

# Knowledge, Behaviors and Prevalence of Reproductive Tract Infections: A Descriptive Study on Rural Women in Hunchun, China

Chunyu Li<sup>1</sup>, RN, PhD, Hae-Ra Han<sup>2</sup>, RN, PhD,  
Jong-Eun Lee<sup>3\*</sup>, RN, PhD, Myungken Lee<sup>4</sup>, MD, PhD, Youngja Lee<sup>5</sup>, RN, PhD,  
Miyong T. Kim<sup>6</sup>, RN, PhD, FAAN

<sup>1</sup>Professor, Division of Community, School of Nursing, Yanbian University, Jilin, China

<sup>2</sup>Associate Professor, School of Nursing, Johns Hopkins University, Baltimore, USA

<sup>3</sup>Full-time Instructor, College of Nursing, The Catholic University of Korea, Seoul, Korea

<sup>4</sup>Associate Professor, School of Public of Health, Johns Hopkins University, Baltimore, USA

<sup>5</sup>Researcher, College of Nursing, Yonsei University, Seoul, Korea

<sup>6</sup>Professor, School of Nursing, Johns Hopkins University, Baltimore, USA

**Purpose** The aim of the study was to assess the prevalence, knowledge and behavior about reproductive tract infections (RTIs) among rural Chinese women in Hunchun, China.

**Methods** The study employed a cross-sectional research design with a convenience sample of 190 participants who had received microfinancing. Data were collected by trained research staff, utilizing face to face interviews and physical examinations.

**Results** About 1 in 5 participants (20.3%) had had more than 5 pregnancies and 26.7% had had 3 or more abortions. More than half (57.3%) of study participants had an RTI at the time of examination, and 92.3% reported having had at least one RTI symptom. Nearly half (49.6%) of the women who exhibited RTI symptoms reported no utilization of any healthcare services. Age, number of pregnancies, RTI knowledge, and behavior were found to be significant correlates in the sample.

**Conclusions** The prevalence of RTI among low-income rural Chinese women were extremely high, indicating the urgent need for effective and culturally sensitive health education, particularly targeted to the poor rural population. [*Asian Nursing Research* 2010;4(3):122–129]

**Key Words** Chinese women, low income, reproductive tract infections

## INTRODUCTION

Reproductive tract infections (RTIs) among women have become a widespread health concern. An

estimated 340 million new cases of RTIs, including sexually transmitted infections (STI), emerge each year, with 151 million of them occurring in Asia (World Health Organization, 2001). RTIs often cause



\*Correspondence to: Jong-Eun Lee, PhD, RN, The Catholic University of Korea, College of Nursing, 505 Banpo-Dong, Seocho-Gu, Seoul, 137-701, Korea.  
E-mail: jlee@catholic.ac.kr

Received: May 4, 2010 Revised: June 29, 2010 Accepted: August 31, 2010

serious long-term health consequences, such as pelvic inflammatory disease, cervical cancer, infertility, spontaneous abortion, and ectopic pregnancy (Cates, Rolfes, & Aral, 1990). In addition, the presence of an RTI is often associated with an increased risk for acquiring and transmitting HIV in many different populations (Cohen 1998; Coleman et al., 2007).

Although the prevalence of RTIs in China has declined in the past two decades, due, in part, to reproductive health care that is available through government services (Qian, Tang, & Garner, 2004), some medically underserved rural areas with limited access to health care services continue to experience a high prevalence of RTIs. For example, the prevalence rate of RTI was reported at 47.6%–58.1% for women residing in rural areas (Fang, Zhou, Yang, Diao, & Li, 2007; Zhang et al., 2009).

Poor personal hygiene, harsh living conditions, and a lack of accessible medical care facilities in rural villages significantly contribute to the high prevalence of RTIs among rural Chinese women. Although RTIs have become a major threat to the health of rural women in China (Wang, Zhao, Chen, & Bao, 2001; Xu, Wu, & Wen, 2003; Zhang et al., 2003), little information is available on RTIs among low-income rural Chinese women, including exact prevalence and correlates of RTIs, such as modifiable risk factors (Guo, Wang, & Yan, 2002; Shun et al., 2003; Xia, Liao, He, Choi, & Mandel, 2004).

In light of these considerations, the objectives of this paper were two-fold: (a) To assess the prevalence of RTIs among participants through a physical examination; and (b) To determine correlates of RTI in order to identify modifiable risk factors of this emerging public health problem among low-income rural Chinese women. Specifically, we focused on describing the knowledge and behaviors toward female reproductive health in the target population. The findings of this research will assist in planning and implementing more effective public health efforts to minimize modifiable risk factors for the target population. Furthermore, the insights gained from the findings of this study will be applicable to other rural populations that have similar cultural and financial barriers to obtaining adequate reproductive care.

## METHODS

### *Design, sample and setting*

A cross-sectional descriptive design was used to assess the status of reproductive health among women in rural China. Chinese women who received microfinancing from the Poverty Alleviation of Tumen River Area (PATRA) in Hunchun city, Jilin province were recruited. PATRA is an on-going, nongovernmental financial assistance program for low-income residents in rural China. The reason for selecting Huchun city was that most of PATRA receivers live in the Huchun area. Since 2003, PATRA has offered microfinancing to a total of 450 individuals in three communities in Hunchun, China.

We targeted the whole population who was on the list of PATRA receivers. We called each person and asked to visit local community center if they want to participate in our study. One hundred and ninety of the 450 women visited a local community center and consented to our study in August, 2003.

In determining the appropriate sample size, we calculated a sample size using an alpha of .05, power of .08, and a moderate effect size ( $R^2 = .13$ ), which was conducted by G\*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009). The sample size was estimated to be at least 77 participants for study with three predictor variables.

### *Procedure*

After obtaining approval and ethical clearance for the study from the Hunchun Health Department Review Board, participants were recruited using the following eligibility criteria: (a) women residing in one of the three communities, Chunhua, Sanjiazi or Hadamen located in Hunchun, who received microfinancing; and (b) able to read, write and communicate in Chinese. Upon obtaining consent, the participants were interviewed by trained research staff in public centers and gynecological exams were given to each participant by certified physicians. If a participant was diagnosed with RTI by physicians, then they were referred to local hospital for further examination and treatment.

### **Instruments**

The interview questionnaire for this study was primarily based on the Chinese National Questionnaire-CNQ (International Cooperation Project of Maternal and Childhood Health in China, 1997), which has been widely used in China to examine many critical aspects of population-based reproductive health promotion such as reproductive health knowledge and health behavior (Jiang & Wu, 2006; Wang et al., 2001).

### **RTI symptoms**

Respondents self-reported any of following RTI symptoms: redness, swelling, pain; thick discharge, cervical erosion, lower back pain; severe menstrual pain, lower abdominal pain and frequent or painful urination.

### **RTI knowledge**

Knowledge on risk factors and prevention methods was measured by three items from the CNQ-W, and four items on knowledge regarding AIDS and other STIs were also added. Participants chose from dichotomous options, “true” or “false”. The internal consistency reliability coefficient for the 7-item knowledge scale was .80.

### **Reproductive health behaviors**

Health behaviors were measured by a 6-item sub-scale from the CNQ-W. Items that assessed relevant personal hygiene practices such as bathing and changing undergarments were included, as well as questions regarding sexual health behaviors. Participants were asked each item with “Yes” or “No” options. The internal consistency reliability coefficient for the 6-item scale was .82.

### **RTI status**

Status of RTI was assessed by a physician through direct physical examination.

### **Data analysis**

Descriptive statistics were used to summarize sample characteristics and study variables. In the analysis of socio-demographic characteristics, annual household income was recalculated from yuan (¥) to American dollars (US\$). Eight yuan is estimated to

equal one dollar. Pearson’s correlation coefficients were calculated to examine the relationships between RTI knowledge, and reproductive health behaviors. To examine the internal consistency reliability coefficient of RTI knowledge and reproductive health behaviors, Kuder–Richardson Formula 20 (KR-20) test was used for dichotomous variables. A *p* value of less than .05 was used to indicate a statistically significant association. In addition, a series of logistic regressions were performed in order to identify the significant predictors of the independent variables of age, RTI knowledge, and reproductive health behavior and impact on prevalence of RTI among the participants. All analyses in this study were performed using SPSS Statistics 12.0 (SPSS Inc., Chicago, IL, USA).

## **RESULTS**

### **Sample characteristics**

Participants represented a wide range of age groups (25–77 years), with a mean of  $43.48 \pm 10.40$  years. An overwhelming majority of them (97.4%) was married (Table 1). The ethnic breakdowns of the sample population were similar to that of the surrounding region, the majority of which is Han-Chinese (65.3%) followed by Korean-Chinese (34.7%). Education levels of the participants were low: only 16.4% were high school graduates and 28.9% were elementary school graduates or less. Because all participants were recipients of the PATRA microfinancing program, the average annual household income fell below poverty level: 53.8% of the sample earned under US\$200 per year. About one third (32.2%) made US\$200–399 per year and 14.0% earned US\$400 or more per year. Few of the participants had access to healthcare, while only 3.2% of participants reported to have medical insurance.

The obstetric history of women revealed that all of them experienced at least one pregnancy with 20.3% of them reporting multiple pregnancies (over 5 times) despite the current one child per household policy of China. The majority (70.9%) had experienced at least one induced abortion. Among those women, 26.7% had multiple abortion experiences

Table 1		
Sample Characteristics (N = 190)		
Variables	Categories	n (%)
Age (yr)	< 30	24 (12.6)
	30–39	56 (29.5)
	40–49	67 (35.3)
	≥ 50	43 (22.6)
	<i>M ± SD</i>	42.48 ± 10.52
Marital status	Yes	185 (97.4)
	No	5 (2.6)
Ethnicity	Han-Chinese	124 (65.3)
	Korean Chinese and other	66 (34.7)
Education	Elementary school or less	55 (28.9)
	Middle school	104 (54.7)
	High school	31 (16.4)
Annual household income	< US\$200	102 (53.8)
	US\$200–399	61 (32.2)
	≥ US\$400	27 (14.0)
Medical insurance	Yes	6 (3.2)
	No	184 (96.8)
No. of pregnancies	1–2	82 (43.2)
	3–4	69 (36.5)
	≥ 5	39 (20.3)
Induced abortion	Yes	135 (70.9)
	No	55 (29.1)
No. of abortions	1–2	139 (73.3)
	≥ 3	51 (26.7)
Place of childbirth	Hospitals	107 (56.2)
	At home	83 (43.8)

(over 3 times). While more than half (56.2%) reported that they delivered their child or children in a hospital setting, a substantial number of women (43.8%) had their children delivered at home.

### RTI status

Of the 190 participants of this study, 117 women agreed to and received gynecological examinations by a physician. Over 38.4% of women refused the examination because, being so modest, they felt extremely

Table 2		
Status and Symptoms of RTI (N = 117)		
Variables	Categories	n (%)
RTI <sup>a</sup>	Yes	67 (57.3)
	No	50 (42.7)
RTI signs <sup>a</sup>	Redness and swelling	24 (5.8)
	Pain	29 (43.3)
	Thick discharge	25 (37.3)
	All of the above	56 (83.6)
Cervical erosion <sup>a</sup>	Yes	33 (28.2)
	No	84 (71.8)
Self-reported RTI	Yes	108 (92.3)
	No	9 (7.7)
Self-reported symptoms of RTI	Thick, whitish discharge with odor	80 (74.1)
	Perineal itching	65 (60.2)
	Lower back pain	61 (56.5)
	Severe menstrual pain	41 (38.0)
	Lower abdominal pain	24 (22.2)
	Frequent or painful urination	14 (13.0)

Note. RTI = reproductive tract infection. <sup>a</sup>Examined and confirmed by a physician.

embarrassed to have such examinations. When these women were asked for their response to hypothetical situations of encountering RTI symptoms, all women who refused the examination said they would avoid going to the doctor all together due to the “embarrassing” physical examination by male physicians.

Of the 117 participants who were examined by the physician, 57.3% were diagnosed to have RTI (Table 2). The most common RTI signs and symptoms were redness and swelling of the vagina or vulva area with pain and thick discharges (83.6%). More than a quarter (28.2%) of those who were diagnosed to have RTI also revealed some degree of cervical erosions noted by physical examinations. The majority of the participants (92.3%) reported that they suspected having an RTI, with unusual vaginal discharges, perineal itching, lower back pain, being the most commonly reported symptoms, affecting more than half of the respondents.

**Table 3****Knowledge of RTI (N = 145)**

Variables	Items	Correctly answered
		n (%)
Knowledge		
	Risk factors	
	Bacterial vaginitis can be transmitted through sexual intercourse	41 (28.3)
	Having multiple sexual significant partners is a risk of sexually transmitted diseases	46 (31.7)
Prevention methods	AIDS can be transmitted by blood	65 (44.8)
	AIDS can be transmitted by sexual intercourse	73 (50.3)
	Condom use can reduce the risk of getting sexually transmitted diseases	26 (17.9)
	If you are diagnosed with a sexually transmitted disease, you and your spouse or sexual partners must receive treatment together	30 (20.7)
	Diagnosis of AIDS should be through a blood test	34 (23.4)

Note. RTI = reproductive tract infection.

### RTI Knowledge

Table 3 presents RTI related knowledge in the sample. In general, the participants' levels of RTI knowledge were very low with the average total score of the knowledge scale being 2.17 (scale range: 0–7). The majority of participants did not understand the nature of STI, nor ways of preventing the spread of such infections. For example, over 70.0% of the participants gave incorrect responses to the following questions: (a) “condom use can reduce the risk of getting STI”; (b) “if you are diagnosed with a STI, you and your spouse or sexual partners must receive treatment together”; (c) diagnosis of AIDS should be

**Table 4****Reproductive Health Behavior (N = 145)**

Items	Yes	No
	n (%)	n (%)
Washing during menstruation	21 (14.4)	124 (85.6)
Changing their undergarment daily	40 (27.9)	105 (72.1)
Taking shower daily	72 (49.6)	73 (50.4)
Washing before a sexual intercourse	30 (20.5)	115 (79.5)
Washing after a sexual intercourse	39 (26.7)	106 (73.3)
Spouses taking shower or washing before sexual intercourses	40 (27.9)	105 (72.1)

through a blood test, and (d) “bacterial vaginitis can be transmitted through sexual intercourse”.

### Reproductive health behavior

Items regarding reproductive health behaviors consisted of a series of personal hygiene questions related to reproductive health. The results of this behavioral survey indicated that only about or less than 1 in 4 women in the sample were washing during menstruation (14.4%), changing their undergarment daily (27.9%), and washing before and after sexual intercourse (20.5% and 26.7%, respectively) and about half were taking a shower daily (49.6%). The survey also indicated that less than one third (27.9%) of participants' spouses took a shower or washed before sexual intercourse (Table 4).

### Correlates of RTI knowledge, reproductive health behaviors and RTI status

We hypothesized that RTI knowledge is positively associated with behaviors of reproductive health and ultimately the RTI status. This hypothesis was supported by a significant positive correlation between RTI knowledge and reproductive health behavior ( $r = .33, p < .01$ ). Other significant correlates of RTI knowledge included younger age ( $r = -.43, p < .01$ ), less number of pregnancies ( $r = -.19, p < .05$ ). The significant correlates of reproductive health behaviors

**Table 5**

*Correlations Among Demographics, Knowledge and Behaviors to RTI*

Variables	Age	No. of pregnancies	RTI knowledge	Reproductive health behaviors
Age				
No. of pregnancies	.581**			
RTI knowledge	-.428**	-.189*		
Reproductive health behaviors	-.445**	-.293**	.333**	

Note. RTI = reproductive tract infection. \* $p < .05$ . \*\* $p < .01$ .

**Table 6**

*Adjusted Odds Ratios of Association Between RTI and Related Factors*

Factors	OR	95% CI		p
		Lower	Upper	
Reproductive health behavior	1.311	.623	2.757	.288
RTI knowledge	1.610	.636	4.075	.315
Age	1.583	.637	3.937	.323

Note. OR = odds ratio; CI = confidence interval; RTI = reproductive tract infection.

were similar to those of the level of knowledge; they included age ( $r = -.45, p < .01$ ), the number of pregnancies ( $r = -.29, p < .01$ ). The findings indicate that younger women and fewer pregnancies practice more desirable reproductive health behaviors and RTI knowledge (Table 5).

In order to identify correlates of RTI status, a series of bivariate logistic regression analyses were conducted. The women who did not practice desirable reproductive health behaviors were about 1.3 times (95% confidence interval [CI]: 0.62–2.76) more likely to have a RTI than women who practiced desirable reproductive health behaviors. Similarly, participants with lower RTI knowledge were 1.6 times (95% CI: 0.64–4.08) more likely to have a RTI when compared to women with higher levels of RTI knowledge. Finally, older women ( $\geq 45$  yr) were about 1.6 times (95% CI: 0.64–3.94) more likely to have a RTI than their younger counterparts ( $< 45$  yr). However, there were no statistically significant results in the bivariate logistic regression analyses (Table 6).

**DISCUSSION**

The findings of this study indicate that the sample of rural Chinese women suffered from a high prevalence of RTI that stemmed from limited knowledge and access to care regarding RTIs and general reproductive health. The findings are consistent with other research done in similar populations, as the rates of RTI symptoms among the rural low-income women in our study are as high as or higher than those reported in studies targeting rural women in China or other underdeveloped countries (International Cooperation Project in Maternal and Childhood Health in China, 1997; Maitra, Degraft-Johnson, Singh, & Tsui, 2001; Xia et al., 2004). Our study findings also suggest that this high RTI prevalence is strongly related to the level of reproductive health knowledge and behaviors. The majority of study participants revealed extremely low levels of knowledge in reproductive health in general and rarely used proper personal hygiene to prevent RTIs. Previous studies focusing on rural women with low socioeconomic status also revealed similar patterns of insufficient knowledge and health behaviors to protect against RTIs and STI (Harms et al., 1998; Shun et al., 2003).

Although our results of multivariate analyses to identify significant correlates of RTI status failed to yield significant findings, bivariate analyses revealed several potential risk factors of RTIs in this population such as being of old age, low RTI knowledge, and poor personal hygiene, which are consistent with other study results (Guo et al., 2002; Zhang et al., 2003). In particular, older women in this sample had significantly lower RTI knowledge and inadequate

health behaviors to prevent RTIs. RTI knowledge was positively associated with reproductive health behaviors. Guo et al. also found that rural women who had more knowledge on self-medication were more likely to utilize health services. Our finding implies that future intervention efforts for RTI prevention may need to be focused more on those who are at relatively high risk for low levels of RTI knowledge. Another noteworthy finding of this study was that our study participants were not only experiencing a high rate of RTIs, but they also suffered from major repercussions of poor reproductive health such as a high rate of unwanted pregnancies and subsequent abortions. Despite the nation's "one child policy," a majority of these women reported multiple pregnancies which ended in elective abortions. It appears that a lack of access to proper health education in general for these women is the common cause of insufficient knowledge and inadequate self-care skills. In addition, for the majority of women the cultural notion of "modesty" plays a critical role in preventing them from receiving proper prenatal care or reproductive health related examinations. During our study, a great number of participants refused to undergo a physical (pelvic) examination from male physicians because it is "embarrassing." Tian, Li, Zhang, and Guest (2007) also found that female clients did not feel comfortable and were very embarrassed to see male physicians for reproductive problems. They pointed out lack of female doctors as a barrier that inhibited many women from seeking reproductive health care. Therefore, the government needs to train and facilitate women in gynecology specialties, such as women's health advanced practice nurses as well as female physicians. Also, health care providers need to establish network system so that female doctors and advanced practice nurses can access rural areas that cannot provide reproductive health care by female doctors.

Our study findings should be read with some caution in light of the following limitations. First, our study sample was representative of only rural women populations with limited economic resources. Second, our data have some inherent limitations because of the relatively small sample size. In particular,

because of the high refusal rate (38.4%) of a physical examination, the RTI outcome variable had a fewer number of people who were included. In addition, the variance of knowledge and behaviors were relatively low as the majority of the participants had low levels of education and limited access to health information. The lack of variance in these key variables might have been the main reason for not obtaining statistically significant results in the multivariate analyses.

Despite these limitations, the current study suggests a few important clinical implications regarding the reproductive health of rural Chinese women. The findings of this study underscore the urgent need for access to reproductive health care for the target population. As RTIs and wide-spread STI become major public health concerns in many countries, including underdeveloped countries and rural areas, extremely limited access to care experienced by these women can lead to catastrophic consequences. To increase awareness, knowledge, and self-care skill related to RTI, health care provider need to develop effective strategies. Psychobehavioral education intervention, which include enhancing RTI knowledge and its treatment, reducing RTI risk factors, and providing hygiene practices and resources regarding health care services with low price should be developed and implemented as community-based interventions.

## CONCLUSION

Chinese women were extremely high, and low levels of RTI knowledge and poor reproductive health were revealed. Current findings underscores the urgent need for culturally relevant and effective reproductive health education for rural women. Specifically, community-based interventions targeting these women in impoverished environments should be implemented in order to reduce the extreme health disparity gap in the lives of women in rural China. Also, as the cultural notion of modesty regarding pelvic examination from male physicians was a barrier, active training and incorporation of women's health advanced practice nurses and female physicians

are needed to facilitate access at the community level.

Finally, at the social level, the government has to consider distribution of health care delivery system to expand health service resources for vulnerable population in rural areas.

## REFERENCES

- Cates, W., Jr., Rolfs, R. T., Jr., & Aral, S. O. (1990). Sexually transmitted diseases, pelvic inflammatory disease, and infertility: An epidemiologic update. *Epidemiologic Reviews*, *12*, 199–220.
- Cohen, M. S. (1998). Sexually transmitted diseases enhance HIV transmission: No longer a hypothesis. *Lancet*, *351* (Suppl 3), 5–7.
- Coleman, J. S., Hitti, J., Bukusi, E. A., Mwachari, C., Muliro, A., Nguti, R., et al. (2007). Infectious correlates of HIV-1 shedding in the female upper and lower genital tracts. *AIDS (London, England)*, *21*, 755–759.
- Fang, X., Zhou, Y., Yang, Y., Diao, Y., & Li, H. (2007). Prevalence and risk factors of trichomoniasis, bacterial vaginosis, and candidiasis for married women of child bearing age in rural Shandong. *Japanese Journal of Infectious Diseases*, *60*, 257–261.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G\*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149–1160.
- Guo, S., Wang, L., & Yan, R. (2002). Health service needs of women with reproductive tract infections in selected areas of China. *Chinese Medical Journal*, *115*, 1253–1256.
- Harms, G., Iyambo, S. N., Corea, A., Radebe, F., Fehler, H. G., & Ballard, R. C. (1998). Perceptions and patterns of reproductive tract infections in a young rural population in north-west Namibia. *International Journal of STD & AIDS*, *9*, 744–750.
- International Cooperation Project of Maternal and Childhood Health in China. (1997). Investigation of reproductive tract infection status among married women in rural poor areas. *Journal of Maternal and Child Health Care of China*, *12*, 176–178.
- Jiang, R. G., & Wu, Q. X. (2006). Investigation on the relative knowledge of reproductive tract infection and health-seeking behavior of rural married women of child bearing age. *Chinese Women Health*, *21*, 2718–2719.
- Maitra, K., Degraft-Johnson, J., Singh, K. K., & Tsui, A. O. (2001). Prevalence of self-reported symptoms of reproductive tract infections among recently pregnant women in Uttar Pradesh, India. *Journal of Biosocial Science*, *33*, 585–601.
- Qian, X., Tang, S., & Garner, P. (2004). Unintended pregnancy and induced abortion among unmarried women in china: A systematic review. *BMC Health Services Research*, *4*, 1.
- Shun, X. J., Zhang, A. G., Dan, B. D., Zhou, F. R., Liu, X., Liu, X. J., et al. (2003). Shandong province women reproductive health condition and prevention and strategies of prevention. *Journal of Maternal & Child Health Care of China (Chin)*, *18*, 560–561.
- Tian, L., Li, J., Zhang, K., & Guest, P. (2007). Women's status, institutional barriers and reproductive health care: A case study in Yunnan, China. *Health Policy*, *84*, 284–297.
- Wang, L. H., Zhao, G. L., Chen, L. J., & Bao, Y. X. (2001). The study on prevalence and influencing factors to reproductive tract infections in married women. *Chinese Journal Health Statistic (Chin)*, *18*, 77–79.
- World Health Organization (WHO). (2001). Global prevalence and incidence of selected curable sexually transmitted infections: Overview and estimates. Geneva, Switzerland: WHO.
- Xia, D. Y., Liao, S. S., He, Q. Y., Choi, K. H., & Mandel, J. S. (2004). Self-reported symptoms of reproductive tract infections among rural women in Hainan, China: Prevalence rates and risk factors. *Sexually Transmitted Diseases*, *31*, 643–649.
- Xu, Y. L., Wu, F. Y., & Wen, S. L. (2003). Investigation of reproductive tract infection status among women. *Modern Preventive Medicine (Chin)*, *30*, 525–526.
- Zhang, W. H., Peng, L., Liu, C. L., Liu, Y. X., Li, Z. L., & Wu, S. X. (2003). The poor region village is married to teach women reproductive of risk factor in an infection analysis. *Journal of Maternal & Child Health Care of China (Chin)*, *18*, 589–591.
- Zhang, X. J., Shen, Q., Wang, G. Y., Yu, Y. L., Sun, Y. H., Yu, G. B., et al. (2009). Risk factors for reproductive tract infections among married women in rural areas of Anhui Province, China. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*, *147*, 187–191.