cervical carcinoma (ICC). HPV 58 a relatively common type among women with normal cytology and HSIL lesions were lower ranked in frequency among women with invasive cervical carcinoma (ICC).

Another interesting finding was the low prevalence of HPV 52 and the high prevalence of the group under other genotypes of HPV among ADC. The latter representing a contribution of a wider range of types as compared to SCC. Adenocarcinomas comprise around 16% of all cervical cancers which is consistent with the range reported by cancer registries (Figure 1.)<sup>29</sup>



Type-specific HPV prevalence across the spectrum of HPV related cervical diagnoses. Multiple infections counted several times.

ADC = adenocarcinoma; HPV = human papillomavirus; HSIL = high squamous intraepithelial lesions; SCC = squamous cervical carcinoma.

**Figure 1. Prevalence type-specific HPV are normal, high-grade cervical intraepithelial neoplasia and invasive cervical carcinoma (ICC).**<sup>29</sup>

Globally, MSM populations are disproportionately affected by high-risk oncogenic HPV infections and increased incidence of HPV-associated anal cancers.<sup>30</sup> In 2003 in the United States, the average annual incidence of anal cancer was 1.0 and 1.5 per 100,000 among men and women, respectively, whereas the incidence of anal cancer among MSM was estimated to be as high as 37 per 100,000.<sup>31,32</sup>

However, there is a gap in knowledge regarding the HPV and anal cancer prevalence in MSM sex workers worldwide. In Thailand, MSM and MSM sex worker populations are not regularly screened for HPV, genital warts, or anal carcinoma. A study from Peru found that 77% of MSM sex workers were positive for HPV.<sup>33</sup>

One possible explanation of the observed increased prevalence among MSM sex workers may be high-risk sexual behavior such as multiple partners or sex without condoms, increasing physical disturbance of the epithelial lining of the anal canal or possibly HPV exposure; however, data to support this claim are unavailable.

HPV high risk types are infection several years of initiating sexual intercourse, results in characteristic morphologic changes within infected cells and rapidly multiply abnormal cervical squamous cells then progresses to cancer. Cells demonstrating the morphologic changes associated with a productive HPV infection are referred to low-grade squamous intraepithelial lesions (LSIL) when observed in cytologic specimens and low-grade cervical intraepithelial neoplasia grade 1 (CIN 1) when observed in histologic specimens.<sup>27</sup>

The cervical cancer can develop in multistep process that take many years, which involve both the presence of oncogenic HPV genotypes and the interaction of many host factors. Even though a high percentage of sexually active young women are exposed to and develop productive HPV infections, only a very small percentage go on to develop cervical cancer.<sup>34</sup>

HPV infection is common among younger women between 18 to 35 years old, but cervical cancer is more common in women over 35 years of age. Several studies have shown that persistent infection with oncogenic viral types such as HPV 16 is a very important determinant in the development of cervical cancer.<sup>35</sup>

About high-risk HPV types, the E6 and E7 proteins have a high affinity for the p53 and pRb host gene products. This interaction disrupts the normal functions of the important cellular proteins and leads to cellular dysfunction, indicated by an increased proliferation and genomic instability, which are malignant transformation (**Figure 2**). Several alterations of the host genome have been described in premalignant and malignant lesions of the cervix. Increased expression of the angiogenic factor epidermal growth factor (EGF) and expression of telomerase.<sup>36</sup>

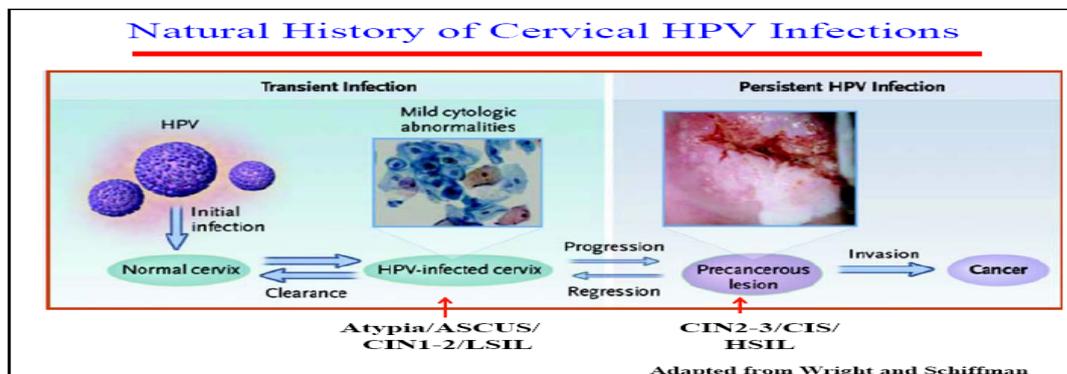
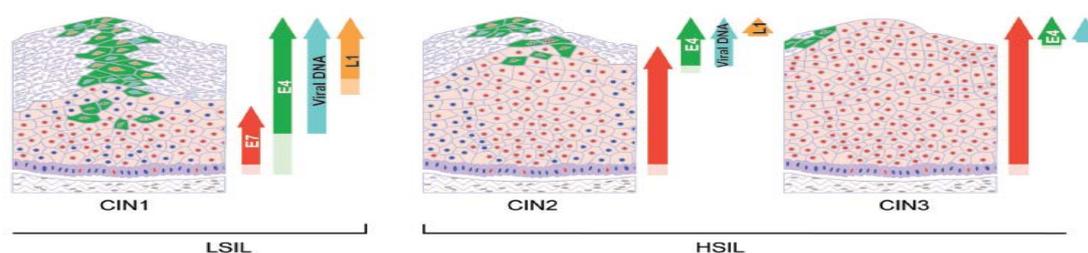


Figure 2. Natural history of cervical HPV infections.<sup>36</sup>

The expression of HPV proteins is predictable changes during in a cancer progression. The timing and order of events regions of low-grade squamous intraepithelial lesion (LSIL) is resemble those seen in productive infections caused by other papillomavirus types. In high-grade squamous intraepithelial lesion (HSIL) caused by HPV high risk types, the order of events is preserved, but the timing is disturbed and the number of cells expressing surrogate markers of viral oncogene activity is increased. In HSIL (CIN3) a total failure to complete the papillomavirus life cycle can occur, resulting in an abortive infection (**Figure 3.**)<sup>37</sup>



**Figure 3. Pathology of LSIL and HSIL.**<sup>37</sup>

The Pap test is used to detect abnormal cells in the cervix cells or anal cells. It involves the collection of cells from the cervix or anal sites for examination under the microscope. The terms have been used to describe the abnormal cells that may be seen in Pap test. The Bethesda system used to report the results of Pap tests in the United States, which is the same in Thailand.<sup>38</sup>

The Bethesda System (TBS) is a system for reporting cervical and anal cytologic diagnoses used for reporting Pap smear results. It was introduced in 1988, and revised in 1991 and 2001.<sup>39</sup> The name comes from the location (Bethesda, Maryland) of the conference that established the system. In this system, samples with cell abnormalities are divided into the following categories:

### **1. Atypical squamous cells (ASC)**

The squamous cells are the thin, flat cells that form the surface of the cervix. The Bethesda System divides this category into two groups:

#### **A. Atypical squamous cells of undetermined significance (ASC-US)**

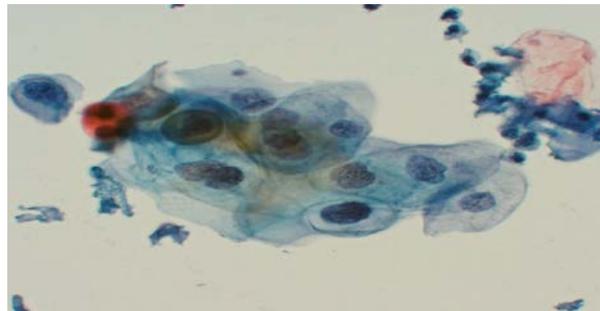
ASC-US is mildly abnormal reading abnormal squamous cells but their presence doesn't clearly indicate that there is cancerous or a precancerous state. In over 80% of cases, ASC-US doesn't represent a finding of cancer, but it's still advised that care be taken.<sup>40</sup>

**B. Atypical squamous cells cannot exclude a high-grade squamous intraepithelial abnormality (ASC-H)** Intraepithelial refers to the layer of cells that forms the surface of the cervix. The cells do not appear normal, but ASC-H lesions may be at higher risk of being precancerous compared with ASC-US lesions.<sup>40</sup>

**Low-grade squamous intraepithelial lesion (LSIL):**

LSILs are early changes in the size and shape of the cells. The lesion refers to an area of abnormal tissue. LSILs are usually mild dysplasia or cervical intraepithelial neoplasia grade 1 (CIN 1) caused by HPV infection, especially among young women. Dysplasia is abnormal cells that are not cancer but have the potential to become cancer. The majority of LSIL return to normal over months to a few years. **(Figure 4.)**<sup>41</sup>

CIN 1 is the most common and most benign form of cervical intraepithelial neoplasia and usually resolves spontaneously within two years. There is a 12-16% chance of progression to more severe dysplasia, the physician may want to follow the results more aggressively by performing a colposcopy with biopsy. If the dysplasia still progresses the treatment may be necessary.<sup>42</sup>

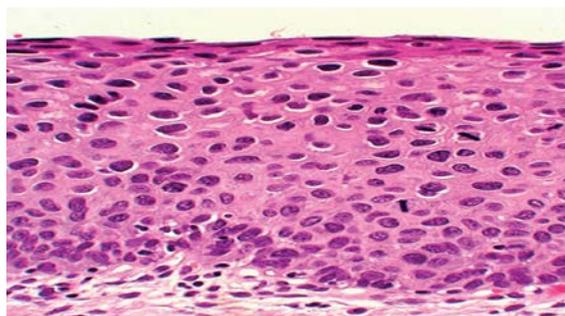


**Figure 4. Low-grade squamous intraepithelial lesion (LSIL).**<sup>40</sup>

They show multinucleation, perinuclear halos, nuclear enlargement, and hyperchromasia.

**High-grade squamous intraepithelial lesion (HSIL):**

HSILs are more evident changes in the size and shape of the abnormal precancerous cells. The progression HSILs are usually followed by an immediate colposcopy with biopsy to sample or remove the dysplastic tissue. HSIL generally corresponds to the histological classification of CIN 2 or moderate dysplasia, CIN 3 or severe dysplasia and carcinoma in situ is abnormal cells are present only on the surface of the cervix. Although they are not cancer, these abnormal cells may become cancer and spread into nearby healthy tissue. **(Figure 5)**<sup>40</sup>



**Figure 5. High-grade cervical intraepithelial neoplasia (CIN 2, 3).<sup>40</sup>**

Immature basaloid type cells extend into the middle layers of the epithelium. These cells have enlarged hyperchromatic nuclei giving them a high nucleus to cytoplasm ratio. Mitoses are also occurring in the upper half of the epithelium.

### **Squamous cell carcinoma (SCC)**

Squamous cell carcinoma is a histologically distinct form of cancer, which arises from the uncontrolled multiplication of transformed malignant cells showing squamous differentiation and tissue architecture. SCC is the second most common skin cancer, and frequently forms in a large number of body tissues and organs. Microscopically SCC shows normal maturing epidermal keratinocytes with intraepidermal atypical squamous cells that do not show maturation and appear disordered.<sup>43, 44</sup>

### **Atypical glandular cells not otherwise specified (AGC-NOS)**

Endocervical type cells display nuclear atypia that exceeds obvious reactive or reparative changes but that lack unequivocal features of endocervical adenocarcinoma in situ or invasive adenocarcinoma.<sup>45</sup>

### **Atypical Glandular Cells, suspicious for AIS or cancer (AGC-neoplastic)**

Cell morphology, either quantitatively or qualitatively, falls just short of an interpretation of endocervical adenocarcinoma in situ or invasive adenocarcinoma.<sup>45</sup>

### **Adenocarcinoma in situ (AIS)**

Adenocarcinoma in situ (AIS) is precursor cell of found in the glandular tissue. High-grade endocervical glandular lesion that is characterized by nuclear enlargement, hyperchromasia, stratification, and mitotic activity, but without invasion.<sup>45</sup>

**Table 1. Classification of squamous cell abnormalities**

There will be a Bethesda III conference May, 2001 to further review and modify The Bethesda System (TBS).<sup>46</sup>

<b>Description</b>	<b>CIN grading</b>	<b>Bethesda System</b>	<b>Class (outdated)</b>
Normal	Normal	Normal	Class I
Atypia Reactive or Neoplastic	Atypia	ASC-US	Class II
HPV	HPV	LSIL	Class II
Atypia with HPV	Atypia, "condylomatous atypia" and "koilocytic atypia"	LSIL	Class II
Mild dysplasia	CIN I	LSIL	Class III
Moderate dysplasia	CIN II	HSIL	Class III
Severe dysplasia	CIN III	HSIL	Class III
Carcinoma in situ	CIS	HSIL	Class IV
Invasive cancer	Invasive cancer	Invasive cancer	Class V

<b>Class</b>	<b>Description<sup>46</sup></b>
Class I	benign
Class II	minor cellular abnormalities considered benign
Class III	cells suspicious for but not diagnostic of cancer
Class IV	cells fairly conclusive for malignancy
Class V	cells diagnostic of cancer

**Classified of cervical and anal cell abnormalities**

The Pap smear test is used to detect abnormal cells in the cervix cells or anal cells. It involves the collection of cells from the cervix or anal sites for examination under the microscope. The terms have been used to describe the abnormal cells that may be seen in Pap tests. The Bethesda system used to report the results of Pap tests in the United States, which is the same in Thailand.<sup>38</sup>

## CHAPTER IV

### MATERIALS AND METHODS

**Study design:** A cross-sectional study, was performed from during January – September, 2016 at the STD clinic, Bangrak Hospital, Bangkok Thailand

**Participants:** Criteria of included participants were

1) Thai people in high risk groups (Men who have sex with men (MSM) and female sex worker (FSW)

2) age  $\geq$  18 years old,

3) engaged in sexual activities and were not diagnosed as either cervical or anal cancer patients.

4) non pregnant women

5) no had sexual activities two nights before enrollment

6) no had insert suppository before enrollment.

7) Writing or verbal consent was given by all participants. They were received counseling before getting the specimens.

8) Volunteer for Pap test

#### **Equipment**

1. Glass slide

2. Liquid based cytology thinprep

3. Microscope

4. Cool box

#### **Material and Methods**

The nursing staff interviewed participants and recorded data about number of sex partner within 3 months, frequency of condom used, and screening history of cervical and anal cytological result by using Pap test before enrolled including physical history in case of genital wart from pelvic examination was identified. After that the cervical and anal swabs were collected from all participants were determined using Papanicolaou (Pap) test. The smears were made and read by expert cytologists of the National Cancer Institute, Bangkok. Cell abnormalities were graded using the 2014 Bethesda system.

### **Statistical analysis**

Difference between percentage of abnormal cytology identified by Pap test in high-risk sexual behavior populations, as well as between FSW and MSM were assessed using a Pearson's Chi-square test. A two-tailed analysis ( $P\text{-value} \leq 0.05$ ) was considered as statistically significant. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 22.0 (SPSS Inc., Illinois, USA).<sup>47</sup>

## Chapter 5

### Results

The age range of all participants was 18-67 years with a median of 29 years. We found the mostly proportion of the samples collected derived from age 21-40 year age group. They have had between 2-185 sex partners. Most of them always condom used 148 (40.4%) when their sexual intercourse, 160 (43.7%) sometimes condom used and we found all of participants were 27 (7.4%) without a condom. The MSM had sex without a condom as 24 (10.3%) more than 3 (2.2%) of FSW group. The missing data was 31 (8.5%).

Among 366 participants, 86 (23.5%) presented genital wart (**Table 2**). The percentage of participant who had never been screened with Pap test before enrollment was 356 (97.3%). The 10 (2.7%) of FSW had history of Pap test results within 5 years before 2016 (**Table 2**). They were mostly negative for intraepithelial neoplasia, while some case as inflammation but, all those cases were found 1 case of atypical squamous cells of undermined significance (ASCUS), 2 cases of low-grade squamous intraepithelial lesion (LSIL) and cervical intraepithelial neoplasia grade 1, 4 cases of inflammation and 3 cases of negative intraepithelial neoplasia with Pap test when they were enrolled to our study.

Of 366 participants, 57 (15.6%) showed cytological abnormalities, which comprised ASCUS 38 (10.4%); LSIL and HPV change 2 (0.6%); LSIL; CIN1/AIN I 15 (4.1%) and high-grade squamous intraepithelial lesion (HSIL); CIN2/CIN3 1(0.3%, 0.3%). FSW group was showed abnormal cervical cytology as 12% and anal abnormalities cytology was found 17.7% in MSM as shown in (**Table 3**).

The cytological abnormalities between FSW and MSM high-risk sexual behavior groups were no statistically significant ( $P = 0.068$ ). Age of participant, number of sex partner within 3 months, condom used, had no significant ( $P = 0.078$ ) correlation to occurrence of abnormal Pap test.

Some cervical and anal swabs, which gave negative Pap test, were found to be infected with other organisms (*Candida* spp., Herpes simplex virus). In addition, inflammation cytological results were found in both female sex worker and MSM populations.

**Table 2. Demographics of study participants**

<b>Demographic Characteristics</b>	<b>Female sex worker (n=134)</b>	<b>MSM<sup>1</sup> (n=232)</b>	<b>Total (n=366)</b>
<b>Median age (years)</b>	30	28	29
18-20	11 (8.2%)	16 (6.9%)	27 (7.4%)
21-30	58 (43.3%)	121 (52.2%)	179 (48.9%)
31-40	52 (38.8%)	64 (27.6%)	116 (31.7%)
41-50	10 (7.5%)	26 (11.2%)	36 (9.8%)
51-60	3 (2.2%)	4 (1.7%)	7 (1.9%)
61-70	0	1 (0.4%)	1 (0.3%)
<b>Number of sex partner within 3 months</b>			
1-25	29 (21.6%)	24 (10.3%)	53 (14.5%)
25-50	79 (59%)	201 (86.6%)	280 (76.5%)
>50	8 (6%)	4 (1.7%)	12 (3.3%)
N/A	18 (13.4%)	3 (1.3%)	21 (5.7%)
<b>Genital wart</b>			
Vagina	3 (2.2%)	N/A <sup>2</sup>	3 (2.2%)
Anus	N/A <sup>2</sup>	83 (35.8%)	83 (35.8%)
<b>Total</b>	3 (2.2%)	83 (35.8%)	86 (23.5%)
<b>History of Pap test before 2016</b>			
Never had Pap test	124 (92.5%)	232 (100%)	356 (97.3%)
More than 1 year to 5 years	10 (7.5%)	0	10 (2.7%)
<b>Condom used</b>			
Always	49 (36.6%)	99 (42.7%)	148 (40.4%)
Sometimes	82 (61.2%)	78 (33.6%)	160 (43.7%)
Never	3 (2.2%)	24 (10.3%)	27 (7.4%)
N/A	0	31 (13.4%)	31 (8.5%)

<sup>1</sup> Men who have sex with men<sup>2</sup> Not applicable

**Table 3. Cytological results of study participants using Pap test method.**

Cytology of results		Female sex worker (n=134)	MSM <sup>1</sup> (n=232)	Total (n=336)
Negative with	Negative for Intraepithelial neoplasia	37 (27.6%)	177 (76.3%)	214 (58.5%)
	Inflammation	68 (50.7%)	13 (5.6%)	81 (22.1%)
	<i>Candida spp.</i>	12 (9%)	0	12 (3.3%)
	Herpes simplex Virus	1 (0.75%)	1 (0.43%)	2 (0.6%)
	Total	118 (88.1%)	191 (82.3%)	309 (84.4%)
	Positive	ASCUS <sup>2</sup>	9 (6.7%)	29 (12.5%)
LSIL <sup>3</sup> and HPV Change		1 (0.75%)	1 (0.43%)	2 (0.6%)
CIN <sup>5</sup> 1/ AIN <sup>6</sup> 1 (LSIL)		4 (3%)	11 (4.74%)	15 (4.1%)
CIN 2/ AIN2 (HSIL <sup>4</sup> )		1 (0.75%)	0	1 (0.3%)
CIN 3/ AIN 3 (HSIL)		1 (0.75%)	0	1 (0.3%)
<b>Total</b>	<b>16 (12%)</b>	<b>41 (17.7%)</b>	<b>57 (15.6%)</b>	

<sup>1</sup> Men who have sex with men

<sup>2</sup> Atypical squamous cells of undetermined significance

<sup>3</sup> Low-grade squamous intraepithelial lesion

<sup>4</sup> High-grade squamous intraepithelial lesion

<sup>5</sup> Cervical intraepithelial neoplasia

<sup>6</sup> Anal intraepithelial neoplasia

## CHAPTER VI CONCLUSION AND DISCUSSION

This study reported percentage of cervical and anal cell abnormalities in two groups of Thai population; FSW 16 (12%) and MSM 41 (17.7%) by using cytological technique (Pap test). However, the result in this study was not significantly different between these two groups by using chi-square test ( $p = 0.068$ ). The highest percentage of abnormal cell cytology was found in MSM similar to the study of Guillem S *et al.* (2006), which reported 43% of anal cytological abnormalities in MSM.<sup>48</sup> The previous study of Pornsawan L *et al.* (2015), reported the abnormalities cytology 12 (24%) of general MSM group, 14 (28%) of MSM sex worker group, 5 (5%) of general women group and 10 (10%) of FSW group, respectively.<sup>49</sup> These results of FSW and MSM group were nearly percentage to our study. Moreover, Paya S *et al.* (2015) they found the prevalence of abnormal cervical and anal Pap test of HIV-infected women were 19.4% and 2.3%, respectively among Thai women.<sup>50</sup> However, we don't have control group as healthy general women for comparison between FSW group and we lose data about HIV status of participants as the limitation of this study.

Although, we don't found HSIL in MSM group but another recent study they evaluate HIV negative MSM and determined a HSIL prevalence of 21.5% and was able to provide an estimated anal cancer rate of 5 per 100,000.<sup>51</sup> Anal cancer screening is not widely implemented, even among the highest risk groups. This is likely because of several issues including limitations in research, clinical expertise, and practice guidelines. Also, MSM might have low education about risk of HPV infection, for example unprotected sexual intercourse, high numbers of sex partner, and lack of awareness for Pap test screening.<sup>52</sup>

The outcomes of cervical cell abnormalities identified with cytological technique revealed higher prevalence of abnormal cervical cells in FSW were concordant with Mak RV *et al.* (2004), which reported higher prevalence of LSIL and HSIL (15.6% and 2.9%, respectively) in FSW.<sup>53</sup> In addition, Ghosh I *et al.* (2012) reported high prevalence of cervical abnormal cytology (54.3%) in FSW.<sup>15</sup>

Ten FSW participants, who had previously examined with Pap test more than 1-5 years before enrollment. The mostly found negative for intraepithelial neoplasia and someone as inflammation result, while they visited to our studies the Pap test results showed abnormal cervical cell such as; ASCUS, CIN 1, CIN 2. Furthermore, the investigation of

Tewari *et al.* (2010), which reported that 70% of ASCUS lesions might regress to be undetectable within 1-6 years.<sup>55</sup>

Moreover, this study was found the inflammation results among the FSW group was 68 (50.7%) higher than MSM group 13 (5.6%). According to, the previous data of Pornsawan *et al.* (2015), they were reported of low and high risk HPV genotype in patients with abnormal cytology results. High-risk genotypes 16 and 18 were found in cases having inflammation.<sup>49</sup> Also, the follow up of screening Pap test every year and the detection of HPV testing was important for all of participants.

The FSW and MSM groups had more numbers of sexually transmitted infections. They might be due to the lack of safe sex practices with their sexual partner, which lead to have more opportunity to get sexual transmitted infections.

Pap test is used widely for screening cervical and anal cell abnormalities, which change into cervical cancers. The abnormal cells may be missed under the microscope because the test low sensitivity and difficult to interpret the results due to result interpretation have to rely on expertise of cytologist, which were the disadvantage of Pap test, but the cost of Pap test is cheaper than HPV DNA technique. Although, HPV DNA testing has sensitivity higher than Pap test, but it requires expensive equipment and laborious and essential research tool. Limited Pap test coverage in Thailand is potentially a very important public health issue that, although improving recently, may be overlooked to some degree in the health care system.

Still, it is possible that FSW may attend clinics for education and screening as part of their employment requirements, reducing their risks to HPV infection and infection with other microorganisms, but these data are not consistent. The limited HPV screening practices currently used in Thailand may result in under diagnosis of HPV in all women with an abnormal smear result who may be best suited for further testing. It has been proposed that FSW be screened when they enter prostitution regardless of their age.<sup>56,57</sup>

Even though cervical cancer screening is promoted, the cancer burden is still a major problem in Thailand and other developing countries because the population loss of follow-up Pap tests every 6 months.<sup>58</sup> Annually screening of cervical and anal cancers by Pap test is an advantage to the population. They might be early detected and therefore found an opportunity to ravage cancer in order to receive appropriate treatment. In this study showed that MSM group had the highest prevalence of cytological abnormality therefore a policy or campaign to educate Thai MSM for anal cancer screening would be conducted.

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