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Original Article

Comparative study of reproductive tract infections of female sex workers and gynecology clinic patients and general population in Suzhou

Shao M.F[1], Li X[1], Zhou H.Q[1], Zhang W.Y[1], Zhao X.P[2], Zhang H[1*]

[1]Department of Obstetrics and Gynecology, 2nd affiliated hospital of Soochow University, Suzhou;
[2] Center for Disease Control and Prevention of Suzhou, Suzhou .China.

*Corresponding Author: zlanling@163.com, szzhanghong@suda.edu.cn

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ABSTRACT

Background: Reproductive tract infections (RTIs) have become international public health problem. **Aim:** We assessed the RTIs. A community-based study was carried out among female sex workers (FSWs), gynecology clinic patients and general population in Suzhou, China to investigate the major pathogens of RTIs and to compare the pathogens among FSWs, gynecology clinic patients and general population. **Materials and methods:** The study was conducted over 12 months in 1357 women. They were recruited into three groups: group I: 243 asymptomatic FSWs, group II: 629 symptomatic gynecology clinic patients, and group III: 485 women who attending physical examination. Genital specimens were collected after informed and written consent was obtained. All specimens were transported to department of clinical laboratory and processed by standard methods. Appropriate management was commenced after laboratory reports were sent to the clinicians. Data were analysed. **Results:** Overall, 110 out of 243 asymptomatic FSWs were detected with pathogens, equaling 45.27% showing positive, while 301 out of 629 symptomatic gynecology clinic patients were detected with pathogens, 9.27% general population were detected with pathogens. Reproductive tract infections (RTIs) were more prevalent in FSWs than general population. The distribution of pathogens among three groups was different. **Conclusion:** Rates of RTIs are still high among FSWs in Suzhou. Where resources allow, routine screening and treatment of RTIs should be offered. The study also highlights that health interventions aimed at reducing morbidities from RTIs should focus on prevention raher than treatment.

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Key words: Female sex workers, reproductive tract infections, pathogens, distribution

INTRODUCTION

Reproductive tract infections (RTIs) are a group of infectious diseases caused by bacteria, viruses, *Chlamydia*, *Mycoplasma* and other pathogens invading the genital tract and can cause serious physical and psychological harm such as infertility, intrauterine growth retardation, premature labour, increased vulnerability to HIV/AIDS, and a heavy socio-economic burden to the families.[1] Female RTIs often starts in the lower genital tract as vaginitis or cervicitis with manifestation like itching, genital pain, abnormal vaginal discharge, and burning feeling with urination. It could be asymptomatic and thus pose a problem to effective control. At present, RTIs have become international public health problem, especially in developing countries. FSWs constitute the group documented as being the most exposed population to sexually transmitted infections (STIs), and also are the high prevalence rate population of RTIs. [2] This study was carried out to present the prevalence of the major pathogens for genital tract infection of the FSWs and survey the comparison of pathogens distribution between FSWs and gynecology clinic patients and general population to develop better strategies for the treatment and prevention.

MATERIALS AND METHODS

The study was carried out at Center for Disease Control and Prevention of Soochow（Suzhou, Jiangsu Province, China）over a period of 12 months, from January 2010 to December 2010. Prior to the commencement of the study, institutional ethics committee approval was obtained.

Study population

A total of 1357 women between 14-70 years were used for the study. They were assigned to one of the three study groups. Group I was consisted of 243 asymptomatic FSWs (mean age 27.25, SD 6.42) ,who were high-risk group ,Group II comprised 629 gynecology clinic patients aged between 17-45 years old(mean age 26.55, SD 8.12), who were 100% symptomatic. Group II comprised 485 women, recruited by physical examination. Women with other infections, such as anaerobic bacteria and *Mycoplasma* and *Chlamydia*, urinary tract infections (UTIs), and gynecological surgeries were excluded from the study. The study information was collected through physical examinations carried out by Center for Disease Control and Prevention of Soochow during 2010. Prior to the commencement of the study, informed written consent was obtained from all subjects. Assurance was also given on confidentiality. Each subject was assigned a code number for future reference.

Samples collection

Physical examination including vaginal and bimanual examination was done to assess the presence of any abnormality such as discharge, genital ulcers, genital warts, and cervical erosion. Samples were collected from cervical os and sterile swab was inserted into cervical os for about 1-2 cm, then turn it around for about 20-30 seconds .All specimens were transported to department of clinical laboratory, 2nd affiliated hospital of Soochow University and processed by standard methods.

Swabs were inoculated into blood agar and chocolate agar and saponin-lysed blood agar with vancomycin, colistin, nystatin, trimethoprim (VCNT) supplement to detect *Neisseria gonorrhoeae*, then the inoculated broth was incubated for 18- 24 h at 35℃ carbon dioxide. [3] Gram-stained slides were

evaluated and graded to determine the vaginal flora pattern according to Nugent's criteria.[4] Negative plates were subcultured and reexamined under the same incubation conditions for 48h.The *Lactobacillus SP* is a gram-positive bacillus that produces components such as lactic acid, bacteriocins and hydrogen, and which has properties that protect the vaginal flora.[5] Anaerobic bacteria and *Mycoplasma* and *Chlamydia* were excluded in this research. Appropriate treatment was instituted to patients at their follow-up visits based on their laboratory reports.

Statistical analyses

Statistical analyses were performed with the SPSS software, version 13.0. Significance level was set at P<0.05. Statistical analysis was performed through the χ2 and t-test, whose level of significance was fixed at α=0.05.

RESULTS

110 out of 243 asymptomatic FSWs (45.27%) were detected with pathogens, while 301 out of 629 outpatients with symptoms were detected with pathogens, taking up 47.85%, in group Ⅲ, 9.27% general population were detected with pathogens. There was statistical difference among them (p<0.05). Our findings revealed that 32.57% of women were detected with pathogens which included :①*Gardnerellavaginalis* (group Ⅰ 2.88% , group Ⅱ 11.61% , group Ⅲ 3.30%)②*Candida albicans* (group Ⅰ 7.41% , group Ⅱ 8.43% , group Ⅲ 1.85%)③*Escherichia coli*(group Ⅰ 13.58% , group Ⅱ 2.23% , group Ⅲ 0.41%)④*enterococcus faecalis* (group Ⅰ 4.11% , group Ⅱ 3.33% , group Ⅲ 0%)⑤*streptococcus aglactiae* (group Ⅰ 6.58% , group Ⅱ 16.37% , group Ⅲ 1.67%) (figure 4). However, there was significant difference in the infection rate of *Gardnerella vaginalis* among three groups (p<0.05; Table 1), so was the same in the infection rate of *Escherichia coli* and *enterococcus faecalis* and *streptococcus aglactiae*. There was significant difference in the infection rate among three groups(p<0.05; Table 2), however, no significant difference was observed in the age among three groups (p>0.05).

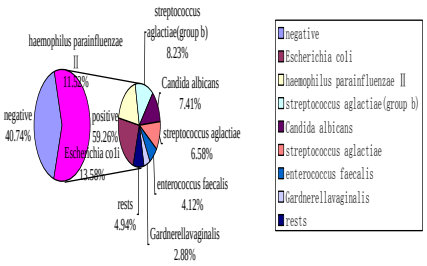

Figure 1: Distribution of pathogens in Group I

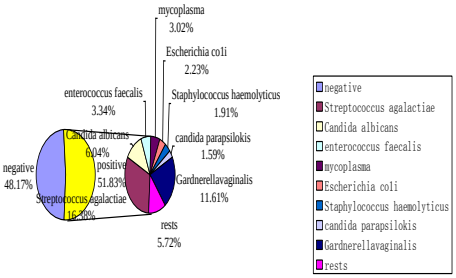

Figure 2: Distribution of pathogens in Group Ⅱ

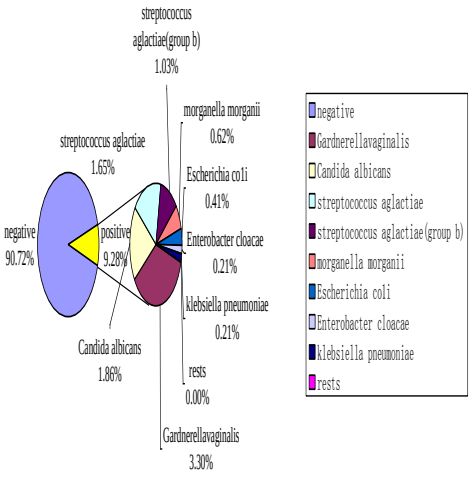

Figure 3: Distribution of pathogens in Group III

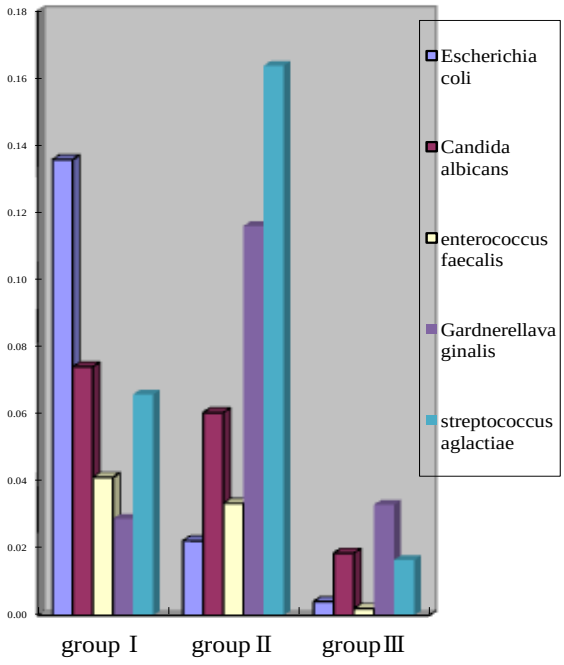

Figure 4: Comparison of major pathogens in the study groups

Table 1 Infection rate of different pathogens in the study groups

microorganism	Group Ⅰ （n=243）		Group Ⅱ (n=629）		Group Ⅲ (n=485)	
	Number	infection rate（%）	Number	infection rate（%）	Number	infection rate（%）
Gardnerellavaginas	7	2.88	73	11.61	16	3.30
Candida albicans	18	7.41	53	8.43	9	1.85
Escherichia coli	33	13.58	14	2.23	2	0.41
Neisseria Gonorrhoeae	1	0.41	0	0	0	0
enterococcus faecalis	10	4.11	21	3.33	0	0
streptococcus aglactiae	16	6.58	103	16.37	8	1.64

Group Ⅰ, 243 asymptomatic FSWs ; Group Ⅱ , 629 Symptomatic gynecology clinic patients ; Group Ⅲ 485 women attending physical examination.

Table 2 Comparison of infection rate in the study groups

	Group Ⅰ	Group Ⅱ	Group Ⅲ
negative	133	328	440
positive	110	301	45
Total	243	629	485

Group Ⅰ, 243 asymptomatic FSWs ; Group Ⅱ, 629 Symptomatic gynecology clinic patients ; Group Ⅲ 485 women attending physical examination.

DISCUSSION

FSWs have been identified as one of the highest risk groups for the infection and transmission of STIs because most RTIs show no symptoms or symptom is too minimal to detect.[6] We usually apply pathogen incubation to detect the potential infection. This screening have demonstrated that the infection rate in asymptomatic FSWs was so high as to 45.27%.We assumed that it was associated with the age of first sexual experience, high intensity of commercial sex work, the number of sexual partners >1, low level of education.[7] The infection rate of asymptomatic FSWs did not match with previous reports. We analyzed it might be some of asymptomatic FSWs have washed their genitals before samples collection. In addition, *Mycoplasma* and *Chlamydia* were excluded in this research, so the real rate of RTIs was higher than the results. So our results might be an underestimation in the prevalence of RTIs.

The results of screening have shown that *Garderella* infection in asymptomatic FSWs was 3.30%, while in gynecological clinic patients with symptoms was 11.61%.The discrepancy between the infection rates of this two kinds of microorganism was associated with long-term irregular use of antibiotic, genital wash, vaginal flora caused by irregular treatment supplied by private small clinic.[8] Moreover, due to the dissecting characteristics of female reproductive system, high intensity of sexual intercourse and floating sex partner, the disorder of internal endocrine hormone could break the original balanced vaginal condition. *Escherichia coli,* as one kind of conditioned pathogen, will overgrow abnormally. Furthermore, because of irregular use of antibiotic in asymptomatic FSWs, the washing of vaginal might cause resistance of *Escherichia coli*.[9-11] According to the statistic analysis of infectious department in our hospital, the percentage of ampicillin resistance was 100%, cefazolin resistance was 96%, ceftazidime resistance was 85.7%, cefotaxime resistance was 100%, cefepime resistance was 90.5%. This analysis may reveal the reason why asymptomatic FSWs have high infection rate of *Escherichia coli*. It also demonstrated that the prevalence of *Candida albicans* in asymptomatic FSWs was 7.41%, and no significant difference was noted. However, it should get more attention because of the high infection rates.

Only one example of *Neisseria gonorrhoeae*

was detected in asymptomatic FSWs in this research, taking up 0.41%.The study demonstrated that STIs and other reproductive tract infections were still prevalent among FSWs in the area with low STIs infection rate.[12] The infection rate of STIs was associated with local economy, income level and education level. The FSWs in this screening have almost received knowledge of STIs, and condom use was consistent in them, so it may lead to the low infection rate of STIs. But FSWs were still vulnerable to genital tract infection. [13-14]

RTIs in female can cause abdomen pain, increased the risk of sexually transmitted infections, chronic pelvic inflammatory disease, ectopic pregnancy, and infertility. Awareness and knowledge need to be improved on the subject to initiate meaningful preventive measures for control of RTIs. This implies that health intervention measures directed towards reducing morbidities from RTIs need not focus mainly on treatment of RTIs but rather on disease preventing strategies.[15] These include reproductive and sex education on the prevention of the infections by avoidance of high risk sexual behaviours, use of barrier contraception and regular hospital visits as RTIs are often asymptomatic. Condom was confirmed as the effective way to prevent RTIs, especially in the high risk population.[16] RTIs preventive programs should be integrated into other reproductive health care programs such as family planning, maternal and child health services with a view to providing a broad based reproductive health care.[17] Making vaccination to prevent RTIs is very difficult , such as variation in the immune responses due to the hormonal cycle, selection of vaccine antigens and timing of the vaccine administration prior to infection exposure.[18]

REFERENCES

1. Xiu-Jun Zhang , Qiong Shen , Guo-Ying Wang, Yu-Ling Yu. Risk factors for reproductive tract infections among married women in rural areas of Anhui Province, China. Eur J Obstet Gynecol Reprod Biol 2009;147:187–191.

2. World Health Organization. Global strategy for the prevention and control of sexually transmitted infections: 2006-2015.

3. World Health Organization. Laboratory diagnosis of gonorrhoea. WHO Regional Publication, South East Asia series No. 33. Geneva:World Health Organization;1999.

4. Nugent RP, Krohn MA, Hillier SL. Reliability of diagnosing bacterial vaginosis is improved by a standard method of Gram stain interpretation. J Clin Microbiol 1991; 29:297-301.

5. Danielle Cristina Alves Feitosa Gondo ,Marli Teresinha Cassamassimo Duarte, Márcia Guimarães da Silva, Cristina Maria Garcia de Lima Parada. Abnormal Vaginal Flora in Low-Risk Pregnant Women Cared for by a Public Health Service: Prevalence and Association with Symptoms and Findings from Gynecological Exams. Rev. Latino-Am. Rev Latino-Am Enfermagem 2010;18:919-27.

6. Krishna Ray , Sumathi Muralidhar , Manju Bala , Madhu Kumari . Comparative study of syndromic and etiological diagnosis of reproductive tract infections/sexually transmitted infections in women in Delhi. Int J Infect Dis 2009;13:352-359.

7. Sia Msuya, Jacqueline Uriyo, Akhtar Hussain. Prevalence of sexually transmitted infections among pregnant women with known HIV status in northern Tanzania. Reprod Health 2009;6:1-4.

8. Abir Znazen, Olfa Frikha-Gargouri, Lamia Berrajah, Sihem Bellalouna. Sexually transmitted infections among female sex workers in Tunisia: high prevalence of Chlamydia trachomatis. Sex Transm Infect 2010;86:500-505.

9. Li Rong Yang, Hong Zhao, He Ping Wang. Improving Ability of Married Women to Prevent Reproductive Tract Infections in Rural Western

China. Environ Health Prev Med 2006;11:233-240.

10. Lars Bjerrum ,Josep M Cots ,Carl Llor . Effect of intervention promoting a reduction in antibiotic prescribing by improvement of diagnostic procedures: a prospective, before and after study in general practice Eur J Clin Pharmacol 2006;62:913-918.

11. Chunyu Li, Hae-Ra Han, Jong-Eun Lee. Knowledge, behaviors and prevalence of Reproductive Tract Infections: A Descriptive Study on Rural Women in Hunchun, China. Asian Nurs Res 2010;4:122-129.

12. Lisa Scipioni Hernández, Peter J Winch, Kea Parker. Understandings of reproductive tract infections in a peri-urban pueblo joven in Lima, Peru. BMC Women's Health 2006,6:7.

13. Ojeda VD, Strathdee SA, Lozada R. Associations between migrant status and sexually transmitted infections among female sex workers in Tijuana, Mexico. Sex Transm Infect 2009;85:420-426.

14. Xu JJ, Wang N, Lu L. HIV and STIs in clients and female sex workers in mining regions of Gejiu City, China. Sex Transm Dis 2008;35:558-565.

15. Nguyn M Hng, Jørgen Kurtzhals, Th Thu Thy, Vibeke Rasch. Reproductive tract infections in women seeking abortion in Vietnam. BMC Women's Health 2009;9:1.

16. Tanaka M, Nakayama H, Sakumoto M. Reduced chlamydial infection and gonorrhea among commercial sex workers in Fukuoka City, Japan. Int J Urol 1998;5:471-475.

17. Li-xia DOU, Wei Yuan, Meng-ye Peng, Er-sheng Gao. Current situations of the integration of RTIs prevention and treatment into routine FP Program. J Reprod Contracept 2007;18:102-109.

18. Huston Wilhelmina M, Harvie Marina,Mittal Aruna. Vaccination to protect against infection of the female reproductive tract. Expert Rev Clin Immunol 2012;8:81-94.

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