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# **Sexually Transmitted Infections and other Reproductive Tract Infections in Rural Vietnam**

**Current situation, management and implications for control**

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Institutet**

**Stockholm 2009**

Published by Karolinska Institutet. Printed by Universitetservice US – AB  
Box 200, SE-171 77 Stockholm, Sweden

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ISBN 978-91-7409-366-7

## ABSTRACT

**Background:** Sexually transmitted infections (STI) and other reproductive tract infections (RTI) constitute a huge health and economic burden in low-income countries. The infections may result in severe sequelae, particularly in women, and facilitate HIV acquisition and transmission. In Vietnam, women from rural or remote areas delay before seeking care for STI. Little is known about the situation regarding STI/RTI in the community.

**Aims:** To explore perceptions and attitudes towards STI/RTI among people in the community; to assess the knowledge of STI and possible associations between socioeconomic determinants and STI knowledge among women aged 15 to 49; to investigate the prevalence of STI/RTI and related factors among married women aged 18 to 49; and to assess healthcare providers' (HCPs') knowledge and reported practices regarding STI.

**Methods:** Ten focus group discussions (FGDs) were conducted with a total of 73 participants aged 15 to 49 (46 women and 27 men) in Bavi district (Study I). Face-to-face interviews using a structured questionnaire about STI knowledge were carried out among 1805 women aged 15 to 49 randomly selected from 17 clusters of an epidemiological field laboratory in Bavi district (FilaBavi) (Studies II, III). In total, 1,012 married women, in addition to being interviewed, underwent a gynaecological examination. Specimens were collected for laboratory diagnostics of chlamydia, gonorrhoea, trichomonas, bacterial vaginosis (BV), candidiasis, hepatitis B, HIV, and syphilis (Study III). HCPs working in Bavi district, including 390 medical personnel and 75 pharmacy personnel participated in a self-completion questionnaire survey on STI knowledge and case scenarios (Study IV).

**Results:** In the FGDs, RTI, gonorrhoea and syphilis was described as three stages of an STI. Health-seeking patterns for STI/RTI were reported to differ between men and women: self-medication was a common practice among women, while men were more likely to seek healthcare from private HCPs. Complaints were voiced about clinicians' negative attitudes towards STI/RTI patients (Paper I). Among 1,805 women, 78% did not know of any symptom of any STI. Of 40 possible correct answers, the mean knowledge score was 6.5. Young and/or unmarried women demonstrated very low levels of STI knowledge. Experience of an induced abortion predicted a higher level of knowledge (Paper II). Of the 1,012 married women, 39% were aetiologically confirmed as having an STI/RTI. Endogenous infections were most prevalent (candidiasis 26%, BV 11%) followed by hepatitis B 8.3%, *Chlamydia trachomatis* 4.3%, *Trichomonas vaginalis* 1%, *Neisseria gonorrhoeae* 0.7%, genital warts 0.2%, HIV and syphilis 0%. Prevalence of any STI was 6.0%. Age under 30 years or using an intrauterine device were significantly associated with increased risk of BV. Determinants of candidiasis were vaginal douching, high education level and low economic status, whereas a determinant of chlamydia was high economic status. Out migration of the husband was associated with an increased risk of hepatitis B surface antigen seropositivity among women. Compared with the laboratory diagnostics, both self-reported symptoms and clinical diagnosis had very low sensitivity and positive predictive values (Paper III). Of 465 HCPs, 70% acknowledged the necessity for partner treatment for BV or candidiasis cases (which is often not the case). Sharing clothes/food or kissing were commonly mentioned as transmission routes of STI (60%). Mean score of knowledge and reported practice were 28.2 (minimum 0, maximum 50, median 26) and 4.7 (minimum 0, maximum 20, median 2), respectively. Of the HCPs, 34% and 78% had suboptimal knowledge and practice score (below 50% of the total score). Being a medical doctor, assistant medical doctor, midwife or serving STI patients predicted a higher level of knowledge. Additionally, serving STI patients, being a midwife, female provider, and having participated in STI/RTI training courses predicted higher level of practice (Paper IV).

**Recommendations:** Health education interventions to improve knowledge of STI/RTI for community members as well as HCPs are urgently needed. Further, communication between STI/RTI patients and clinicians needs to be improved. Syndromic algorithms should be supplemented by risk assessment in order to reduce under and over treatment. Microscopic diagnosis could be applied in primary care settings to achieve more accurate diagnoses. Vaccination to prevent hepatitis B for migrants should be considered.

**Keywords:** sexually transmitted infections; reproductive tract infections; prevalence; knowledge; perception; attitude; health-seeking pattern; community; healthcare provider; rural; Vietnam

## LIST OF PUBLICATIONS

This thesis is based on the following papers, which will be referred to by their Roman Numerals I-IV.

- I. Lan PT, Faxelid E, Chuc NTK, Mogren I, Stålsby Lundborg C. Perceptions and attitudes in relation to reproductive tract infections including sexually transmitted infections in rural Vietnam: A qualitative study. *Health Policy* 2008;86:308-17.
- II. Lan PT, Stålsby Lundborg C, Mogren I, Phuc HD, Chuc NTK. Lack of knowledge about sexually transmitted infections among women in rural Vietnam. (Submitted for publication).
- III. Lan PT, Stålsby Lundborg C, Phuc HD, Sihavong A, Unemo M, Chuc NTK, Khang TH, Mogren I. Reproductive tract infections including sexually transmitted infections: a population-based study of women of reproductive age in a rural district of Vietnam. *Sex Transm Infect* 2008;84(2):126-32.
- IV. Lan PT, Mogren I, Phuc HD, Stålsby Lundborg C. Knowledge and practice of healthcare providers regarding sexually transmitted infections in rural Vietnam. *Sex Transm Dis*. (In press).

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## ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
AMD	Assistant Medical Doctor
ANC	Antenatal Care
BV	Bacterial Vaginosis
CI	Confidence Interval
CHC	Commune Health Centre
DHC	District Health Centre
ELISA	Enzyme-linked immunosorbent assays
FGD	Focus Group Discussion
FSW	Female Sex Worker
GDP	Gross Domestic Product
GSO	General Statistical Office
HBsAg	Hepatitis B surface antigen
HIV	Human Immunodeficiency Virus
HMU	Hanoi Medical University
HSRP	Health System Research Project
ICC	Intra Cluster Correlation
IEC	Information, Education and Communication
IDU	Intravenous Drug User
IUD	Intrauterine Device
IHCAR	Division of International Health, Karolinska Institutet
MD	Medical Doctor
MOH	Ministry of Health
MSM	Men who have Sex with Men
NIDV	National Institute of Dermato-Venereology
NPV	Negative Predictive Value
OR	Odds Ratio
PCR	Polymerase Chain Reaction
PLWHA	People living with HIV/AIDS
PPV	Positive Predictive Value
RPR	Rapid Plasma Reagin
RTI	Reproductive Tract Infections
SD	Standard Deviation
Sida	Swedish International Development Cooperation Agency
STI	Sexually Transmitted Infections
UNAIDS	United Nations Joint Programme on AIDS
UNFPA	United Nations Population Fund
WHO	World Health Organization

## PREFACE

I graduated from Hanoi Medical University (HMU), Vietnam in 1990, then continued with a three year postgraduate training as a resident doctor in dermato-venereology and obtained a Master of Science in Medicine in 1998. Since 1995, I have been working as a lecturer at HMU and as a dermato-venereologist at the National Institute of Dermato-Venereology (NIDV), Hanoi, Vietnam.

In Vietnam, the economic reform happened in 1986, during my studies at the medical university. I, have therefore experienced at first hand the changes from the “closed door” to the “open door” policies. The open door policy - “Renovation” has marked a new step forward for the economy and society. This has had a great impact on urbanization, migration and the lifestyles of people. Together with other changes in economic and social life, sexuality is gradually becoming far more open than it was in the past. Moreover, since the first case of HIV appeared in Vietnam in 1990, there has been a rapid increase in numbers despite the great efforts of the government to combat it.

Working at the NIDV as a clinician, I have seen many STI patients from a variety of areas and socio-economic backgrounds with different kinds of infections that have been transmitted sexually and have learnt a great deal about the different risks in this field. The common factors are that they have engaged in unprotected sexual intercourse with high risk groups or got the infections from their spouses/partners. It seems that the STI patients are afraid of being infected by HIV, but are far less worried about other STI. I have well understood that STI patients either belong to high risk groups or act as bridges to potentially transfer the infections most often from high risk groups to the general population. However knowledge about STI/HIV among the general population is very limited, especially among rural dwellers who make up the majority of population of Vietnam.

I have been involved in the Health System Research Project, Vietnam since 2003. I saw my field work at FilaBavi as providing a good opportunity to visit households and health centres, and to talk with people in the community and health staff in order to gain a preliminary understanding about the issues that interested me. I was told that “gynaecological disease” was very common among local women in Bavi district, and that out of ten women, eight to nine would have “gynaecological disease”, further “venereal disease” or STI were also common. I was curious as to whether the infections were so common. If they were, why? and if they were, something had to be done for this community to reduce the morbidity.

The above reasons made me become very interested in an investigation of STI/RTI with the emphasis on the STI situation from different perspectives with the hope that contributions from the studies in this thesis would be of use for combatting STI/RTI/HIV in my country.

In 2004, I was registered as a PhD student at IHCAR, Karolinska Institutet. The training that I have gone through during these years has further provided me with broader views on those factors that impact on the morbidity of the population as a whole. This has also enhanced my clinical view on each individual case.

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# 1 BACKGROUND

Reproductive tract infections (RTI) refer to three types of infections, which affect the reproductive tract: *i*) sexually transmitted infections (STI) transmitted through sexual activity with an infected partner; *ii*) endogenous infections resulting from an overgrowth of organisms normally present in the vagina, including bacterial vaginosis and candidiasis; and *iii*) iatrogenic infections occurring when micro-organisms are introduced into the reproductive tract by unsterilized surgical instruments through a medical procedure such as menstrual regulation, induced abortion, insertion of an intrauterine device (IUD) or termination of a pregnancy.<sup>126, 180</sup>

In most cases, STI have more severe health consequences than other RTI, the term STI/RTI is used throughout the thesis to highlight the importance of STI within reproductive tract infections. When information provided is relevant to sexually transmitted infections only, the term STI has been used alone.

## 1.1 STI/RTI – A PUBLIC HEALTH PROBLEM

The global disease burden of STI/RTI is well documented as a major public health concern.<sup>144</sup> In low-income countries, STI are the second cause of healthy life lost in women, after maternal morbidity and mortality.<sup>144</sup> Among women, non-sexually-transmitted RTI are usually even more common.<sup>180</sup> STI/RTI may result in severe sequelae, particularly in women, such as pelvic inflammatory diseases, infertility, ectopic pregnancy, cervical cancer, maternal infections, perinatal deaths, and potentially blinding eye infections in infants.<sup>35, 45, 126, 181</sup> Unfortunately, symptoms and signs of many infections may not appear until it is too late to avoid the consequences and damage of the reproductive organs. Furthermore, STI/RTI are important cofactors of the acquisition and transmission of human immunodeficiency virus (HIV).<sup>27, 45, 138</sup> Ulcerative STI increase the risk of HIV acquisition through sexual intercourse most dramatically because genital ulcers and lesions allow easier entry of infectious particles. Inflammatory STI/RTI increase genital shedding of HIV infected cells. In addition, urethral and endocervical infections that cause inflammation allow for more efficient exchange of infectious particles, making transmission more likely.<sup>126</sup>

STI are caused by about 30 different identified agents, of which bacteria, protozoa, and parasites can be killed by effective medications. In spite of the availability of effective treatment, bacterial STI are still a major public health concern in all countries irrespective of economic level. The main STI (excluding HIV) that are important from a public health perspective are syphilis, gonorrhoea, chlamydia and trichomoniasis.<sup>180</sup> The World Health Organization (WHO) estimates that apart from AIDS, there are over 340 million new cases of curable STI each year worldwide in men and women aged 15–49 years, including trichomoniasis, chlamydial infection, gonorrhoea and syphilis.<sup>178</sup> Millions of viral STI cases also occur annually, attributable mainly to HIV, human herpes viruses, human papilloma viruses and hepatitis B virus.<sup>80, 178</sup>



Globally, STI/RTI constitute a huge health and economic burden, especially for low-income countries where they account for 17% of economic losses caused by ill-health.<sup>80</sup> The morbidity associated with STI/RTI also affects the economic productivity and quality of life of individuals as well as whole communities. The socioeconomic costs of these infections and their complications are substantial,<sup>35</sup> ranking among the top ten reasons for healthcare visits in most low-income countries, despite that many STI patients do not seek healthcare from health facilities, and substantially drain both national health budgets and household income.<sup>178</sup> The social costs include conflict between sexual partners and domestic violence. The costs increase further when the cofactor effect of other STI on HIV transmission is taken into consideration.<sup>178</sup>

## **1.2 STI/RTI PREVENTION AND CONTROL**

### **The necessity for prevention and control**

#### *To reduce morbidity and mortality*

To limit the morbidity and mortality associated with both STI and HIV, prevention is crucial.<sup>126</sup> Primary strategies for preventing the transmission of STI are the same as those for HIV/AIDS.<sup>126</sup> Infections with sexually transmitted pathogens other than HIV impose a huge burden of morbidity and mortality in all countries irrespective of income level. The infections may impact directly on quality of life, reproductive health and child health, and indirectly on facilitating HIV transmission, and on national and individual economies.<sup>35, 178</sup> The health consequences of STI range from mild acute illness to painful disfiguring lesions and psychological morbidity. In addition, there is a large economic burden and loss of productivity to individuals and nations as a whole.<sup>178</sup> Thus, the infections should be controlled in their own right as a public health problem.

#### *To prevent HIV infection*

While HIV/AIDS can only be suppressed using antiretroviral (ARV) therapy, the majority of STI/RTI can be cured by medication. Consequently, improved case management of STI is one of the interventions scientifically proven to reduce the incidence of HIV infection in the general population.<sup>45, 76</sup> Preventing and treating STI reduces the risk of sexual transmission of HIV,<sup>126</sup> especially among populations who have a high number of sex partners, such as sex workers and their clients. The presence of an untreated inflammatory or ulcerative STI increases the risk of transmission of HIV during unprotected sex.<sup>126, 177</sup> Genital ulcers have been estimated to increase the risk of transmission of HIV 50–300-fold per episode of unprotected sexual intercourse.<sup>178</sup> Services providing care for STI are one of the key entry points for HIV prevention. Patients seeking care for STI are a key target population for prevention, counselling and voluntary and confidential testing for HIV, and may be in need of care for HIV/AIDS because they may have primary HIV infection at the same time. Effective prevention messages, treatment for STI, and promotion of condoms could have a substantial impact on HIV transmission.<sup>178</sup>

### *To prevent serious complications and adverse pregnancy outcomes*

STI are the main preventable cause of infertility, particularly in women. Between 10% and 40% of women with untreated chlamydial infection develop symptomatic pelvic inflammatory disease (PID).<sup>149</sup> Post-infection tubal damage is responsible for 30% to 40% of cases of female infertility. Furthermore, women who have had PID are 6 to 10 times more likely to develop an ectopic pregnancy than those who have not, and up to 50% of ectopic pregnancies can be attributed to previous PID.<sup>178</sup> Prevention of PID will prevent the majority of mortality related to ectopic pregnancy. Prevention of human papilloma virus infection will reduce the number of women who die from cervical cancer,<sup>126, 178</sup> the second most common cancer in women after breast cancer.<sup>178</sup>

Untreated STI are associated with congenital and perinatal infections in neonates. In pregnant women with untreated early syphilis, 25% of pregnancies result in stillbirth and 14% in neonatal death.<sup>178</sup> Untreated gonococcal infection in pregnant women may result in spontaneous abortions, premature births, and up to 10% in perinatal deaths. Infants born to mothers with untreated gonorrhoea and/or chlamydial infection will develop ophthalmia, which can lead to blindness of about 4,000 newborn babies worldwide annually.<sup>178</sup> Furthermore, BV may lead to premature birth, low birth weight; or even infertility or ectopic pregnancy.<sup>77, 126</sup> In short, high rates of preventable reproductive morbidity and mortality related to STI/RTI make prevention and control of these infections a public health priority.<sup>180</sup>

### **The approach for prevention and control**

To reduce the burden of STI/RTI, efforts are needed among both healthcare personnel and the community. Effective prevention and management practised by healthcare providers (HCPs) reduce the STI/RTI burden in several ways. Effective treatment reduces STI prevalence, and thereby decreases transmission in the community. HCPs play a critical role in controlling the spread of STI through early and accurate diagnosis, appropriate treatment, and counselling regarding prevention.<sup>63, 183</sup> Moreover, safe and appropriate clinical procedures mean fewer iatrogenic infections. Community education is needed to promote prevention of infection and use of healthcare services and therefore, reduce disease transmission within the community.<sup>180</sup>

### *Syndromic management of STI/RTI*

Timely diagnosis and effective treatment for STI have always been important in limiting the morbidity and mortality associated with these infections. There have been two main approaches to diagnosis of STI/RTI: clinical and laboratory. *Clinical diagnosis* relies on recognition of symptoms by the patient and identification of signs from the clinician's medical experience. It is an inexpensive approach and treatment can begin immediately. However, it is unstandardized and often unreliable.<sup>126, 179, 181</sup> *Laboratory diagnosis* is a more accurate way to identify STI/RTI, however it often requires resources (e.g. equipment, trained technicians), it may require patients to make several visits to the clinic, and almost always results in delayed treatment.<sup>126, 180, 181</sup> Effective management

of STI is one of the bases of STI control, because it prevents the development of complications and sequelae, decreases the spread of the infections in the community and it also offers a unique opportunity for targeted education about HIV prevention.<sup>179</sup> Therefore, in order to standardize and improve clinical practice, the WHO has developed the so-called *syndromic management approach*.

The *syndromic management approach* is based on the identification of syndromes, which are combinations of symptoms and signs, and the provision of treatments, which are effective for organisms most commonly responsible for each syndrome.<sup>126, 179, 180</sup> Using the syndromic approach to STI case management is a practical way to diagnose and treat STI/RTI cases while helping to prevent further spread of STI. It allows health workers to diagnose and treat patients during the patient's first visit without the need to return to the clinic, and without waiting for the results of laboratory tests.<sup>181</sup>

WHO has developed simple flowcharts to guide HCPs in using the syndromic approach to managing STI syndromes, of which four syndromes are covered in the training package, including (i) urethral discharge in men, (ii) vaginal discharge, (iii) lower abdominal pain in women, and (iv) genital ulcer in men and women.<sup>181</sup> Management is simplified by the use of clinical flowcharts and standardized prescriptions. Primary HCPs can be trained to use the syndromic approach.<sup>126</sup> Comprehensive syndromic management for STI includes correct drug treatment, condom promotion and provision, identification and treatment of sexual partners, and counseling to promote risk reduction.

Despite the limitation in finding asymptomatic cases,<sup>126</sup> and the criticisms regarding the waste of a lot of drugs and promoting the development of antibiotic resistance,<sup>181</sup> the syndromic approach has proved to be cost-effective and particularly suitable for resource-poor settings where diagnostic facilities are either lacking or unreliable.<sup>80</sup> Furthermore, syndromic management guidelines are widely used for syndromes such as lower abdominal pain, urethral discharge and genital ulcer, even in high-income countries with advanced laboratory facilities.<sup>180</sup>

### **Challenges for STI/RTI control in low-income countries**

Epidemiological patterns of STI vary geographically and are influenced by cultural, political, economical and social powers. Many people affected by STI are in marginalised vulnerable groups. The asymptomatic nature of some STI remains a challenge to HCPs in areas of the world where laboratory screening tests are unaffordable.<sup>71</sup> Many people with STI/RTI do not seek treatment because they are asymptomatic or have mild symptoms (Figure 1). Others who have symptoms may prefer self-treatment or seek treatment at pharmacies or traditional healers. Even those who come to a clinic may not be properly diagnosed and treated. Consequently, only a small proportion of people with an STI/RTI may be cured and reinfection avoided.<sup>180</sup>

**Figure 1.** Barriers to STI/RTI control—finding people with an STI/RTI

People with STI/RTI	
Symptomatic	Asymptomatic
Seek care	Do not seek care
Accurate diagnosis	Inaccurate diagnosis
Correct treatment	Incorrect treatment
Completed treatment	Incompleted treatment
Cured	Not cured

Source: Adapted from WHO 2005<sup>180</sup>

Beside a number of challenges to providing effective STI/RTI services to people who need them, syndromic management of vaginal discharge has proven problematic for the detection and management of cervical infections, particularly in areas of low prevalence of STI. Hence, affordable, rapid diagnostic tests are needed. Such tests have been slow to be developed and, where available, they are still too expensive for governments to incorporate into national care programmes.<sup>178</sup>

*Common reasons why STI control programmes often fail in low-income countries*<sup>80</sup>

- Low priority for policy makers and planners in allocating resources because STI are perceived as a result of shameful behaviour.
- Failure to recognise the magnitude of the problem in the population.
- Failure to associate the diseases with serious complications and sequelae.
- Control efforts concentrated on symptomatic patients (usually men) and failing to identify asymptomatic individuals (commonly women) until complications develop.
- Little emphasis on educational and other efforts to prevent infection occurring in the first place, especially among adolescents.

### 1.3 VIETNAM

#### General information

##### *Geographic and demographic information*

Vietnam is situated in Southeast Asia with an area of about 330,000 km<sup>2</sup>, three-quarters of which are mountainous and hilly areas. The Red River delta in the North and the Mekong delta in the South are the two largest low flat deltas upon which 40% of the

Vietnamese population lives. There are more than 54 ethnic groups of which the Kinh is the majority (86%), followed by four other groups that have populations of more than one million: Tay, Thai, Muong and Kh'mer (National Census 1999). Vietnamese is the official language. Vietnam has a population of approximately 84 million, and is the world's 14th most densely populated country. The country's two largest population centres are Hanoi and Ho Chi Minh city, but more than 75% of the population live in rural areas.

In 1986, the Vietnamese Government initiated a new economic policy known as “Doi Moi” or “Renovation”. The new policy firmly put Vietnam on the path to transforming itself from a subsidized socialist economy to a market-oriented economy. As a result, Vietnam has seen dramatic social and economic changes. In general, people’s livelihood in urban as well as rural areas has been improved. Vietnam's health indices have greatly improved, and are much better than one would expect considering the level of economic development. However health inequalities are now growing between different groups and geographical areas because of increasing economical gaps. Maternal and child mortality are much higher among the poor and among some ethnic groups. Infant mortality in remote areas is nearly eight times greater than in urban areas. Malnutrition is still a serious problem among poor children. More than 10,000 people die from road accidents every year, the HIV/AIDS epidemic is escalating becoming one of the 10 leading causes of mortality in the country.<sup>88, 90</sup> The number of non-communicable diseases, such as cancer, diabetes and heart disease, has risen in recent years, accounting for nearly half of all deaths. Meanwhile, some communicable diseases, such as tuberculosis continue to persist. Some basic data and health indicators are shown in Table 1.

**Table 1.** Basic data about Vietnam

<b>Indicators</b>	<b>Values</b>
Area (km <sup>2</sup> )	329,314
Population (million)	84.2
Female (million)	42.8
Population density (person/km <sup>2</sup> )	254
Life expectancy (year)	72.0
Population growth rate (%)	1.33
Infant mortality rate per 1,000 live births	16
Under-5-year mortality rate per 1,000 live births	26
Maternal mortality ratio per 100,000 live births	75.1
Low birth weight (< 2500 g, %)	5.3
Under-5-year malnutrition rate (%)	23.4
HIV/AIDS adult prevalence rate (%)	0.5
GDP per capita (USD)	720
Number of MD* per 10,000 inhabitants	6.23
Number of MD and AMD* per 10,000 inhabitants	12
Number of nurses* per 10,000 inhabitants	6.77
Number of university pharmacists* per 10,000 inhabitants	1.27

*Source:* MOH, Vietnam, 2006.<sup>90</sup> MD: Medical doctor; AMD: Assistant medical doctor

\* Excluding personnel of private sectors because of lack of information

### *Educational status*

In general, literacy of people aged 10 years and over is 93%.<sup>90</sup> It is much higher among people belonging to the highest economic category than that of people in the lowest economic category (98% vs. 85%).<sup>90</sup> The average years of schooling is about 8.6. There is no major difference in educational attainment between male and female youth. However, there is a wide difference in enrollment rates between rich and poor, and urban and rural at secondary and high school education. The introduction of a market economy together with the removal of the subsidy system lead to 30% of students dropping out of school after finishing 5th grade, and cumulatively by the end of secondary school 75% of students have dropped out.<sup>90</sup> The concept of “respecting men and despising women” (*trọng nam, khinh nữ*) is still deep-rooted in rural areas. It is considered that only men need to learn, while higher education for women brings no benefit because female labour is mostly concentrated in agricultural production.<sup>21</sup> Consequently, rural girls tend to discontinue their education earlier to assist their family by working.<sup>139</sup> They usually find a job and earn an income or get married.<sup>21</sup>

### *Family planning*

In Vietnam, policies on population and family planning have been actively implemented as part of development strategy. In order to limit population growth, a two-child population policy was introduced and family planning campaigns intensified in the 1980s. This has led to the total fertility rate declining from nearly 5 children per woman in the 1980s to 2.1 by 2004<sup>90</sup> and 1.86 by 2008 (World fact book 2008). The IUD has been used as the most common contraceptive method 55%, followed by contraceptive pills/injections 14%, sterilization 6.6%, condoms 10%, and traditional methods 14% (e.g. withdraw, rhythm).<sup>33</sup> Most reproductive health services are provided within the public health services, but in the late 1980s market reforms allowed the provision of care by private HCPs also.

Intentional pregnancy termination, in Vietnam, is available in the form of menstrual regulation (MR) or an abortion. Menstrual regulation refers to manual vacuum aspiration up to 5 weeks of pregnancy; abortion refers to sharp curettage performed after 5 weeks. Abortion has been legal since Vietnam gained independence from the French in 1945. In 1963, the government in the North launched its first intensive effort for family planning, which created better facilities for women who desired an abortion.<sup>41</sup> Today, abortion has been accepted widely as a method of fertility regulation, and abortion services remain widely available in Vietnam from the most basic unit of primary health care in the country, the commune health clinic, to the more sophisticated district and provincial hospitals and, since 1989, through private medical practitioners.<sup>41</sup>

Among countries where abortion is legal, Vietnam has the highest abortion rate, 83 per 1,000 women aged 15 to 44.<sup>51</sup> Estimates suggested that 44% of pregnancies are terminated.<sup>51</sup> According to Vietnamese Ministry of Health (MOH), among the 14.6 million women aged 15-49 who were married at the time, 146,000 had an abortion over a 12-month period.<sup>90</sup> On average, each Vietnamese woman has about 2.5

abortions during her reproductive years.<sup>185</sup> Among adolescents, however, abortion is underreported because of the long-standing taboo against premarital sex.<sup>84</sup>

### *Migration*

Parallel with the socioeconomic developments and urbanization, Vietnam also faces many challenging problems caused by internal migration resulting in increases in drug abuse and commercial sex. According to the MOH, spontaneous migration was substantial during recent years i.e 3.4 per 1000 inhabitants migrated away from the locality where they lived. Rural to urban migration is 23% and about half of the migrants are in the group aged 20 to 29 years.<sup>90</sup> It is estimated that, out of 1.1 million migrants, about 60% come from rural to urban areas.<sup>90</sup>

### *Illicit drugs*

Vietnam is considered as a minor producer of the opium poppy, and is probable a minor transit point for Southeast Asian heroin. Despite the fact that long-standing efforts have been made, the government continues to face problems related to addiction to domestic opium/heroin/methamphetamine. HIV/AIDS is closely associated with drug use. Illicit drug use, considered as a social evil, is mostly among youth and men. Of the total drug users, 90% are men, 80% are younger than 35 years of age, and 52% are younger than 25 years.<sup>90</sup>

## **Health care system**

The public healthcare system in Vietnam has three levels: central, provincial, and grassroots.

At *central level*, the MOH is directly in charge of national institutes, medical and pharmaceutical universities, central pharmaceutical enterprises and central hospitals. The MOH is responsible for formulating and executing health policies and programmes in the health sector for the entire country.

At *provincial level*, the provincial health bureau, which is directed by the MOH and also influenced by Provincial People's Committee, is responsible for health activities in the province. The healthcare system at provincial level consists of two main parts namely curative and preventive healthcare. Generally, in each province, there is a general hospital with 500-700 beds, a centre for preventive medicine, dermato-venereology and/or social diseases control centre, population and family planning unit, HIV/AIDS control centre, tuberculosis control centre, and pharmaceutical enterprises. The provincial health services receive technical support from MOH and other vertical, central institutions.

*The grassroots healthcare level* includes the district, commune and village healthcare network.

The District Health Centre (DHC) is mainly responsible for curative and preventive care, and surveillance and health statistics. The centre is also responsible for managing

the commune health services. Each DHC includes a District General Hospital with an average of 100 beds, and a Preventive Medicine Centre responsible for national preventive programmes such as expanded immunization, control of malaria, goitre, malnutrition, HIV/AIDS, tuberculosis, population and family planning, clean water and environmental sanitation, etc.

Intercommunal polyclinics, with about 10 beds for short stay, under the district hospitals mainly provide health services within certain communes in the district. Polyclinics make it easier for people to seek healthcare, and reduce the burden on the district hospitals which have shortage of beds.

The Commune Health Centre (CHC) is the primary healthcare unit. Each CHC has at least 3 staff including a medical doctor or assistant medical doctor, midwife or obstetric-pediatric assistant medical doctor, and nurse to serve up to 8,000 inhabitants; 6 staff in communes with more than 12,000 inhabitants. The CHC is responsible for primary preventive and curative care and implementation of national health programmes.

Village health is the extended arm of commune health, focusing on health information, education and communication; instruction on hygiene and disease prevention; maternal and child health care and family planning; first aid and care of common diseases; and implementation of national health programmes. Village health workers are under the direct management and direction of the CHC.

*Private health facilities* include modern medicine, traditional medicine, and pharmaceutical practices. Since the 1989 health sector reforms, private health facilities have developed rapidly, but the size of facilities tends to be small with a low level of equipment and professional technology.<sup>90</sup>

#### *Provision of drugs*

Prior to 1989, pharmaceutical companies and the pharmacy department of hospitals and clinics distributed drugs in public health facilities. In the 1990s, a shortage of drugs in CHCs had significant influence on the activities of these facilities. The solution was to issue a list of essential drugs, which meet healthcare needs of the general population, and provide a revolving fund to buy essential drugs to serve the basic healthcare needs of local people. In 2003, 84% of CHCs had a drug dispensary. In remote areas, CHC drug dispensaries are the main source of drugs for local people. However, many CHCs do not have an appropriately trained person to manage their drugs.<sup>90</sup>

Private and public pharmacies are important suppliers of drugs. In addition, private clinics or health personnel also sell drugs at their practice (unpublished observation). On average, there is one pharmacy per 2,000 inhabitants. The number of pharmacies in rural areas has increased considerably, even reaching remote areas. This provides people with access to drugs but also poses challenges regarding management of drugs. Most drug sellers are elementary pharmacists with low professional training (6-12 months), in many cases however, educated personnel are not present. In CHCs, about 76% of the patients are prescribed antibiotics, and doctors usually prescribe drugs including antibiotics for 1 or 2 days at the request of patients.<sup>90</sup>



### *Utilization of health services*

Generally, self-treatment is a common healthcare seeking practice among the rich as well as the poor. Among the total cases of illness, 73% are self-treated, 4% are untreated, of which, the main reason is because of being mild illness.<sup>90</sup> The poor tend to seek care at CHCs, regional polyclinics, or district hospitals whereas the rich are likely to access provincial or central hospitals. The utilisation of private health services is increasing. Among rural communes, the utilisation of private health facilities fluctuates between 20-30%.<sup>90</sup>

### **Culture and gender issues**

In Vietnam, the concept of family is deeply influenced by traditional Confucian doctrine. Traditionally, a Vietnamese woman should follow “the three obediences” (*tam tông*), i.e. obey her father as a daughter, her husband as a wife and her eldest son if the husband has died. Vietnamese women are expected to develop “four virtues” (*tứ đức*) consisting of domestic skills (*công*), attractive physical appearance (*dung*), appropriate speech (*ngôn*), and virtuous character (*hạnh*). According to the set norms of our ancestors, an ideal woman had to have all four virtues. A study among rural girls working as servants in Hanoi has shown strong family ties and female subordination. The girls have to sacrifice their own wishes and interests for family and siblings.<sup>139</sup>

In the family, men are assumed to have hot characters (temperamental), to be the heads and to have the last word in making decisions on production, business and investment of household resources.<sup>21</sup> Men are seen as the bread-winners, while, women have responsibility for housework and childcare and are expected to maintain family harmony and happiness<sup>47, 72</sup> while they have little influence on other important issues.<sup>73</sup> For instance, the household income or large expenditures such as important furniture, weddings, funerals etc. are often controlled by husbands. Moreover, women are also expected to contribute to household livelihoods. Due to heavy and double work burdens, women have limited time and energy to participate in social activities, additional learning and local democracy.<sup>60</sup> Over the years, changes in the Vietnamese society together with the reduction in fertility have led to important improvements in women’s status and education leading to increased numbers of women in salaried employment.

Currently, gender relations in Vietnam are a compound of norms, values and practices inherited from a distant Confucian past, together with contemporary thought and the changes associated with the economic transition.<sup>175</sup> Strong cultural traditions, often centred on patriarchal norms about family and gender role, continue to exist despite being increasingly at odds with the economic reality of the lives of women and men. Gender relations are in a state of flux, with attempts to maintain older patriarchal norms concerning gender roles by referring to “tradition” and “customs” coexisting with increased opportunities for women to participate alongside men in the economy and in society.<sup>60</sup>

During the 1990s, due to the impact of economic development, migration, lifestyle changes and through government policy, a number of changes have taken place in

family ideology and the norms for social relations; the fertility rate has been reduced, number of women working outside the home has increased and women's education has improved. Despite this, men are the main decision-makers concerning production and allocation of resources, while the power sphere of women in many cases is restricted to the household. Women participate in community activities but the number of women in decision-making positions is still low.<sup>30, 66</sup>

## **Sexual relationships**

*Marriage:* according to the Marriage and Family Law, the minimum legal age for marriage is 18. Marriage must be voluntary and can not be prohibited. Early marriage prior to the legal age still occurs, mostly in remote/mountainous areas. At present, the average age for marriage is 21 for men and 19.5 for women.<sup>91</sup> Rural young women usually get married earlier than urban women do. Roughly, one-third of young people choose their spouse independently, the other two-thirds share the decision with their families.<sup>91</sup> According to the traditional Vietnamese custom, the woman will live with the husband's family immediately after marriage.

Confucianism, a key source of social organization in Vietnam, has contributed to stringent social and familial disapproval of *extramarital sex*,<sup>62</sup> and has conferred a high value on remaining chaste until marriage, particularly for women, who are considered as guardians of "traditional" moral values. So far, sexual activity in Vietnam occurs largely within and not outside of marriage.<sup>84</sup> Men are regarded as active in sex and women have a passive role. When husbands have extramarital sexual relations, women often try to pretend not to know and/or to persuade the husband to come back in order to keep family harmony and to maintain a good family image in their children's eyes and those of outsiders.<sup>47</sup>

*Premarital sex* is a highly sensitive issue in Vietnam.<sup>84</sup> In traditional Vietnamese culture, abstinence outside of marriage is important for both young men and women, and the virginity of a woman is considered to be of particular value. In contemporary Vietnamese society, a stigma continues to be attached to engagement in sexual behaviour outside of marriage,<sup>62</sup> including premarital and extramarital sex. However, numbers of young, unmarried women undergo induced abortions<sup>108</sup> providing evidence of premarital sexual relationships.<sup>31</sup> Also, in urban areas, premarital sex is becoming more acceptable and more common among young people in a serious, loving relationship but is still not widespread.<sup>36, 107</sup> For instance, reported premarital intercourse fluctuates from 9% to 16%<sup>11</sup> among married men and 4% to 7%<sup>11</sup> among married women, while it is reported to be less than 2% among unmarried women aged 18-21.<sup>91</sup> Despite its social prevalence, premarital sex is still strongly stigmatized, especially in rural areas, and considered by many people as a deprivation of Vietnamese culture. This stigma creates a situation, particularly for young women, in which their behaviours are perceived as bad and immoral. Young women also perceive sex in loving relationships as negative and tend not to accept their own sexuality or to discuss safe sex with partners.<sup>62</sup>

*Polygamy* became illegal in 1960, according to the Vietnamese constitution. Today it is almost non-existent apart from in some rural areas where the law is difficult to apply. The actual number of polygamous marriage relationships is not officially known. However, it's estimated to be very low (proximately less than 1/1,300 men aged over 18 years in FilaBavi).

*Sex work* in Vietnam is extremely stigmatised. It is prohibited and considered to be a social evil. Nevertheless, prostitution is existing, the number of sex workers is increasing, and many people from different social strata have had sex with sex workers.<sup>90</sup>

### **STI/HIV/AIDS situation**

National figures on STI among both sexes increased from approximately 140,000 in 2003 to 220,000 in 2006 (Report from the National Institute of Dermato-Venereology, Vietnam, 2007). The 14-49 year-old age group accounts for almost all STI cases,<sup>182</sup> and the male to female ratios of reported cases was 1:2 to 1:5.<sup>182</sup>

As in other countries in Asia, Vietnam is now faced with a rapid increase of HIV. The first case of HIV infection was reported in December 1990 in Ho Chi Minh City. By 1992, only 11 cases had been reported. The estimated number of people living with HIV more than doubled between 2000 and 2006, from approximately 122,000 to 280,000.<sup>168</sup> Estimates put the actual number of infections much higher. HIV infection is mainly occurring among young adults from 20 to 39 years old.<sup>113</sup> The HIV epidemic in Vietnam is still classified as the concentrated stage with high prevalence among high risk populations, mainly intravenous drug users (IDUs), female sex workers (FSWs), and men who have sex with men (MSM). It is documented that the majority of new HIV infections in Vietnam are due to sexual transmission.<sup>168</sup> In 2006, an estimated one third of people living with HIV were women.<sup>167</sup> A biological and behavioural survey carried out among high-risk populations in Vietnam shows that many people with HIV still do not know their status.<sup>89</sup> Though the HIV infection is estimated to remain low, about 0.53% of the adult general population,<sup>90</sup> signs of a steady increase of HIV prevalence among the general population have been observed.<sup>112, 129</sup> There is an increasing risk of HIV transmission among women, who do not use drugs or engage in sex work, and who currently receive less attention from HIV intervention programmes in Vietnam.<sup>111</sup>

#### *FSWs and their clients*

Sex work is illegal in Vietnam and therefore this population is difficult to access. FSWs usually have multiple partners and high rates of unprotected sexual intercourse. Studies have demonstrated high rates of STI in this group,<sup>89, 158</sup> e.g. approximately 33% to 50% of the FSWs have contracted an STI.<sup>158</sup> Unprotected sexual intercourse is common among the clients of FSWs. Consistent condom use among FSWs with their clients is shown to be less than 40% at last sexual contact<sup>163</sup> or with clients over the previous month,<sup>89</sup> and it is particularly low with their husbands and/or boyfriends.<sup>163</sup>

Furthermore, substantial numbers of men move from rural areas to find work in urban areas and potentially become the clients of FSWs. An STI clinic-based study in Vietnam shows that among male patients, only 8% used condoms consistently when visiting FSWs.<sup>159</sup> Accordingly, there is a high risk of STI/HIV spreading to the clients of sex workers and further to the general population.

### *FSWs and IDUs*

Injecting drug use and sex work frequently overlap. A significant number of FSWs are also IDUs. Studies have found that between 27% and 46% of FSWs used drugs, of whom approximately 80% injected drugs.<sup>110, 161</sup> In one study, 35% of IDU sex workers had started injecting prior to becoming sex workers, while 65% had started sex work prior to starting IDU. Male IDUs frequently (30% or more) pay for sex<sup>89</sup> and have low rates (less than 50%) of condom use. Studies have shown that the proportion of IDUs having sex with FSWs varies from 18% to 59%.<sup>37, 89, 159</sup> IDUs are also consistently linked sexually with regular sexual partners<sup>89, 163</sup> (wife or girlfriend). Only 16-36% of IDUs use condom constantly when they have sex with regular partners.<sup>89</sup> Moreover, up to 50% of IDUs who are HIV positive reported using condom inconsistently with their regular partner.<sup>89</sup>

Among IDUs prevalence of any STI (except HIV) was 30%,<sup>37</sup> HIV was up to 66%<sup>89, 90</sup> or even 74%.<sup>110</sup> High STI/HIV prevalence and high-risk behaviours among IDUs indicate the potential for STI/HIV transmission to the general Vietnamese population,<sup>37</sup> they may play a role as a core group of HIV transmitters in Vietnam.

### *Men who have sex with men (MSM)*

In Vietnam, MSM are a hidden group and highly stigmatized. In this group, there are high rates of STI and multiple risks, such as low levels of condom use and high rates of partner change.<sup>16, 89</sup> HIV among this group is up to 9%, and 16-22% of them have at least one STI. Up to 70% of MSM have two or more male sexual partners. Many of them have commercial sex with both male and female partners but only 51% use condom consistently in the previous month during anal sex,<sup>89</sup> the most high-risk activity for MSM.

## **STI control network in Vietnam**

The National Institute of Dermato-Venereology (NIDV) is the leading institute responsible to the MOH for STI management and treatment in Vietnam. The STI subcommittee of the NIDV is directly under the Department of HIV/AIDS Prevention and Control, MOH and is responsible for planning, programme building, and performing relevant studies. The subcommittee is in charge of technical guidance for provincial units on STI prevention and control and data collection for reporting to central level. The subcommittee is also in charge of organizing training courses on STI for health staffs of the dermatology and venereology profession nationwide. In many areas, staffs responsible for STI activities do little work in this field, instead concentrating on other national health programmes.

In recent years, great efforts have been made regarding HIV/AIDS prevention in the country. Activities available widely include information-education-communication, life skills education for young people, harm reduction interventions among HIV/AIDS vulnerable populations (peer education, needle and syringe distribution, and condom promotion), sentinel and behavioural surveillance surveys, blood safety and safe medical services, care and support for people living with HIV/AIDS (PLWHAs), STI treatment, prevention of mother-to-child transmission of HIV, voluntary counseling and testing, and self-help groups for persons living with AIDS.<sup>113</sup> At the same time, insufficient attention and resources have been paid to STI/RTI prevention and control.

In 1996, the NIDV published a document titled “National guidelines on STI prevention and control in Vietnam” which emphasized the syndromic approach in STI control. In 2003, in collaboration with NIDV, the National Hospital of Mother and Child care produced a document titled “National guidelines on reproductive healthcare services”, of which one chapter was on STI/RTI. These documents focus on syndromic management of STI/RTI with the four syndromes: abnormal vaginal discharge, urethral discharge in men, lower abdominal pain in women, and genital ulcer in both sexes. They have been used for training health personnel at different healthcare levels. Annually, NIDV has organized training courses on STI for health staff at provincial level, who later will give training to district or commune levels. Topics covered and emphasized have been syndromic management of the four syndromes following the national guidelines. The gynaecology/obstetrics network also gives training to medical personnel at different levels, but focus on other reproductive health issues rather than STI/RTI. The training on STI/RTI has been mainly organized for HCPs who work in the dermatovenereology or gynaecology network within public health sectors at provincial or district level. The coverage of training is still very limited because of lack of resources. The national strategy considers the following populations to be a high priority for STI prevention and control: FSWs and their clients, MSM, IDUs and PLWHAs.<sup>37</sup>

#### **1.4 RATIONALE OF THE STUDIES**

In Vietnam, studies have shown that RTI are common among women.<sup>2, 39, 42, 124</sup> Previous studies concerning STI/HIV have either focused on high-risk groups<sup>89, 115, 157-160</sup> or selective hospital-based studies.<sup>2, 124, 162</sup> The data regarding prevalence and epidemiology of STI in Vietnam may be suboptimal due to the fact that a significant number of individuals do not access public services.<sup>182</sup> Instead, they prefer self-medication<sup>13, 182</sup> or visit private practitioners, pharmacists and/or drug sellers.<sup>13</sup> It therefore, is estimated that the real number of STI patients is many times higher, i.e. about 1 million new cases of STI occur every year, including 150,000 syphilis cases, 150,000 gonorrhoea cases, and 500,000 cases of chlamydial infection.<sup>182</sup>

Urbanization and transition to a market-oriented economy in Vietnam have had impacts on migration and lifestyles of people, including increasing STI/HIV risks. Despite the need, comprehensive knowledge regarding STI/RTI/HIV among the Vietnamese general population is limited. Furthermore, studies have shown that women with STI from rural or remote areas delay before first seeking care for STI.<sup>155</sup> Also, misconceptions

regarding HIV have been shown to exist among HCPs.<sup>128</sup> Little is known about STI from the views of community members as well as HCPs in Vietnam. Therefore, understanding people's knowledge, perception, attitudes, and health-seeking patterns when having symptoms or suspicion of STI/RTI would have major implication for how to plan and implement community intervention to prevent and control STI/RTI. Exploring knowledge and practices of HCPs is of importance since the prevention and control of STI/RTI is complicated due to lack of awareness of the infections and their consequences and stigmatizing attitudes of HCPs towards marginalized groups in low-income countries.<sup>130</sup>

Surveillance of clinical syndromes is easier to implement in resource-poor countries than more costly and technically demanding microbiological surveillance systems. Up-to-date local knowledge of the pathological agents causing the syndromes (aetiological surveillance) is of importance for the success of STI syndromic management.<sup>71</sup> Thus, investigations into the burden and determinants of these infections are necessary to provide appropriate background information for the development of an effective STI/HIV control strategy.

## **2 AIMS AND OBJECTIVES**

### **2.1 AIMS**

The aim of the study was to investigate perceptions, knowledge, prevalence, determinants and management of STI/RTI in a rural context of Vietnam. The long term aim is to contribute to the background information of the present situation of STI/RTI as a basis for the further development of appropriate interventions aimed at community and healthcare providers in order to reduce the prevalence of the infections.

### **2.2 OBJECTIVES**

- To explore perceptions and attitudes among people of reproductive age in the community towards STI/RTI (Paper I).
- To investigate knowledge of STI and possible associations between socioeconomic determinants and STI knowledge among women aged 15 to 49 (Paper II).
- To estimate the prevalence of STI/RTI (symptomatic and asymptomatic) among married women aged 18 to 49 using both clinical and aetiological diagnoses, and to assess the influence of socio-economic, socio-demographic, and other determinants possibly related to STI/RTI (Paper III).
- To assess knowledge and evaluate reported practices among healthcare providers regarding STI (Paper IV).

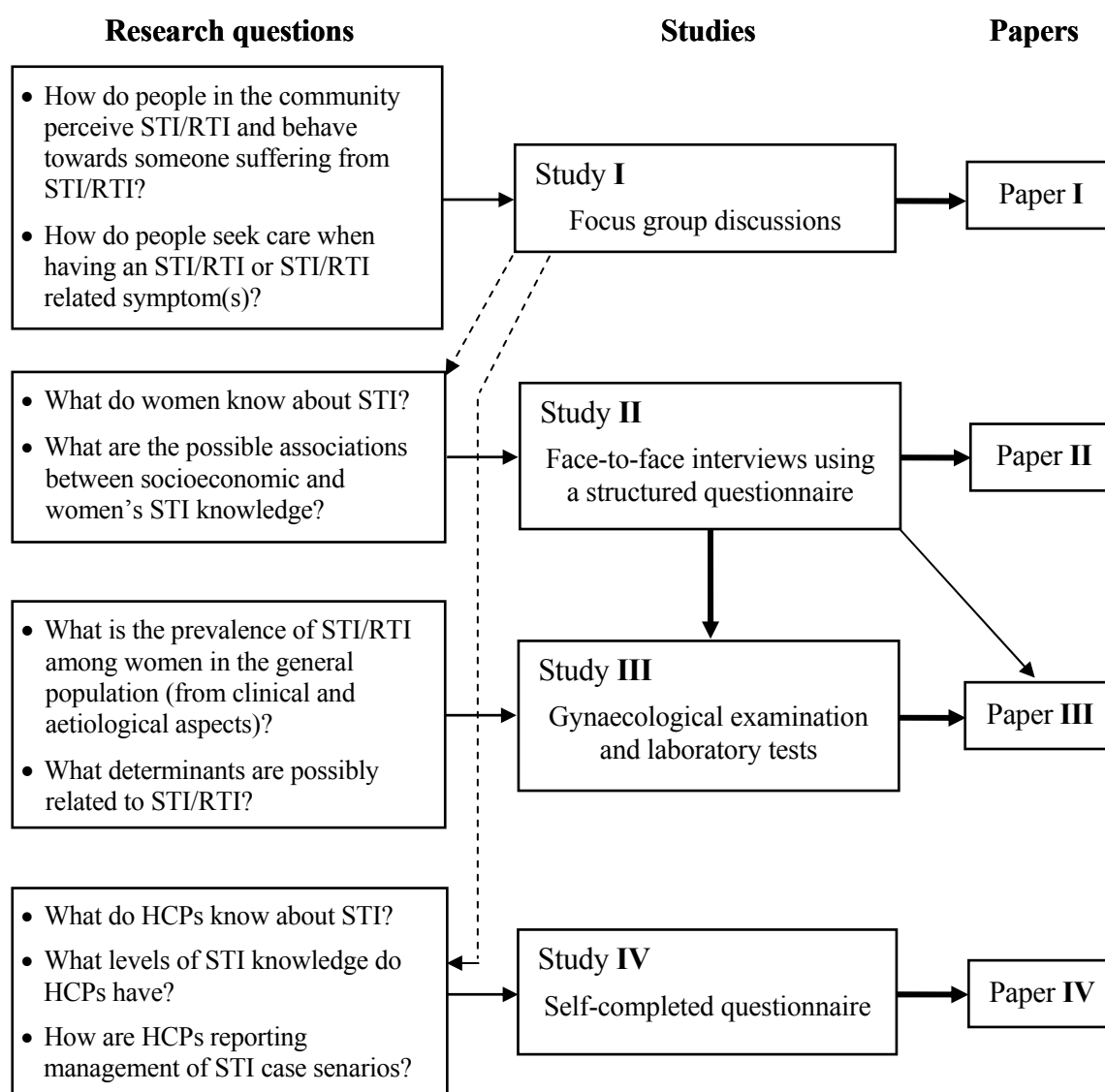
### 3 METHODS

#### 3.1 STUDY DESIGN

A qualitative method was used in Study I, and quantitative methods were used in Studies II, III and IV (Figure 2). The qualitative method using focus group discussions (FGD) with content analysis was applied to explore the community members' perceptions, attitudes and health seeking behaviour in relation to STI/RTI (Study I).

The quantitative methods encompassed: *i*) a community based study among randomly selected women aged 15 to 49 in FilaBavi using face-to-face interviews with structured questionnaire regarding STI knowledge (Study II), *ii*) a clinical study among the married women, who were interviewed from study II, with a gynaecological examination and laboratory tests for STI/RTI diagnostics (Study III), and *iii*) a self-completed questionnaire study among healthcare providers (HCPs) in Bavi district with the use of a questionnaire regarding STI knowledge and reported practice (Study IV).

**Figure 2.** Relationship between the four studies





## 3.2 STUDY SETTING

### Bavi district

All studies included in the thesis were conducted in Bavi district, Ha Tay province in 2004-2006 (at the time of the study, Ha Tay province was a separate province. The area was incorporated into Hanoi city in 2008) northern Vietnam where an epidemiological field laboratory (named FilaBavi) was established in 1999. The district is located 60 km west of Hanoi, the capital and covers an area of 410 km<sup>2</sup>, including lowland, highland, and mountainous areas (Map 1). The number of inhabitants is approximately 240,000 people, living in 32 communes. Each commune has 6,000 to 10,000 inhabitants divided into a number of villages. Children under one year of age comprise 1.5% of the overall population, children under 5 years of age 7.9%, and women 15 to 49 years of age 27%. Most people in Bavi district are farmers (81%) with agricultural production and livestock breeding as the main economic activities. The average income per capita in the district was approximately USD 300 in 2004 (FilaBavi annual report 2005).

*The healthcare system in Bavi district* is organized in the same way as all districts of Vietnam. It includes one district hospital with 150 beds, 3 intercommunal polyclinics, 32 CHCs, village health workers, private sector including private drugstores, clinics and traditional healers. The Preventive Medicine Centre is responsible for national preventive programmes, and the family planning team is mainly in charge of issues related to contraceptive methods, and control of the fertility rate of the whole district. CHC provide antenatal care (ANC) and delivery services. Home delivery is very uncommon in the district, it can however, happen in the remote areas. The private sector is rarely involved in ANC and delivery.

### FilaBavi

#### *Organisation of FilaBavi*

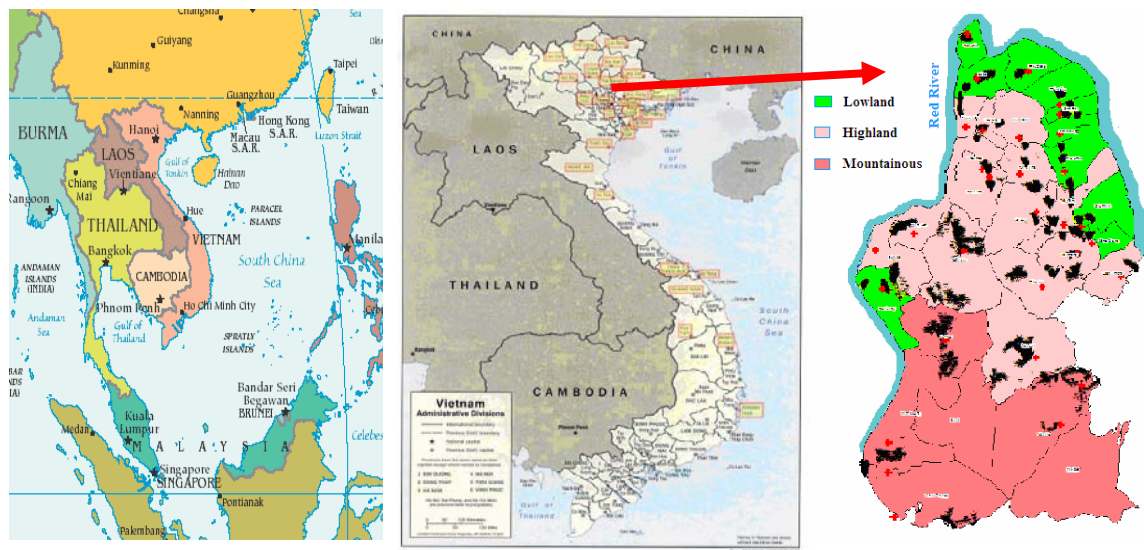
The FilaBavi was developed within the Health Systems Research Project (HSRP) supported by Sida/SAREC, Sweden, with the overall aim to implement a longitudinal epidemiological surveillance system in Bavi district of Vietnam that could generate basic health and healthcare data, supply information for health planning, serve as a background and sampling frame for specific studies, and constitute a setting for epidemiological training of research students.

Sixty-nine clusters (out of 352) in the district were selected randomly with probability proportional to size to constitute the sample for FilaBavi. These clusters had approximately 12,000 households with about 51,000 inhabitants (20% of the total population of the district), of which women aged 15-49 years constitute approximately 28%. A cluster was defined as an administrative unit, usually a village. However, if a village was too large it could be divided into two clusters and small villages were brought together into one cluster. On average, there are about 160 households (minimum 41, maximum 512) and 670 inhabitants (minimum 185, maximum 1,944) in each cluster.

In FilaBavi, there are 42 female surveyors and six field surveyors, who live in the district, employed for the field work. All the surveyors have completed high school education and they were trained before starting their fieldwork. The field supervisors have a medical background as assistant medical doctors or nurses. Each supervisor is in charge of a group of 6-8 surveyors. The main tasks of a field supervisor are to manually check all survey forms filled by the surveyors in the group and to conduct re-interviews of approximately five percent of the household visits. The surveyors are frequently updated in weekly meetings by feedback from the field supervisors regarding surveyors' data collection progress and quality, as well as activities related to ongoing or coming additional studies.

An initial baseline survey was carried out in early 1999. Since then household follow-up surveys have been conducted quarterly. A re-census with basically the same scope as the baseline survey has been conducted every second year, 2001, 2003, 2005, and 2007. At baseline and re-census, socio-economic information at household level and characteristics of household members is collected. At follow-up surveys, demographic and household information is updated. Particularly vital events, marriage, pregnancy, birth, death and migration (in and out) are recorded. Up to December 2008, 38 follow-up surveys have been conducted.

**Map 1.** Location and structure of the study setting



Map of South East Asia

Map of Vietnam

Map of FilaBavi

*In the map of Bavi district, the red spots are commune health centres. The black spots show the sampled clusters of FilaBavi.*

### *Health indicators and demographical characteristics*

Among the adult population, literacy is 97.9% (male 98.9%, female 96.9%), 15.2% has completed only primary education, 47.8% secondary school and 33.9% high school or higher. Among women aged 15-49, literacy is about 99%. Some basic information on FilaBavi is shown in Table 2.

**Table 2.** Health indicators and demographical characteristics of FilaBavi, 2007

<b>Indicators</b>	<b>Values</b>
Life expectancy of male (year)	71.7
Life expectancy of female (year)	82.8
Women ever married (%)	71.5
Total fertility rate	2.19
Age at first marriage (year)	22.7
Age at first birth (year)	23.7
Low birth weight (<2500 grs, %)	5.1
Infant mortality rate per 1,000 live births	10.8
Under-5-year mortality rate per 1,000 live births	11.5
Abortion rate among pregnancy outcomes (%)	5.8
Live birth prevalence among pregnancy outcomes (%)	88.8
Still birth prevalence among pregnancy outcomes (%)	0.5
Miscarriage prevalence among pregnancy outcomes (%)	4.9

*Source:* FilaBavi's database, 2007

### **3.3 SAMPLE SIZE AND SAMPLING**

#### **Study I. FGDs among community members**

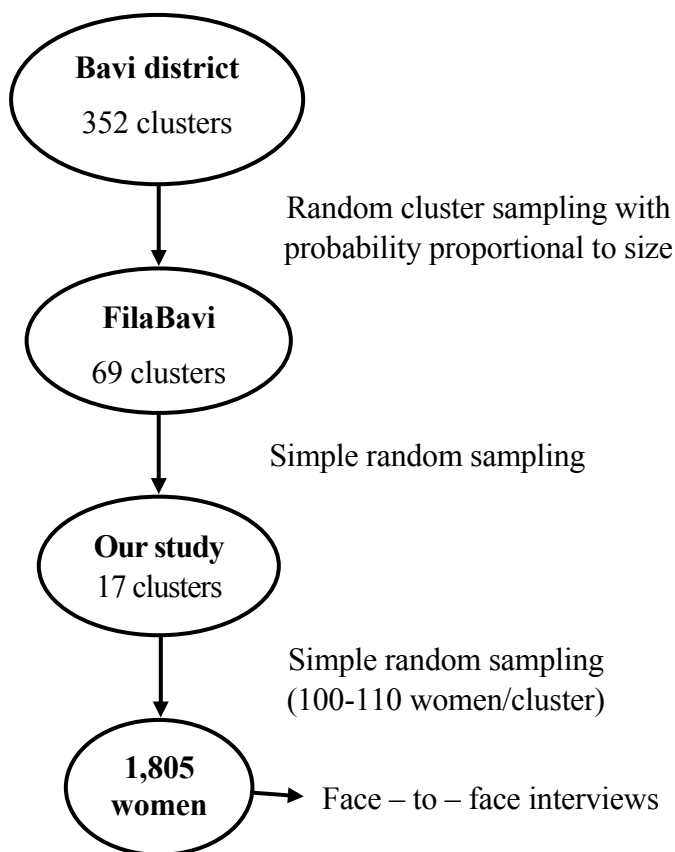
Participants were men and women aged 15 to 49 years old, living in Bavi district. They were selected purposively according to sex, age, marital status, education level and occupation with the aim of achieving a maximum variation.<sup>6</sup> In total, ten FGDs were conducted including six women only groups (three married and three unmarried) and four men only groups (two married and two unmarried) with five to nine participants per group. The groups were homogenous in terms of sex and marital status.

#### **Studies II and III. Face-to-face interviews and clinical examination among women**

These two studies were carried out within the framework of FilaBavi. To calculate the sample size, we projected an RTI prevalence of 40% with precision of 5%, confidence level of 95% and a design effect of 2.5 due to clustering.<sup>61</sup> Approximately 1,000 married women were needed for gynaecological examinations. Due to the cultural climate, unmarried women were excluded from the gynaecological examination.

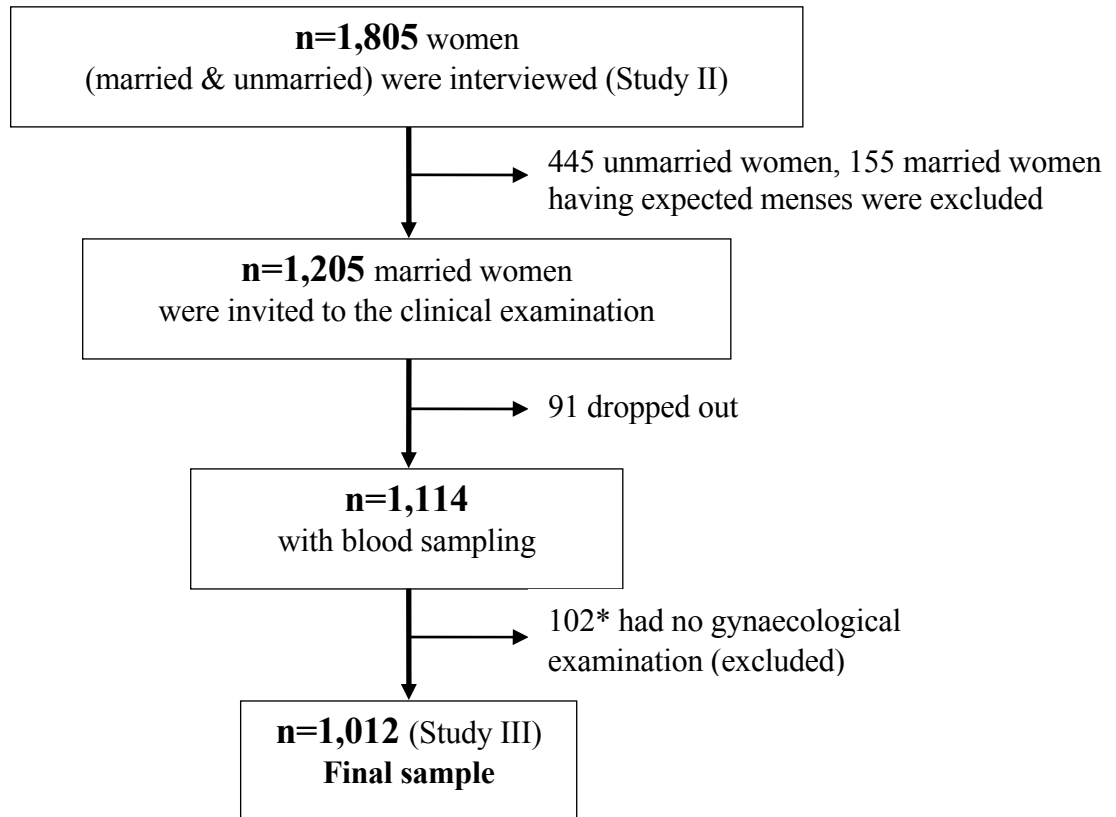
From FilaBavi database, it is shown that the proportion of married women among 15 to 49 year-old women is about 70%. Therefore, approximately 1,800 women (both married and unmarried) were recruited for the interview. Out of 69 clusters of FilaBavi, 17 clusters were randomly selected. In each selected cluster, 100 - 110 women aged 15 to 49 (both married and unmarried) were randomly selected for the interview. Totally, 1,805 women were interviewed (Figure 3).

**Figure 3.** Sampling procedure for study II and III



All married women interviewed in study II were invited to a gynaecological examination in Study III (Figure 4). Exclusion criteria were women who expected menstruation or had heavy abnormal vaginal bleeding during the examination days. Nevertheless, some women who did not have much bleeding i.e. the first or the last day of their menstrual period were also examined.

**Figure 4.** The study sample (II and III)



\*102 women were not gynaecologically examined due to having actual menstrual bleedings 75, pregnancy 7 or other reasons 20.

#### **Study IV. Self-completed questionnaire among HCPs**

Out of 487 eligible healthcare providers working in public and private sectors from district to village levels in Bavi district 465 participated in the study, including 390 medical personnel (medical doctors, assistant medical doctors, nurses, midwives, and village health workers) and 75 pharmacy personnel (pharmacists and drugsellers). The list of HCPs including private providers was given by the administrative department of the DHC.

### **3.4 DATA COLLECTION**

The data collection methods for the whole thesis included FGDs (Study I), face-to-face interview using a structured questionnaire (Study II), gynaecological examination and laboratory tests (Study III), and self-completed questionnaire (Study IV).

**Table 3.** Summary of study design, subjects, data collection and analysis

<b>Study and data collection period</b>	<b>Study designs and data collection methods</b>	<b>Subjects</b>	<b>Data analysis methods</b>
<b>I.</b> Perceptions and attitudes towards STI/RTI among adults aged 15-49  December 2004- July 2005	Qualitative study with the use of focus group discussions (FGDs)	46 women and 27 men in 10 FGDs, 5-9 persons/FGD	Content analysis
<b>II.</b> Survey of STI knowledge among women aged 15-49  March-May 2006	Cross sectional, population-based study with face-to-face interviews using a structured questionnaire	1,805 women were randomly selected (100-110 women per cluster) from 17 clusters of FilaBavi sample	Descriptive and univariate analysis, multivariate and multilevel linear regression, logistic regression
<b>III.</b> STI/RTI prevalence among married women aged 18-49  March-May 2006	Cross sectional, population-based study with gynaecological examinations and laboratory tests for STI/RTI diagnostics	1,012 married women from the sample of Study II	Descriptive and univariate analysis, multivariate logistic regression, sensitivity-specificity analysis
<b>IV.</b> Survey of knowledge and reported practices regarding STI among HCPs  January-February 2006	Cross sectional study using a self-completed questionnaire	465 HCPs working within Bavi district	Descriptive and univariate analysis, multivariate linear regression, logistic regression

**Focus group discussions (I)**

A pre-designed discussion guide (Appendix 1) was developed by the research team. The guide was reviewed beforehand together with the field supervisors of FilaBavi. Before data collection, the research team organized meetings with the surveyors and the field supervisors who worked within FilaBavi and were familiar with the local community to discuss about the topic for discussion, to review the discussion guide in order to determine the appropriateness to the local context of the issues to be raised during discussion. The criteria for selecting participants were explained during the meetings. Eligible participants were individuals who would potentially be willing to provide information on the topic.<sup>95</sup> Invitation letters were sent to each potential participant explaining the purpose of the study, and that their potential participation was entirely voluntary. Participants' consent was obtained prior to the data collection. The FGDs

were conducted in Vietnamese and held in the homes of field supervisors or participants. Each FGD lasted about one and a half hour. Green tea, candies and cookies were provided during the discussions.

The data were collected during 2004 and 2005. Each FGD was led by a moderator and a note-taker affiliated with FilaBavi. Male and female researchers served as moderators. PT Lan participated and moderated six female groups and two male groups; a male researcher guided the other two male groups. The moderator facilitated the discussions and the note-taker operated the tape recorder and wrote down observations concerning the interaction between participants as well as group dynamics. The moderator began by introducing the topic to be discussed and asked again if all participants presented had given their consent. After the introduction, the participants were informed about the importance of confidentiality regarding the information they would provide and get during the discussion. Moreover, the researchers promised the information from discussions would be kept in confidence. Permission to use the tape-recorder was sought and granted by the participants. In order to avoid unpredicted recording failures, all FGDs were tape-recorded by two tape recorders. Issues discussed during the FGDs were: the definitions of and common terms used for STI/RTI, perceived causes of STI/RTI, views on routes of transmission, symptoms, complications, prevention, treatment, health-seeking behaviour when symptoms were perceived as indicating an STI/RTI, and attitudes towards STI/RTI. The taped discussions were transcribed verbatim in Vietnamese and then translated into English.

### **Face-to-face interview (II)**

A structured questionnaire (Appendix 2) was developed mainly based on findings of the Study I and previous studies elsewhere.<sup>8, 40</sup> It contained questions regarding: participants' sociodemographic information; experiences related to childbearing and hygiene; and questions concerning STI knowledge including characteristics of abnormal vaginal discharge, suspected symptoms, possible causes, transmission, curability, complications, partner treatment and prevention. Information on self-reported diagnosed STI or STI-related symptoms during life-time, and self-reported STI-related symptoms during the past 6 months and at the time of the interview was also requested. The questionnaire was reviewed with the surveyors of FilaBavi, pre-tested and revised several times to ensure that it was understandable and suitable to the sociocultural context of the study area. Piloting of the questionnaire was conducted in one cluster (100 women), which was not included in the analysis for this study, in order to check if the progress of the interview fitted in with a clinical examination plan, to get an overview about the response rate for the interview as well as women's willingness to participate in the clinical examination.

The data collection was performed between March and May 2006. Firstly, the surveyors and the field supervisors of FilaBavi were trained to be familiar with the questionnaire and were informed about data collection procedures. Then 42 female surveyors performed interviews with the selected women in private at respondents' homes. All collected forms were checked by the field supervisors to ensure quality of the interviews. After the interview, the surveyors gave all the married women written

information and invitation letters for a gynaecological examination and laboratory tests in a certain CHC at a pre-set of time i.e. one to three days after the interview.

Data regarding the economic status, and out-migration (absent from home 3 months or more) of the women or their husbands were extracted from the available demographic database of FilaBavi.

### **Gynaecological examination (III)**

Data was collected between March and May, 2006. Women were interviewed and blood was sampled before gynaecological examinations. Three female physicians including two gynaecologists (with 16 and 20 years experience) and one venereologist (PT Lan, with 16 years of experience) conducted the examinations, which included inspection of the vulva, perineum, and perianal area, as well as the vagina and the cervix using a speculum for examination and sampling (see below and Appendix 3). Finally, a bimanual pelvic examination was performed. In the beginning of the study, the three physicians examined several women together in order to have similar assessment of clinical signs. This procedure was repeated once more in the middle of the data collection process.

*Clinical diagnoses* were made based on signs observed during the speculum and bimanual examinations as follows:

- Vaginitis: abnormal vaginal discharge and/or inflammation of the vagina.
- Cervicitis: inflammatory appearance of the cervix or easy induced cervical bleeding at touching or yellow cervical discharge, or combinations of the signs.
- PID: purulent or muco-purulent discharge from the cervical os combined with lower abdominal or adnexal and/or cervical motion tenderness.
- Genital warts: soft, raised, cauliflower-like masses on the genital area, e.g. labia minora, vaginal canal, cervix.

### **Sampling of biological specimens (III)**

All the samples collected (except the wet mount smears) were transported within 11 hours to the laboratory in Hanoi for analysis. For the diagnosis of hepatitis B, HIV and syphilis, 3 ml of blood were sampled and centrifuged. The sera were transported in cooling boxes, and stored at  $-20^{\circ}\text{C}$  until analysis.

Samples from the posterior vaginal fornix were collected for wet mount preparation, which was examined immediately at the examination rooms. For Gram-staining, specimens from endocervical canal, urethra and the posterior vaginal fornix were collected, smeared on slides, fixed and put in slide boxes, then sent to the laboratory for further staining and analysing process.<sup>22</sup>



Specimens for polymerase chain reaction (PCR) assays were endocervical swabs which were sampled by cleaning the exocervix, inserting a cotton swab 2cm into the cervical canal then gently rotating and scalping cells from the cervical canal wall.<sup>22</sup> The swabs then were placed and transported in dry ice boxes, and subsequently stored at  $-70^{\circ}\text{C}$  until analysis.

### **Laboratory diagnostics (III)**

*T vaginalis* was diagnosed by visualization of motile trichomonads in the wet-mount smear; *Candida* by budding yeast cells or pseudohyphae found in the wet mount smear and/or Gram-stained smear; and BV by Nugent's score of 7 to 10.<sup>116</sup>

Enzyme-linked immunosorbent assays (ELISA) were used to screen hepatitis B, HIV, and Rapid Plasma Reagin (RPR) was used to detect syphilis. Multiplex PCR assay was performed as previously described<sup>75</sup> for the diagnosis of *C trachomatis* and *N gonorrhoeae* from the endocervical swabs. Five percent of negative samples were randomly selected and reanalyzed. All positive samples were confirmed by re-testing (by using the extracted DNA).

### **Self-completed questionnaire (IV)**

A self-completed questionnaire (Appendix 4) was developed based on the national guideline training materials. It was pre-tested outside the study setting and revised several times prior to use. The questionnaire contained mainly closed but also a few open ended questions. The information asked were HCPs' socio-demographic characteristics and knowledge about STI, such as identification of the diseases, suspected symptoms, transmission routes, causes and risk factors, complications, and partner treatment and notification. The questionnaire also consisted of four hypothetical cases of the four common STI syndromes based on the national guideline on syndromic case management. The four cases were one each of vaginal discharge, urethral discharge, genital ulcer, and lower abdominal pain syndromes. HCPs were asked what could be possible diagnosis, how they would make diagnosis, treatment and counselling for each case scenario.

The data were collected in January and February 2006. The questionnaire was distributed to HCPs in groups at the DHC or CHCs for self-completion without discussion or aid, at a pre-set time and under the supervision of the research team. Those who could not participate in the groups (a few drugsellers and medical personnel who had days off due to previous night duties) were asked to fill in the questionnaire individually in the presence of the surveyors. All participants were assured that filling in the form was not a test, and that they could do it anonymously without any pressure. Verbal consent was sought from the respondents before data collection.

### 3.5 DATA ANALYSIS

#### Qualitative study with content analysis (I)

Content analysis without pre-determined categories was applied for data analysis.<sup>43</sup> We decided to use content analysis in Study I because it is considered as one of the most suitable approaches to analyse FGDs. The research team read through the transcripts several times in order to become immersed in the data.<sup>12</sup> Open coding was used for each sentence or paragraph which was considered as a meaning unit (Figure 5). The Vietnamese and English versions were used simultaneously side-by-side during the coding procedure to avoid misinterpretations of the full meaning of the texts. Words not deemed relevant or not related to the main topic were not coded. Similar codes were clustered together and collapsed into sub-categories and categories. The main themes were created, based on the relationship between categories.<sup>12</sup> Two researchers coded the material separately, then compared and discussed to see if the coding of the data was reliable and the themes appropriate.

**Figure 5.** Example of meaning units and codes

	Meaning unit	Code
1	Some elders said that it is very hard when they catch the diseases. When they go to the “doctor”, they are shouted at.	Shout at patient
2	Some men said to us that “let’s keep quiet when being scolded”	Keep silent when being scolded
3	If they [“doctor”] scold, it’s better to keep silent, and just only for 15-20 minutes because they have to check others [patients], they don’t scold us for life!	Accept scolding
4	Cover their ears to avoid hearing.	Avoid hearing
5	It would be bad if they [“doctor”] refuse to cure us.	Fear being denied cure

#### Quantitative data analysis (II, III, IV)

Data analysis was processed in SPSS version 13 for all the quantitative studies II, III and IV. Frequencies, proportions, mean, median, minimum and maximum were used for the descriptive analysis, Chi-Square tests were performed to examine the difference between proportions. In study III, 95% confidence interval was used to compare two prevalence of diseases. In study IV, *t*-test and ANOVA were used for univariate comparisons of providers’ knowledge and practice competence between groups defined by each factor of interest.

Multivariate\* analysis to explain relations between dependent and independent variables controlling for confounders were employed in all of these studies. Logistic regression analysis was employed to indicate influencing factors on the prevalence of the infections

\* This term is commonly used, also it is known as “multiple” although “multivariable” is the correct term.

(III), to identify factors influencing women's STI knowledge (II) as well as providers' knowledge and reported practice regarding STI (IV). In the logistic regression models, all independent variables (i.e. age, education level, occupation, economic status, place of residence etc.) were put together into the logistic regression equations, therefore, the odds ratios (ORs) were adjusted. Linear regression analysis was used in Papers II and IV to assess the mutual impacts of independent variables on knowledge and/or practice of the respondents.

In Paper II, MLwiN version 1.1 was used for multilevel linear regression analysis and for calculation of intra-cluster correlation (ICC) examining the similarities of STI knowledge of women within clusters.

In Paper III, the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) of self-reported symptoms and clinical diagnosis compared with laboratory findings were calculated.

Scoring was used to measure levels of STI knowledge (II, IV) and practice of respondents (IV). All correct responses were given a score of 1 and incorrect or "do not know" responses were given a score of 0. Regarding reported practice among the HCPs in Study IV, in every scenario, the score 1 was given for each correct answer regarding diagnosis, treatment, partner notification, and advice. Furthermore, one extra point was awarded for a response from medical personnel that made diagnosis by using a syndromic approach, or from pharmacy personnel that gave the correct name(s) of drug(s) used for each scenario. We graded the total score of knowledge (50 points) and practice (20 points) into three different categories: optimal (above 75% of total score), acceptable (50-75%) and suboptimal (below 50%).

### **3.6 ETHICAL CONSIDERATIONS**

Ethical permission for the study was obtained from the Research Ethics Committee at Karolinska Institutet (reference number: 2005/278), Stockholm, Sweden and from Hanoi Medical University (reference number: 22/IRB), Hanoi, Vietnam.

The aims and procedures of the study were explained and verbal consents were granted by all respondents before inclusion in the study. The respondents were informed that they could withdraw at any time of the study. Respondents were assured that they would remain anonymous in any written report from the study, and their responses would be treated in confidence.<sup>135</sup> They were encouraged to tell their experiences and views of the issues under study. In the FGDs, the moderators asked permission to tape-record the discussions and explained the purpose of doing so.

Counseling was made available to respondents when needed. Women with diagnosed infections were treated free of charge following the national guidelines. Any STI detected by laboratory tests were reported to the women individually and they were given prescriptions and counseling in relation to compliance of the treatment, partner notification and prevention of further infections.

## 4 MAIN RESULTS

### 4.1 COMMUNITY'S PERCEPTIONS ABOUT STI/RTI (I)

How do people in the community perceive STI/RTI?

STI/RTI were mentioned as a sensitive issue in all ten FGDs. The atmosphere in almost all groups was quiet at the beginning. After warming up and building trust, participants started to talk. Unmarried participants seemed to perceive the issue as more sensitive than married participants. It was emphasized by the participants that married and unmarried people should not discuss the issue together. Women, especially those who were unmarried, found it difficult and embarrassing to discuss STI/RTI.

*“It’s so difficult and shameful to talk about this; especially for unmarried girls like us it’s more difficult than for married women” (29-year old unmarried woman).*

During the discussions, it was said in almost all FGDs that teachers at school, and male family members had rarely or never talked about STI/RTI. It was considered shameful for young boys to talk about this topic with family members while young girls could confide in mothers or sisters when having symptoms. Additionally, in the past, older people avoided talking about the issue and did not really want the young to hear anything about it. The majority of participants said that they could get information, exchange experiences and talk about STI/RTI with peers, while, it was hard to get information about STI/RTI through mass media, books, magazines and newspapers.

*“...we have rarely heard about ‘inflammation’. From TV, radio, newspapers, a lot of people know about HIV/AIDS but not ‘inflammation’ [RTI] or ‘social disease’ [STI]” (49 year-old married man).*

*“It was difficult to understand the old’s unclear sayings. When they talked about this, they asked us to go far away. They said that children shouldn’t listen to that. They were afraid that if their children listen to sex stories too early, they might have easy-going sexual relations” (23 year-old unmarried woman)*

HIV/AIDS were called “Sida” - the French term, and it entered the discussions spontaneously as a new, incurable and fatal disease with several ways of transmission: sexual intercourse, blood transfusion, sharing needles and from mother to child. Prostitution and intravenous drug use were considered high risk behaviours. All groups mentioned that HIV/AIDS could be prevented by both partners being faithful in a relationship, practising safe sex, using condoms and not sharing needles.

In general, people in the community classified STI and RTI separately and various local names were used for STI, such as “*bệnh xã hội*” (social disease), “*bệnh hoa liễu*” (venereal disease), “*chào mào hoa khê*”, “*kim la tổ đũa*”; for Gonorrhoea (lậu) as “*nổ*”

(explosion), “nổ bom”, “nổ ống xả” (exhaust pipe explosion), “nổ ống khói” (chimney explosion); for RTI as “bệnh phụ khoa” (gynaecological disease), “viêm” (inflammation), “bệnh phụ nữ” (women’s disease), “bệnh khí hư” (vaginal discharge), “viêm âm đạo” (vaginitis), “viêm tử cung” (uterine inflammation), “viêm buồng trứng” (ovaritis), “viêm phần phụ” (adnexal mass inflammation), “viêm trong” (inner inflammation), “viêm ngoài” (outer inflammation), “rong huyết trắng” (white blood discharge), “nấm” (fungus) and “ngứa âm hộ” (vulva itchiness).

Common terms used for STI were: social disease or venereal disease; for RTI they were: gynaecological disease, women’s disease, inflammation. The most common STI mentioned in FGDs were gonorrhoea, syphilis, hepatitis B, genital warts, and urethritis. Besides, smallpox, diabetes, tuberculosis, and prostatitis were mentioned by a minority of community members as also being transmitted sexually.

In the FGDs, bad personal hygiene or bad hygiene when having sex, having sex during menstruation or soon after delivery were mentioned as causes of STI. The following quotes from a group of married women imply that poor hygiene in men can also cause gonorrhoea.

*“Maybe he gets this disease [gonorrhoea] spontaneously just because of dirtiness of his private part”* (42 year-old married women, teacher).

*“People who are in period, if have sexual intercourse they will catch gonorrhoea. If men have sexual relations with these women, they will be infected”* (19 year-old unmarried woman).

A common belief that existed among men was that STI originate from women and that men get gonorrhoea and syphilis from women through intercourse. Women could get STI because of dirtiness. The dirtiness of women also can cause “inflammation”. If untreated, “inflammation” would develop into gonorrhoea and syphilis which were considered to be later and more severe stages of the same disease.

*“We only know the cause [of STI] is not originally from men. Women have this disease, and then pass on the disease to men during intercourse . . . I can say that STI is one disease in many stages . . . At first, it is “inflammation”, if not treated, it becomes gonorrhoea, and the next period is syphilis”* (41-year old married man).

Urethral discharge in men and vaginal discharge in women were stated as the main STI symptoms by the majority of FGDs. Moreover, in men, gonorrhoea could cause pain and swelling of the penis, painful urination, fever, weight loss, sickness and a sexual desire so strong, that men could even rape women. The occurrence of asymptomatic STI in women was mentioned. Here is the way to check for the disease in women:

*“... it is more difficult for female to recognize the disease, ... there was a way to check... may be... put cold cigarette ashes to the girl's genitals. If she has the disease, we will know, she will feel stinging and curve her body”* (21 year-old unmarried man).

Injections with antibiotics and abstaining from sexual intercourse during treatment were said to be the main ways of STI treatment. However, all male groups discussed that severe or recurrent gonorrhoea might result in an operation that would split the penis into several segments and scraping to remove pus then suture it.

*“If they catch [gonorrhoea] many times, the patients even have to undergo an operation. The penis will be split into 2 segments, scraped then sutured”* (21 year-old unmarried man).

*“When it [gonorrhoea] is severe, the penis may be split into 3 or 4 segments and scraped”* (38 year-old married men).

Complications of STI/RTI were stated to be infertility in both sexes, cervical cancer, miscarriage in women, and malformation of children. Young men especially seemed to fear infertility which was mentioned as partially related to promiscuity. There were also statements saying that chronic gonorrhoea might become AIDS and that “inflammation” makes women weaker so they more easily develop other diseases such as hypertension or hypotension.

All groups mentioned that faithfulness, condom use, avoiding sex soon after childbirth or during menses and abstinence from intercourse during STI/RTI treatment were ways to prevent STI. Keeping good hygiene, not working hard, not soaking the body in dirty water during menstruation, eating food and drinking fluids moderately were said to protect women from RTI. Furthermore, there was a belief that no ejaculation or practicing good hygiene when having sex could protect people from any STI.

*“Just in poor hygiene people can be inflamed much more than from sexual intercourse. If someone has sexual intercourse but they are in good hygiene, they will not catch any diseases”* (19 year-old unmarried man).

In summary: STI/RTI were perceived by the community members, especially unmarried women, as a sensitive issue. The availability of information in relation to STI/RTI as opposed to HIV/AIDS was voiced to be limited. Complex terminology was used for STI/RTI. Personal hygiene was considered the core factor of STI/RTI. Misconceptions regarding various aspects of STI/RTI were found among people in the community.

#### **4.2 ATTITUDES TOWARDS STI/RTI AND HEALTH-SEEKING PATTERNS (I)**

How do people behave towards someone suffering from STI/RTI?

How do people seek care when having an STI/RTI or related symptom(s)?

##### **Attitudes of lay people towards STI/RTI**

Most participants of FGDs mentioned that people with STI often hide their disease and feel ashamed. In some groups, people with STI were considered to be “bad” because of

their deviant behaviour, as opposed to people with RTI. During the discussions it was pointed out that women with STI faced a greater risk of discrimination than men.

*“The feudal thoughts, which value man over woman, still exist...In the countryside where I live, the woman is always in a worse situation”* (19 year-old unmarried men).

Men were said to react in different ways depending on their beliefs. A wife suffering from gonorrhoea would e.g. receive support for treatment if her husband believed that the disease was due to dirtiness. Inversely, she would be driven out, even ruthlessly beaten, if he perceived the cause to be unfaithfulness on her part.

*“In rural areas, if the wife commits adultery and the husband knows, 9 out of 10 husbands will surely send her back to her parents at once”* (38 year-old married men).

### **Clinician – patient interaction**

According to most male participants of the FGDs, STI patients usually have bad feelings when visiting health facilities. “Doctors”<sup>†</sup> shout at them and scold them, and patients have to keep silent and accept the scolding because they fear being denied a cure for their diseases.

*“...in case of “nô” [gonorrhoea], doctors scold patients like you scold a dog. They scoff at patients’ promiscuity”* (38 year-old married men).

Not only did men have to bear scolding by “doctors”, women also experienced discrimination from medical staff when visiting health facilities. The following statement illustrates this:

*“The “doctor” often shouts at the patients with “inflammation”. They are right because the people in rural areas don’t keep clean. However, they make us ashamed. I feel that they behave differently towards patients with “women’s disease” than towards patients with other diseases”* (32 year –old married women).

In some female groups the participants discussed that women usually care about the sex of the providers. Especially unmarried women found difficulties when talking to health care providers of the opposite sex. The sex of the health care providers was said to be more important than their attitudes.

*“Male doctors often don’t scold us, but we still feel more ashamed. We are not so scared of female doctors even if they scold us”* (22 year-old unmarried women).

*“As usual, women would feel very ashamed when talking these problems to male doctors”* (18 year-old unmarried).

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<sup>†</sup> It is quite common for people in rural areas of Vietnam to call all health care providers, who wear white blouse uniforms in health facilities, as “Doctors”

## Health-seeking patterns for STI/RTI

In all female groups the participants mentioned self-medication as the first health care action for RTI. Peers were often consulted about treatment. Daily genital washing with salt water, “Rose” washing powder<sup>‡</sup>, herbs, green tea or betel leaves were described as common practices for RTI treatment and prevention. The second choice was to buy drugs from drugstores after informing the drug sellers about the symptoms. Health facilities were considered as the last choice due to the shamefulness of the diseases and the negative attitudes of health personnel.

*“Friendliness (of “doctors”) will make us feel freer and more comfortable. It is last way for us to go to see “doctors”, so why we are not scared under this grouchy-temper (of the “doctors”)?” (38 year-old married women).*

Asking peers or experienced people for advice and seeking care from private health providers were said by participants in most of the male groups to be the most common choices of men with STI, due to concerns about confidentiality. However, many other male participants agreed that provincial or central levels would be better because there the doctors are more specialized, equipment and drugs are plentiful, and confidentiality is assured.

In summary, discrimination against STI patients, especially women, was stated to be more or less prevalent among people in the community. Complaints were voiced about clinicians’ negative attitudes towards STI/RTI patients. Health-seeking patterns for STI/RTI were reported to differ between men and women: self-medication was mentioned as a common practice among women, while men were more likely to seek healthcare from private providers.

### 4.3 KNOWLEDGE OF STI AND PREDICTIVE FACTORS (II, IV)

#### STI knowledge among women and predictive factors for level of knowledge (II)

What do women know about STI?

What are the possible associations between socioeconomic and women’s STI knowledge?

Among the 1805 respondents, 1360 were married and 445 were unmarried. Almost all women aged 15 to 19 years (97%) were unmarried. Nearly half of the respondents lived in the lowland. Literacy reached 99.6% in the study population. Among married women, the mean age at first marriage was 20.9 years (range 13-43, SD 3) and the mean number of children was 2.3 (range 0-8, SD 1). Women who had experienced at least one induced abortion or miscarriage were 37% and 15%, respectively.

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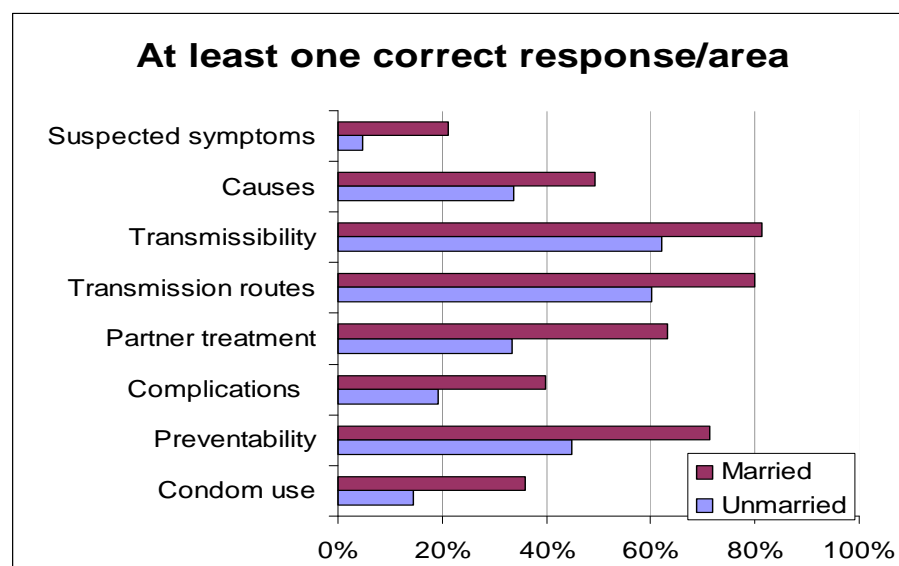
<sup>‡</sup> “Rose” washing powder is a female hygiene powder, which is widely sold in the countryside



Of the respondents, 64% considered vaginal discharge as a normal phenomenon, 12% considered it abnormal and 24% did not know whether it was normal or abnormal. Three-fourths of unmarried women did not know the common characteristics of abnormal vaginal discharge. Vaginal itching was the most frequently mentioned (16%) as suspected symptom of STI, followed by abnormal vaginal discharge (9.5%), and urethral discharge in men (1.3%). However, 78% women (73% married vs. 93% unmarried,  $p=0.000$ ) did not know any symptoms of STI. Only five percent of the women answered that possible causes of STI are microorganisms. Nearly half (41%) of the interviewed women answered that STI was caused by being unfaithful or having unsafe sex, and half of the women did not report knowledge about any cause of STI. Twelve percent and 3% of the women considered bad hygiene and having sex during menstruation as causes of STI. Sharing clothes/food or kissing was mentioned as ways of STI transmission by 1.6% of the women.

The percentage of correct answer were below 50% for the questions on suspected symptoms, condom use for STI prevention, and medical sequelae of untreated STI (Figure 6). There were significantly more unmarried than married women who were unaware that STI could be prevented. Condom use for STI prevention was mentioned by 31% of the women (unmarried 14% vs. married 36%,  $p\leq 0.001$ ).

**Figure 6.** Percentage of the respondents who gave at least one correct answer per question related to STI



Out of 40 possible correct answers, the mean knowledge score was 6.5 (range 0-26, median=6). Only 2% could give at least one correct answer for every question. There was an association of STI knowledge between women within cluster ( $ICC=0.25$ ,  $p<0.01$ ). The highest mean knowledge score (9.9, range 0-26) was obtained from a cluster in the lowland, and the lowest mean score (3.6, range 0-12) was obtained in a cluster in the mountainous area.

A knowledge score of zero was found among 31% unmarried and 5% married women. More than a quarter (26.7%) of the women who were students reported no knowledge about STI. The proportion of women with a knowledge score of zero was significantly higher among women living in the remote areas (15.2%) compared to those living in the lowland (6.6%), and among women lacking experience of induced abortion compared to women having had at least one abortion (14.8% vs. 2.8%,  $p < 0.05$ ).

Multivariate regression analyses showed that being young (under 20 years of age), unmarried, and living in the highlands or mountainous areas predicted very low levels of STI knowledge. Experience of an induced abortion was significantly associated with a higher level of knowledge.

In summary, low levels of STI knowledge, especially in terms of suspected symptoms, complications and condom use for STI prevention were found among the study women. Younger age, unmarried status, low education or residence in highland or mountainous areas predicted lower level of STI knowledge. Experience of an induced abortion was significantly associated with a higher level of STI knowledge.

#### **STI knowledge among HCPs and predictive factors for level of knowledge (IV)**

What do HCPs know about STI? What level of STI knowledge do they have?  
Are there any factors influencing their level of knowledge regarding STI?

Suspected symptoms of STI mainly mentioned by the HCPs were genital ulcer (78% of the responses), genital warts (73%), urethral discharge in men (72%), genital itching (71%), and abnormal vaginal discharge (70%). Of the HCPs, 95% could answer correctly on at least one suspected symptom of STI. Genital itching, urethral discharge in men and abnormal vaginal discharge in women were mentioned as the most common symptoms of STI by 71%, 37%, and 30% of the HCPs, respectively.

Diseases classified as STI by HCPs were gonorrhoea and syphilis (83% of the responses), followed by HIV and genital warts (50-52%), and hepatitis B, trichomoniasis, genital herpes and Chlamydia (30-37%). Of the HCPs, 17% knew of pubic lice as an STI, while 52% and 34% considered candidiasis and bacterial vaginosis (BV) as STI. Up to 70% of the HCPs answered that partner treatment was necessary for BV or candidiasis cases.

Almost all of the HCPs mentioned about personal sexual behaviour, including being unfaithful, practising unsafe sex or prostitution as risk factors of STI. Modes of STI transmission mentioned were sexual intercourse (94%), mother to child (58%), blood transfusion or sharing needles (41%). Among those 278 HCPs (60%) who identified sharing clothes as a route of STI transmission, only 21% recognized pubic lice as an STI ( $p = 0.002$ ). When we excluded pubic lice<sup>§</sup> from the number of certain STI such as

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<sup>§</sup> Pubic lice can be spread by sharing clothing, bedding or towels.

syphilis, gonorrhoea, HIV, chlamydia, trichomoniasis etc. it remained obvious that about 60% of the respondents mentioned sharing clothes as a transmission route. The concepts of risk factors for STI as having bad hygiene when having sex or sex during menses were held among 67% of the HCPs. There were more respondents who knew about the necessity of partner notification and treatment for gonorrhoea, syphilis, HIV/AIDS (96%) than for trichomoniasis, Chlamydia and pubic lice (61%). Compared with pharmacists/drugsellers, medical personnel had less correct answers about the curability of gonorrhoea, hepatitis B, and HIV ( $p < 0.05$ ), however, they knew better about the complications of untreated STI. Pharmacy personnel had better knowledge of STI prevention than did medical personnel (91% vs. 78%,  $p = 0.01$ ), especially concerning 'safe sex' including condom use (80% vs. 61%,  $p = 0.001$ ).

**Table 4.** Overall STI knowledge scores by characteristics of 465 healthcare providers

Category	Knowledge score			
	Univariate analysis		Multivariate analysis	
	Group mean	<i>P</i> value	Regression coefficient	<i>P</i> value
Gender				
Male	27.7	0.440	-0.8	0.375
Female	28.5		0	reference
Years in practice				
< 5	26.2	0.001	-1.6	0.115
5- 19	29.6		0	reference
> 19	29.4		-1.2	0.278
Occupation				
MD/AMD	31.6	0.000	8.9	0.011
Nurse/other	25.8		5.2	0.134
Midwife	32.4		8.5	0.022
Pharmacy personnel	23.7		0	reference
Working places				
District	31.1	0.000	-0.1	0.974
Commune	31.3		-1.9	0.575
Village/private clinic	24.6		-3.4	0.334
Drug store	24.2		0	reference
Serving STI patients				
Yes	25.3	0.000	4.5	reference
No	31.7		0	0.000
Participation in STI/RTI training course				
Yes	32.8	0.000	1.2	0.297
No	27.3		0	reference

*STI: Sexually transmitted infections; RTI: Reproductive tract infections*

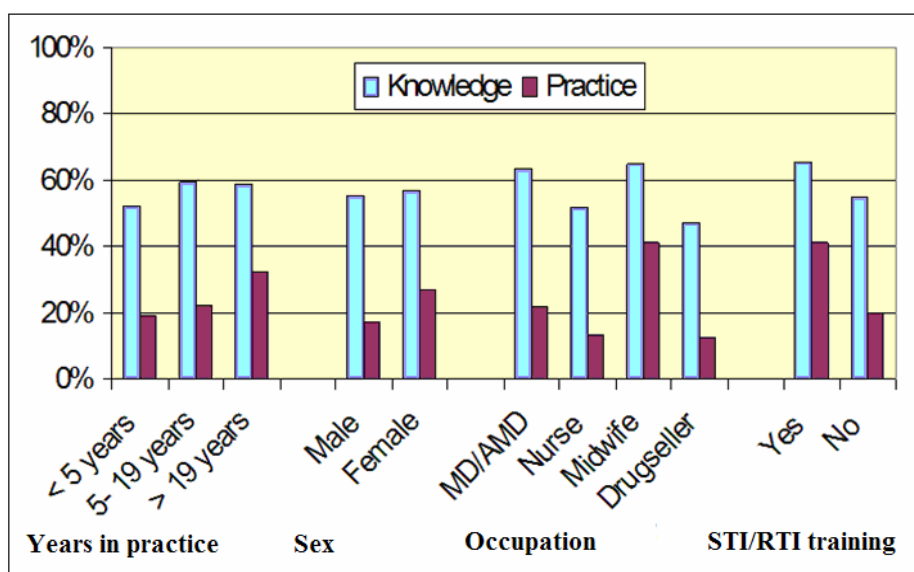
*MD: medical doctor; AMD: assistant medical doctor*

*Positive regression coefficients indicate positive associations*

*Negative regression coefficients indicate negative associations*

Among the HCPs, the mean knowledge score was 28.2 (minimum 0, maximum 50, median=29), 34% had sub-optimal (less than 50% of the correct answers) and 28% had optimal (more than 75%) knowledge of STI, respectively. Medical personnel’s mean knowledge score was significantly higher than that of pharmacists/drugsellers (29 vs. 24,  $p \leq 0.001$ ). Multivariate analysis showed that being a nurse or pharmacist/drugseller predicted low level of STI knowledge. Being a medical doctor or assistant medical doctor, being a midwife, or serving\*\* STI patients was strongly associated with higher overall knowledge (Table 4) although in some of the sub-areas, this was not always the case.

**Figure 7.** Mean percentage of STI knowledge and practice scores by provider groups



#### 4.3 HEALTHCARE PROVIDERS’ REPORTED PRACTICE (IV)

How are HCPs reporting management of STI case scenarios?

Among the HCPs, average practice score was 4.7 (minimum 0, maximum 20, median 2), 78% scored less than 10 and nearly half (48%) had score of 0. Medical personnel achieved significantly higher scores than pharmacists/drugsellers (5.1 vs. 2.9,  $p < 0.05$ ). Linear regression analysis (Table 5) showed the significant influence of years in practice, gender, occupation, workplace, serving STI patients, and training on providers’ reported practice. Working at village or in the private sector was significantly associated with low practice.

\*\* We considered the HCPs from whom patients seek care for STI as HCPs “serving STI patients”. They may give counselling and/or treatment to STI patients, or refer them to other places for treatment.

**Table 5.** Reported practice scores by characteristics of 465 healthcare providers regarding STI case scenarios

Category	Practice score			
	Univariate analysis		Multivariate analysis	
	Group mean	P value	Regression coefficient	P value
Gender				
Male	3.5	0.001	-1.2	0.031
Female	5.4		0	reference
Years in practice				
< 5	3.9	0.001	1.3	0.025
5- 19	4.5		0	reference
> 19	6.5		1.3	0.050
Occupation				
MD/AMD	4.4	0.000	3.5	0.062
Nurse/other	2.7		3.1	0.098
Midwife	8.2		5.6	0.007
Pharmacy personnel	2.6		0	reference
Working places				
District	6.0	0.000	-0.9	0.564
Commune	6.3		-0.4	0.731
Village/private clinic	1.0		-4.6	0.013
Drug store	2.8		0	reference
Serving STI patients				
Yes	6.9	0.000	2.5	0.000
No	2.9		0	reference
Participation in STI/RTI training course				
Yes	8.3	0.000	1.4	0.055
No	4.0		0	reference

*STI: Sexually transmitted infections; RTI: Reproductive tract infections*

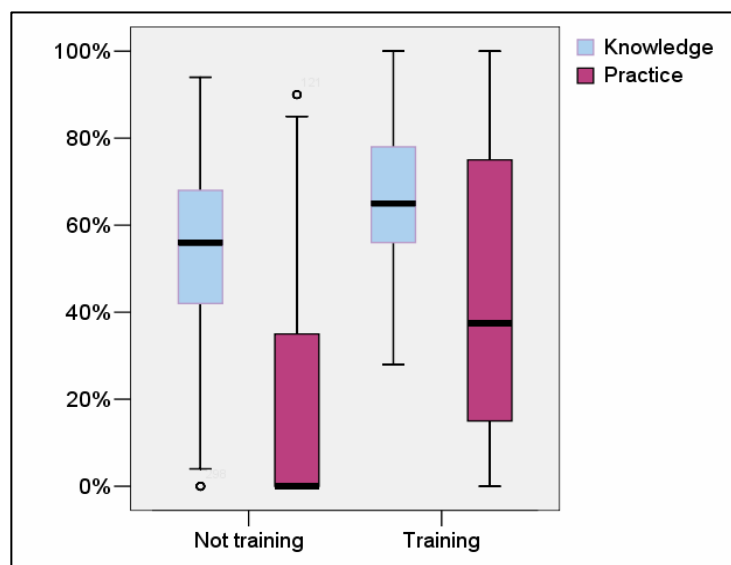
*MD: medical doctor; AMD: assistant medical doctor*

*Positive regression coefficients indicate positive associations*

*Negative regression coefficients indicate negative associations*

Those who had participated in STI/RTI training courses had significantly higher practice scores (Figure 8). HCPs who reported not referring patients with STI-related symptoms to other health facilities had a mean practice score higher than the others (14 vs. 3,  $p < 0.05$ ).

**Figure 8.** Percentage of knowledge and reported practice score by participation in STI/RTI training



Multivariate logistic regression showed that being a male respondent or not serving STI patients or not participating in STI/RTI training courses were two times more likely to have practice score of 0 (ORs=2,  $p \leq 0.03$ ). When removing those HCPs who had a score of 0 from the logistic regression model, the results did not show any significant impact of training on those who had level of practice score different from 0.

In summary, one-third and three-fourths of the HCPs had sub-optimal knowledge and practice regarding STI. Characteristics predicting higher level of knowledge were being a medical doctor, assistant medical doctor, or midwife or serving STI patients. Characteristics predicting higher level of practice were serving STI patients, being a midwife female provider, and having participated in STI/RTI training courses. Respondents who reported treating patients had a higher level of knowledge and reported practice than the others.

#### 4.4 PREVALENCE OF STI/RTI (III)

What is the prevalence of STI/RTI among women in the general population?  
 What determinants are possibly related to STI/RTI?

The mean age of the 1,012 married women who fully participated in the clinical examination with speculum and blood sample was 36 years (range 18 to 49). Of the women, 39% had at least one induced abortion, 16% had at least one miscarriage. IUDs were currently used as contraceptive method by 37% of the women, 49% practiced daily vaginal douching, 17.5% had had a husband who out-migrated at least once. Thirty-four had self-reported symptoms during the time of interview (1-3 days before

gynaecological examination), of which abnormal vaginal discharge was most common 29% (Table 6).

### Prevalence of STI/RTI and determinants

In total, 37% of the married women were clinically diagnosed with a current STI/RTI (Table 6). Some women had more than one diagnosis. At least one aetiologically confirmed STI/RTI was identified in 39% of the married women. HBsAg seropositivity was 8.3%. The prevalence of STI was 6% of the total married women. Among the identified STI, *C trachomatis* was the most prevalent 71%, followed by *T vaginalis* 16.4%, and *N gonorrhoeae* 11.5%.

**Table 6.** Reported symptoms, clinical and aetiological diagnoses of STI/RTI among 1012 married women 18–49 years of age in a rural district of Vietnam

	Number*	%
<b>Self-reported symptoms</b>		
Abnormal vaginal discharge	292	29
Vaginal itching	94	9.3
Lower abdominal pain (not related to menstruation)	55	5.4
Dysuria/dyspareunia/bleeding after intercourse/genital ulcer/wart	48	4.7
<b>Clinical diagnoses</b>		
Vaginitis	292	29
Cervicitis	100	9.9
Genital warts	2	0.2
Pelvic inflammatory disease	3	0.3
<b>Aetiological diagnoses</b>		
<i>Endogenous infections</i>		
Candidiasis	260	25.7
Bacterial vaginosis	115	11.4
<i>Sexually transmitted infections</i>		
<i>C trachomatis</i>	43	4.3
<i>N gonorrhoeae</i>	7	0.7
<i>T vaginalis</i>	10	1.0
HIV and Syphilis	0	0

\*Some women had more than one diagnosis.

No significant association between self-reported symptoms and clinical diagnosis or laboratory findings was found. The prevalence of BV and candidiasis was more than doubled in women with signs recognized during gynaecological examination compared to those without signs (59% vs. 26%;  $p < 0.001$ ). Considering *C trachomatis*, *N gonorrhoeae* and *T vaginalis* combined, the prevalence of these infections was higher in women with symptoms (7.9% vs. 5.0%), but this difference was not statistically significant ( $p = 0.102$ ). Of the 61 STI cases, 50% were asymptomatic (four *N*

*gonorrhoeae*, 24 *C trachomatis*, and three *T vaginalis* cases). Twenty five women had one endogenous RTI and one STI, and one woman had two STI (*C trachomatis*, *T vaginalis*) and one endogenous RTI. Overall, 29% (187/642) of the women, who had no symptoms, had laboratory findings confirming a present infection.

Multivariate logistic regression analyses showed that being of a younger age (below 30 years of age) was strongly associated with an increased risk of BV as compared with being in the age of 30-39 years (OR=0.50, 95% CI 0.29-0.88). However, the risk of having BV was the same different between the under 30 and 40-49 age groups (OR=0.9, 95% CI 0.52-1.46). Using intrauterine device was significantly associated with increased risk of BV (OR=1.5, 95% CI 1.01-2.33). Significant determinants of candidiasis were vaginal douching (OR=1.5, 95% CI 1.07-1.99), high education level (OR=6.8, 95% CI 1.91-24.02) and low economic status (OR=2.1, 95% CI 1.25-3.51), whereas a determinant of chlamydia was high economic status (OR=3.2, 95% CI 1.08-9.45). Out-migration of husband was associated with increased risk of hepatitis B surface antigen seropositivity among women (OR=1.8, 95% CI 1.01-3.33).

### **Efficacy of STI/RTI diagnoses**

In comparison with the clinical diagnosis, the sensitivity of self-reported abnormal vaginal discharge only reached 29% for vaginitis, with the specificity 70%, PPV 28%. The sensitivity of self-reported lower abdominal pain was 75% for cervicitis, with the specificity 37%, PPV 17%.

In comparison with the aetiologically-based laboratory diagnostics, both self-reported symptoms and clinical diagnosis had specificity ranging from 71% to 90%) and NPVs 74% to 95% but very low sensitivity (11-50%) and PPVs (5.8-44%). If syndromic treatment was based solely on clinical diagnosis, two-thirds of the women would receive unnecessary treatment for BV and/or *T vaginalis*; half of the women would have unnecessary treatment for candidiasis as vaginitis; and 9/10 would be unnecessarily treated for *C trachomatis*/*N gonorrhoeae* as vaginitis/cervicitis.

Summary: STI/RTI were prevalent among married women. Candidiasis was the most common infection and related to vaginal douching and low economic status, followed by BV that was predicted by being under 30 years old or using IUDs. Prevalence of any STI was 6% among the married women, of which, half was asymptomatic. Vaginitis was clinically diagnosed among 29% of women who had self-reported symptoms. Clinical diagnosis and self-reported symptoms had very low sensitivity and PPVs compared with laboratory findings. HBsAg seropositivity among women was significantly associated with out-migration of husbands.



## 5 DISCUSSION

### 5.1 STI/RTI PREVALENCE AND DIAGNOSTICS

#### STI/RTI prevalence

The overall prevalence of STI among the married women, excluding hepatitis B, was 6.0%, which in comparison with other rather similar contexts was both slightly higher<sup>50, 119</sup> and lower.<sup>32, 127</sup> To our knowledge, this is the first study performed in the general population in Vietnam using PCR for the diagnosis of chlamydial infection and gonorrhoea and serological assays for HIV and syphilis. Furthermore, the prevalence of candidiasis, BV, and HBsAg seropositivity was laboratory confirmed.

Among the study women, *C trachomatis* and *N gonorrhoeae* were found to be the most commonly identified STI. These infections are also documented as the most common STI worldwide.<sup>177</sup> Compared to previous studies in family planning clinics<sup>2, 99, 124</sup> or the rural community<sup>42</sup> in Vietnam, the prevalence of *C trachomatis* and *N gonorrhoeae* found in our study was higher. This was not unexpected because PCR, comprising high sensitivity, was used in our study. The determined PCR prevalence among the study women when compared to those among women in the general population elsewhere is either higher or lower. For instances, the prevalence of *N gonorrhoeae* has been reported to be 0.08% in China<sup>118</sup> and 1.2% in Peru,<sup>32</sup> and the prevalence of *C trachomatis* is 2.6% in China,<sup>118</sup> 1% to 2% in Bangladesh and India,<sup>50, 59, 127</sup> and 6.9% in Peru.<sup>32</sup> This variation could be due to the different approaches either in specimen collection methods or the age span of the study subjects, or both. In conjunction with the current study, we also investigated the prevalence of *Mycoplasma genitalium*, which was 0.8% among the married women.<sup>117</sup>

Asymptomatic STI have been previously shown to be common among women,<sup>180</sup> especially *C trachomatis*<sup>24, 83</sup> and *N gonorrhoeae*.<sup>24, 83</sup> Half of STI cases found in our study were asymptomatic. The detection of asymptomatic STI cases, especially *C trachomatis* and *N gonorrhoeae* among women in our study would be of importance to prevent them from the development of complications and spread of the disease to their husbands/partners and further to the community. Also, it provides an insight into understanding the asymptomatic infections in the study population.

The results regarding endogenous infections among married women in our study were similar to the results from other studies in Vietnam<sup>2, 42, 99, 124</sup> and other low-income countries,<sup>32, 119, 127, 154</sup> where Candida and BV have been reported to be highly prevalent. In addition, BV has been found to be either commonly asymptomatic,<sup>98</sup> or over-diagnosed<sup>68</sup> and over-treated,<sup>34</sup> which could contribute to an increased risk of antibiotic resistance. Use of antibiotics may also increase the risk of unnecessary candidiasis infections due to disturbances in the normal flora.<sup>126</sup>

Having no case of HIV positive found in our study was not unexpected because the study women were from a rural area and belonged to a low-risk population. The HIV

epidemic in Vietnam has occurred predominantly among male IDUs who were estimated to represent a quarter of the adult epidemic. In 2005, the HIV prevalence among Vietnamese women of reproductive age was estimated to be 0.34%.<sup>90</sup> A study with household surveys has indicated the prevalence of HIV among rural women aged 15-49 to be 0.06%.<sup>164</sup> However, it has been proposed that the number of Vietnamese women infected with HIV seems to be considerably under-reported.<sup>111</sup>

Previous studies of HBV in rural Vietnam have found that HBsAg seropositivity is prevalent among the general population.<sup>52, 114</sup> For instance, one study conducted in two rural districts in the central of Vietnam demonstrates an HBsAg prevalence of 18.8% among people aged 25–40 years and 15.8% among women in general.<sup>52</sup> Another study in the rural part of the Red River Delta shows the prevalence of HBsAg seropositivity among the general population aged 16-82 years (both men and women) to be 19%, and 21% among women.<sup>114</sup> The HBsAg positivity rate in our study (8.3%), which was quite similar to that among pregnant women in a rural area of Vietnam (10%),<sup>42</sup> reflected only married women of reproductive age in the population.

The identified prevalence of STI/RTI, especially HIV infection, may be underestimated because some of the drop-outs may have had a self-recognition of being infected or being at risk. Furthermore, one cluster, which includes a higher proportion of known IDUs and gold-miners<sup>††</sup> with an associated high risk of HIV/STI, had a rather low response rate (66%). Overall, the influence of individual procedures on the results, such as cleaning the vagina before the examination, cannot be excluded, at least for BV, candidiasis, and *T vaginalis*.

In summary we believe that our study has contributed considerably to the overall picture of STI/RTI prevalence, especially the STI situation, of which data are extremely scarce, among rural women, who make up a high proportion of Vietnam's general population.

### **STI/RTI diagnostics**

The self-reported morbidity among the study women was minimally related to clinical and laboratory diagnosis. Signs of abnormal vaginal discharge (observed during clinical examination) are shown to be more predictive of the presence of STI/RTI than are symptoms (reported by patients).<sup>136</sup> Various factors may account underreporting and overreporting of morbidity, including individuals' awareness of their conditions, recall problems, reluctance to provide information, and differences in the conceptualization of what constitutes diseases or symptoms. Also, psychological and behavioural factors together with health-related knowledge, influence self-reporting of morbidity.<sup>141</sup> Therefore, though women are able to report symptoms, laboratory diagnosis is required to confirm STI/RTI<sup>141</sup> whenever the resources are available.

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<sup>††</sup> It is quite common in the study area that men spontaneously migrate to remote and mountainous areas to work at gold-mines that are not under the control of the government

We found that clinical diagnosis had a relatively low sensitivity and PPV compared to laboratory results. This is in accordance with previous studies in Vietnam<sup>42</sup> and elsewhere<sup>69</sup> showing low agreement between the two diagnostic approaches. Low sensitivity and PPV means a certain number of the infections were under-diagnosed or over-diagnosed. Regarding *C trachomatis* and *N gonorrhoeae*, clinically diagnosed vaginitis and cervicitis had low sensitivity and PPV compared with laboratory diagnostics. Such low PPV was expected since the women examined belonged to a low-risk group, as also shown in India.<sup>34</sup> Similarly, a study in Laos demonstrates low PPV for the treatment of vaginal discharge as a potential STI among women at a gynaecology out patients clinic.<sup>148</sup> A study in Botswana shows that syndromic management according to the vaginal discharge algorithm would lead to substantial under-diagnosis and over-treatment of *T vaginalis* and BV.<sup>136</sup> It is not sensitive because most women with STI have no symptoms.<sup>165</sup> The lack of specificity of vaginal discharge symptom and the difficulty interpreting clinical signs may mean that women are over-diagnosed and over-treated for STI when they are in fact only suffering from endogenous infections.<sup>28, 49, 79</sup> Thus, specificity of diagnostics is the most important for low-risk population to avoid over-treatment. Conversely, the commonness of asymptomatic STI/RTI, especially *C trachomatis* and/or *N gonorrhoeae*,<sup>24</sup> BV<sup>98, 136</sup> and *T vaginalis*<sup>136</sup> can lead to a low sensitivity of the recommended algorithm, resulting in infected women not being treated. Therefore, syndromic algorithms should be supplemented by risk assessment in order to reduce under and over-treatment. Diagnosis and treatment that is based on symptoms only is highly inaccurate and should be abandoned where resources permit. The findings point out the need to improve the specificity of syndromic management by rapid tests, which need to be affordable, sensitive, specific, rapid, equipment free and deliverable.<sup>121</sup>

## 5.2 STI/RTI AND DETERMINANTS

### STI, migration and economic status

In Asia, poverty is documented as a key motivator for migration.<sup>57</sup> Mobility is a recognized risk factor for the spread of STI in South East Asia,<sup>151</sup> and in Vietnam<sup>89, 163</sup> in particular. Male migrants may find work as long-distance truck drivers, construction workers, goldminers, workers in new economic zones, traders, doormen in bars, restaurants, and taxi and motorbike drivers etc. Studies in other Asian countries have demonstrated that workers in these trades have engaged in risk behaviours<sup>70</sup> and consequently contributed to spreading the HIV epidemic from high risk groups to the general female population.<sup>57, 97</sup>

According to the Vietnamese MOH, the number of female migrants are 1.5 times higher than male migrants.<sup>90</sup> Female migrants may find work as shopkeepers, housekeepers, small traders, servants for restaurants, bars etc. In our study, men and women included in the highest economic category out-migrated more frequently (data not shown). It is documented that the expanding mobility from rural to urban areas can increase young women's vulnerability to sexual exploitation.<sup>166</sup> The combination of having better incomes, being young and away from home provides more scope for behavioural changes. Migrants tend to engage more commonly in casual and/or

commercial sexual relationships<sup>163</sup> and in illicit drug use. Lack of knowledge and misconceptions regarding STI as such found among the study participants may also increase the risks of acquiring the infections. These factors combined might explain why the prevalence of HBsAg seropositivity among the study women was associated with out migration of their husbands and why *C trachomatis* infection was more prevalent among women in the highest economic category.

Our data showed an inverse relationship between economic status and the prevalence of HBsAg seropositivity. This may be because hepatitis B vaccination is not free of charge in Vietnam and is thus only available to those who can afford it. Hepatitis B vaccine is known as the world's first cancer prevention vaccine and the first vaccine to prevent an STI.<sup>146</sup> Hepatitis B vaccination, which has been shown to be cost-effective in low-income countries,<sup>1, 65</sup> can prevent hepatitis B virus infection, and thereby reduce the incidence of liver cancer.<sup>14, 92, 146</sup> Therefore, vaccination to prevent HBV for migrants should be considered.

### **Endogenous infections and douching practice**

We found that practising daily vaginal douching increased the risk of candida infection among women. This finding is in accordance with other studies elsewhere.<sup>9, 77</sup> Many studies demonstrate the association between intravaginal practices, particularly vaginal douching, and increased risks of BV,<sup>15, 18, 19, 28, 105, 125, 143, 152, 169</sup> or infertility.<sup>77</sup> That our study did not detect an association between BV and vaginal douching may be because the study women belonged to low risk population, while BV has been demonstrated to be associated with high-risk sexual behaviours.<sup>9, 26, 140, 150</sup> The douching procedure may remove normal vaginal flora, permitting the overgrowth of pathogens<sup>77</sup> as well as introducing germs into the vagina. The study women commonly used salt water, green tea, or betel leaves in fresh water solution for daily vaginal douching. Moreover, “Rose” powder and “Da Huong” solution that may have an antimicrobial effect were also used for vaginal douching, which may cause a disturbance of the local flora in the vagina. Important reasons for vaginal douching in other populations have been perceived as personal hygiene<sup>19, 77, 104</sup> or disease prevention.<sup>3, 10, 54, 104, 137</sup> In Vietnam, vaginal douching is sometimes encouraged and/or performed by HCPs in their practices.<sup>54</sup>

Studies have shown the association between BV and preterm delivery<sup>18, 77, 78, 126, 133</sup> and adverse pregnancy outcomes<sup>67, 77</sup> such as prematurity and low birthweight.<sup>77, 126, 133</sup> During pregnancy, treatment of abnormal vaginal flora may reduce the risk of preterm delivery.<sup>82</sup> For women with a previous preterm birth, treatment of BV may reduce the risk of preterm rupture of membranes and low birthweight.<sup>67, 81</sup> Furthermore, BV<sup>4, 67, 100, 101, 131, 145</sup> and Candidiasis<sup>170</sup> increase susceptibility to HIV acquisition and transmission. Therefore, risk reduction education to reduce the prevalence of endogenous infections is crucial and needed for women in the community.

## **STI/RTI and contraceptive methods**

In our study, IUDs were commonly used (37%) and a small number of women used contraceptive pills (7%) or condoms (5.4%). Oral contraceptives can disrupt the balance of the vaginal environment (particularly high-dose pills), predisposing for development of candida.<sup>126</sup> Inversely, oral contraceptive use is shown to be associated with a decreased risk of BV.<sup>132</sup> Our study showed no identified association between condom use or the use of contraceptive pills and STI/RTI prevalence in general (results not presented). The number of Vietnamese women reporting RTI symptoms has been found to be higher among IUD users.<sup>41</sup> Other studies<sup>2, 32</sup> as well as our study revealed no significant association between self-reported symptoms and the presence of STI/RTI, even among women using IUDs. However, we found that BV was diagnosed significantly more frequently in the women with IUDs, which is in line with other studies elsewhere.<sup>5, 46, 50</sup> This finding may partly explain for the phenomenon found previously in Vietnam showing the association between preterm delivery and history of recent IUD use.<sup>109</sup> Recent evidence shows that diagnosis and treatment of BV before abortion reduces post-abortion PID, and that the administration of prophylactic antimicrobials that includes coverage for BV during hysterectomy reduces postoperative complications.<sup>67</sup> Furthermore, a study in Vietnam recently shows that more than half of women, who seek abortion, are aetiologically diagnosed as having at least one RTI, including 2% of STI.<sup>99</sup> Therefore, it is necessary to perform a clinical and/or aetiological screening of STI/RTI before performing certain medical procedures related to the reproductive tract, such as abortion and insertion or removal of IUD.

### **5.3 COMMUNITY AND HCPS' PERCEPTIONS REGARDING STI/RTI**

The most interesting finding from our qualitative study might be the misconceptions about causes and the development of STI that the participants held. They perceived either poor hygiene (in the genital areas or when having sex) or promiscuity in both men and women to be the cause of STI. Surprisingly, many participants believed that STI originate from women. Furthermore RTI, gonorrhoea and syphilis were perceived to be three consecutive stages of an STI, based on its severity.

Previous studies in Vietnam have shown that women mainly blame exposure to dirty water as the main cause of their RTI symptoms.<sup>8, 176</sup> In Study I, our participants from the FGDs, on the contrary, strongly emphasised that poor personal hygiene was the core factor and the main cause of RTI in women. The common belief, especially among female participants, was that people get gonorrhoea through intercourse during menstruation which has also been found in previous studies in Vietnam<sup>176</sup> and elsewhere,<sup>102</sup> and through intercourse soon after childbirth. Many women in Study II answered that bad hygiene, sex during menses or soon after delivery, multiple childbirths or abortions are “causes” of STI, and untreated STI can lead to HIV/AIDS.

A common risk factor profile for STI includes having a higher number of sexual partners, a higher rate of partner change, and an STI history. However, it was commonly responded by the HCPs in Study IV that bad hygiene or sex during menses

were risk factors for STI. This may partly cause misconceptions of STI causes and preventions among people in the community. Many studies show the association between having sex during menses with increased risk of self-reported RTI symptoms,<sup>184</sup> higher prevalence of BV,<sup>105, 140</sup> or self-reported STI history.<sup>29, 153</sup> Nevertheless, BV prevalence in Kenya is shown not to be higher among FSWs who had sex while menstruating.<sup>28</sup> Probably, the increased risk of self-reported STI/RTI history or BV in relation to sex during menstruation is more likely to be a consequence of other high risk behaviours that people may have engaged in rather than the fact that they have had sex during menstruation.

It has previously been shown that many Vietnamese believe that HIV cannot be transmitted by a friend or spouse and can be prevented by washing after intercourse.<sup>23</sup> Even the belief that refraining from ejaculating and practising good hygiene while having sex might protect people from STI existed among our participants from Study I. This belief was voiced by a minority of male participants, but it may discourage men from employing safe sex techniques such as limiting the number of sexual partners and/or using condoms. Surprisingly, participants in most male groups made statements about a certain penis operation for gonorrhoea in men which includes splitting the penis in to several segments. Such an operation does not, however, exist in Vietnam or anywhere else. Postinflammatory urethral stricture and periurethral abscesses of the Littre glands as complications of untreated gonorrhoea in men were common in the preantibiotic era,<sup>53</sup> and could be treated by stretching the urinary tract or curetting the abscesses. These complications are at present very rare. The myth about the penis operation might be the result of an attempt to scare people and raise their awareness about STI. However, this may also cause unnecessary fear among men, which could be a barrier to seeking care at health facilities. Therefore, equipping people with accurate knowledge, would potentially improve their awareness about causes and transmission routes, and encourage appropriate prevention measures.

Misconceptions among HCPs about the sharing of toilets as a transmission route for HIV, or good nutrition as a means of protection against HIV infection have been identified previously.<sup>128</sup> The majority (60%) of the HCPs in Study IV answered that STI transmission routes included kissing (excluding oral sex) or sharing food or sharing clothes. Notably, in Study II, similar responses were found to be less common among women in the community. Given that providers consider health education for the patients as part of their role,<sup>87</sup> providing providers with accurate knowledge is crucial in order to avoid misconceptions, unnecessary fear as well as to reduce the stigma related to STI.

#### **5.4 LACK OF STI KNOWLEDGE AMONG COMMUNITY MEMBERS AND HCPS**

The results from Study II showed that there were relatively low proportions of women who could correctly answer about suspected symptoms, causes, curability and complications of STI. Urethral discharge in men, an important symptom of STI was neglected, and two-thirds of the women did not report knowledge of any symptom of STI. Having no knowledge about STI symptoms, people may not be able to recognise

that something is wrong and will then not seek treatment until complications develop. Therefore, awareness of the early signs of STI/RTI and the consequences of untreated STI/RTI should be raised in the community to enable people to seek care in time.

We found that one-third of the study women did not know whether STI can be prevented, and a low percentage of women gave correct answers about STI prevention methods. Condom use is considered the single, most efficient, available means to reduce the sexual transmission of both HIV and STI.<sup>178</sup> Nevertheless, low knowledge among the Vietnamese general population concerning condom use for STI prevention has been previously shown.<sup>11</sup> In our study, this knowledge was very limited, especially among the unmarried women. In Vietnam, it has been shown that 30% of young people consider condoms only for 'prostitutes and unfaithful people',<sup>91</sup> but that a substantial proportion of young unmarried men have multiple sexual partners.<sup>163</sup> There is a low level of consistent condom use among unmarried men in general<sup>163</sup> and among youths in particular (46% "rarely" or "never" used condoms)<sup>62</sup> because they feel it decreases pleasure.<sup>91</sup> Thus, a significant portion of young people who are sexually active are not engaging in safe sex. Studies in Vietnam have illustrated the association between low level of condom use and a high prevalence of gonorrhoea and chlamydia.<sup>115</sup> Successful negotiation of condom use has a protective effect against HIV/STI,<sup>44</sup> therefore, a publicity campaign encouraging condom use for prevention of STI should be launched for the general population.

In contrast with low level of STI knowledge among the study women, it seemed that our participants had fairly good basic knowledge about routes of transmission, high-risk behaviours, and prevention measures for HIV/AIDS. This is in accordance with what has been shown recently that a majority of Vietnamese people in the community have correct knowledge of HIV/AIDS prevention methods.<sup>164</sup> Furthermore, studies show that almost all young people in Vietnam know that the use of condoms protects against HIV,<sup>91, 172</sup> and that there is adequate knowledge of HIV but little concern for STI.<sup>91, 106</sup> Among young people, the awareness of STI appears to be lower than the awareness of HIV and other reproductive health related topics.<sup>91</sup> This difference could be mainly due to that broad-scaled information, education and communication (IEC) activities targeting HIV/AIDS have been launched by the government in recent years. The IEC activities and materials related to HIV are mainly for the general population.<sup>113</sup> In addition, a majority of health personnel and teachers at schools have been provided with knowledge of HIV/AIDS.<sup>113</sup> In terms of STI/RTI however, people in the study area may get the information mostly from peer networks and less from other sources. Although recently there has been more media and government attention on the need for reproductive health education for young people, there continues to be a significant gap in the actual delivery of these services. Parents are reluctant to discuss sexual issues with their adolescent children for fear that this will increase the risk of experimentation, whereas current school-based education programmes are frequently overwhelmed with problems due to lack of relevant content as well as effective teacher training. This may put people at increased risk because of poor concern for STI e.g. less knowledge of STI and risks related to STI as well as the link between STI and HIV. Besides, nearly half of women in our study either did not know about the necessity of partner treatment or claimed that it was not necessary. Insufficient

knowledge regarding STI prevention and partner treatment may result in neglecting the risks of unsafe sex.

To our knowledge, the impact of the experience of induced abortion, but not of childbirth, on STI knowledge is a novel finding in relation to previous studies. Those who have experienced an induced abortion might have been provided information, by HCPs, about the prevention of unwanted pregnancies, which is associated with STI knowledge. However, women who seek health facilities for childbirth might not receive information about diseases related to sexual behaviours. Thus, HCPs' knowledge and how they phrase their information may play an important role in improving people's STI knowledge.

Our concern is that not only the community members, but also HCPs had insufficient knowledge regarding STI symptoms. One key point for detecting STI/RTI is that HCPs should know how to identify and treat people with signs, symptoms or risk of STI/RTI in order to prevent complications for the individual patient and to reduce transmission in the community.<sup>180</sup> The majority of the HCPs considered candidiasis and BV as STI. Research has shown that BV considerably increases the risk of acquiring HIV infection<sup>58, 101, 142, 178</sup> and other STI.<sup>94</sup> Women with BV have been shown to have similar riskful sexual behaviours to those at risk for STI.<sup>9, 26, 94, 140, 150</sup> The World Health Organization documents candidiasis and BV as endogenous RTI and not sexually transmitted.<sup>180</sup> These infections result from alterations in the balance of normal, protective bacterial flora in a woman's reproductive tract.<sup>178</sup> Labelling such conditions as sexually transmitted may lead to serious social consequences for the patients.<sup>180</sup> The majority of the HCPs answered positively regarding the necessity of partner treatment for both candidiasis and BV whereas the treatment of male partners does not reduce recurrence.<sup>126</sup> This may cause over-treatment since BV is treated by antibiotics and candidiasis also may be wrongly be treated by antibiotics. Consequently, this may contribute to the development of bacterial resistance to antibiotics.

## **5.5 LOW LEVELS OF PRACTICE AMONG HCPS REGARDING WRITTEN STI CASE SCENARIOS**

The low reported practice level found among the HCPs may indicate that a number of STI/RTI patients receive insufficient care. This is coherent with findings from other Asian countries showing low quality of STI case management.<sup>63, 174</sup> In Study IV, many HCPs reported that they would not treat STI patients. Nonetheless, it is shown in Vietnam that a majority of pharmacists/drugsellers knew that they should not treat patients but they actually do so.<sup>13</sup> As is the case in Laos,<sup>147</sup> pharmacies are places where STI patients often go for treatment or advice<sup>106</sup> before seeking care from formal healthcare facilities because of lower costs, more accessibility and less stigmatization. A study in Tanzania shows the need to improve the performance of drugsellers in order for them to provide effective STI management.<sup>171</sup> Thus, involving drugsellers in STI control activities, improving their knowledge and practice regarding STI may play an important role for STI programmes to function adequately.



In our study, the majority of the HCPs knew that condom use can prevent STI, whereas only less than one-fifth of them reported that they would give this advice to patients. Besides, the minority of the HCPs were aware of partner notification and treatment. Similarly, it is shown in India that the number of HCPs advising condom use is low.<sup>87</sup> A study in private pharmacies in Hanoi using the simulated client method which is considered as a practical and consistent way to estimate actual practice<sup>74</sup> in situations not including clinical examination or laboratory testing also shows poor awareness among pharmacists and drugsellers about partner notification and condom use.<sup>13</sup> Possible reasons for low practice in advising STI patients on condom use despite relatively high knowledge levels about this issue could be due to the HCPs' overall discomfort in discussing this issue in a less than confidential working environment or due to limited time for each patient encounter at their practice. The finding may to some extent be attributed to low knowledge of condom use for STI prevention among people in the community.

There were a number of HCPs who answered that they knew about the syndromic approach, but in fact, none of them gave a syndromically correct diagnosis or treatment. The number of HCPs that had participated in STI/RTI training courses was low: only 17% of all the respondents. Possibly, an unbalanced effort has been given to the combat against HIV/AIDS, and of the government funds 97.5% were allocated for HIV/AIDS prevention and care, while only 2.5% were for STI control activities.<sup>113</sup> Our study found that the training courses on STI/RTI seemed to have had a significant impact, not on providers' knowledge, but on their practice. However, the impact was not great enough to provide any significant improvement of practice among the HCPs who had scored more or less in practice. Therefore, more resources are needed for STI training for all relevant HCPs, contents and methods of training should be reviewed, and compiled suitably and applicably for the various target groups. Training should be participatory and practical.

## **5.6 STIGMA, GENDER AND HEALTH-SEEKING BEHAVIOURS**

The stigmatization associated with STI and HCPs or clinics that provide services specifically for these infections may constitute an ongoing and powerful barrier to the implementation of prevention and care interventions.<sup>177, 178</sup> At the individual and community levels, stigmatization results in: *i*) reluctance of patients to seek early treatment; *ii*) preference to seek treatment in the private sector, whether provided by medically qualified personnel, pharmacists, traditional practitioners or other types of providers, who are perceived to offer greater accessibility, confidentiality, and to be less stigmatizing than public-sector facilities; and *iii*) difficulty in notifying and treating infections in sexual partners.<sup>178</sup> In Vietnam furthermore, stigmatization towards sexual relations outside of marriage, especially among young people, if leading to unwanted pregnancy or contraction of STI may reinforce abstinence but, also decrease their ability to obtain accurate information about STI and engage in safer sex.<sup>62</sup> The results from the FGDs in our study showed the existence of negative attitudes towards not only people with STI/AIDS because of the association with deviance, but also towards women with RTI. The issues revealed in our study are

congruent with the results of other studies showing that the attitudes of health staff,<sup>103</sup> as well as shame and fear of STI,<sup>38</sup> are barriers to people with STI/RTI to seek healthcare. Consequently, people do not use healthcare facilities and the infections continue to spread, which will lead to the failure of STI/RTI/AIDS control.<sup>180</sup> Successful management of STI/RTI includes not only treatment, but also education of the patient on how to prevent reinfection and, in some cases, treatment of sex partners. To do this effectively, HCPs must be non-judgemental and respectful of patients.<sup>180</sup> Moreover, improving counseling and interpersonal communication skills can help providers to openly discuss reproductive health issues with clients.

Studies elsewhere have shown that women seek less healthcare than men and wait longer before seeking healthcare, mainly because they perceive their symptoms as mild or natural and do not believe that their symptom is an STI.<sup>173</sup> Especially, many rural women often delay seeking care for STI.<sup>155</sup> Furthermore, self-medication is shown to be common practice among women in the community with RTI symptoms<sup>147</sup> as well as among FSWs with STI.<sup>115</sup> Also, private clinics are described as preferable places for people with STI to seek care.<sup>163</sup> Our results from Study I demonstrated that people with STI/RTI usually access the informal network such as experienced persons, peers, drug-sellers, etc. before seeking care from the formal healthcare system. However, there seemed to be a difference in the health-seeking patterns of men and women with STI/RTI i.e. women preferred self-medication and men were more likely to seek healthcare from private providers. Previous studies from Vietnam have shown no significant differences in the use of health facilities, or in health-seeking patterns between men and women for general health problems<sup>64</sup> or for tuberculosis.<sup>73</sup> Furthermore, women do not delay more than men in seeking care, they even take more healthcare action.<sup>73, 156</sup> The delay among women in seeking care for STI or the difference in health seeking patterns for STI might be due to the sensitive nature of STI and the particular stigma from society towards female patients. In Study IV we found that pharmacists/drugsellers and private HCPs demonstrated very low level of knowledge and reported practice in relation to STI. This implies the need for the development of STI control strategy aiming at all related sectors, of which, private providers and pharmacists/drugsellers will be specifically targeted.

In our study, gender differences were striking and presented in various aspects of the discussed issue. These could be the influences of Vietnamese social norms on people's behaviour, especially in rural areas. Social norms do not seem to impact on men as strongly as women since wives are expected to be faithful, and to bear the burden of their husbands' deviations, while for a husband it seems to be socially less stigmatized to have extramarital sex.<sup>40, 47</sup> It seems that women's extramarital sex leads to strong disapproval, both husband and community are likely to intervene to stop a married woman from engaging in extramarital sex.<sup>40</sup> Notably, in Study I, the belief in the possibility of catching STI through poor hygiene or unfaithfulness strongly affects the wife-husband relationship. A woman with an STI would be abused and abandoned if she is believed to be unfaithful. On the other hand, the selflessness of women leads them to behave kindly towards their husbands, even though women perceive that men are more likely to catch gonorrhoea through extramarital sex. This reflects a subordination of women for the good of the family,<sup>47</sup> which may also cause potential barriers for women to seek care for their problems.

## 5.7 METHODOLOGICAL REFLECTIONS

### Qualitative method (Study I)

When investigating women's perceptions and descriptions of reproductive problems, FGDs are commonly used. FGDs often document how women describe in their own words their experience, opinions and queries with signs, symptoms and probable causes or consequences of illness. This therefore is particularly useful for studies that include women who are least likely to be familiar with biomedical disease categories.<sup>141</sup> This method provides insight on how points-of-view are constructed and expressed in a given cultural context.<sup>6, 20</sup> Contributions of participants within groups can be encouraged from people who are either reluctant to be interviewed on their own or feel they have nothing to say. Also, FGD is considered a flexible method at low cost in relation to sample size<sup>6, 135</sup> and it can provide the opportunity to observe interactions within groups. During the discussions, we observed that the study participants, as have been reported elsewhere, were empowered and encouraged to make comments, while being stimulated by thoughts and comments of others in the group.<sup>134</sup>

Principally, we employed female moderators and notetakers for female groups and male researchers to moderate male groups. Though, we had two male groups moderated by a female moderator (PT Lan) with female notetakers. We found that this appeared not to be a disadvantage, but the participants discussed openly, and provided the group with a lot of information. Moreover, it has not been suggested that FGDs on sensitive issues should never be carried out by researchers of the opposite sex to that of the research subjects.<sup>25</sup>

I moderated six FGDs including four female groups and two male groups, and also co-moderated the other two female groups. Among the moderators, only I myself work with STI/RTI patients daily, therefore STI/RTI is my professional knowledge. However, I did not disclose my status, and while acting as moderator for the discussions, I tried to be an active listener as much as possible, in order to elicit contributions from the participants<sup>25</sup>. Also, I tried to minimise the "domination" and to keep the discussion on the right track by posing guiding questions, proper probes and encouraging less active participants to speak.<sup>6, 55, 93</sup>

*Trustworthiness* of qualitative research is strengthened by *triangulation*,<sup>20, 120</sup> which refers to gaining diverse opinions and different views on the same research question or the same phenomenon for the purpose of validation of conclusions. Four kinds of triangulation can contribute to verification and validation of qualitative analysis,<sup>86</sup> including method triangulation, triangulation of sources, analyst triangulation and theory/perspective triangulation. In the qualitative study of this thesis, we had chosen participants with a variety of characteristics, who provided different views on the topic discussed. Besides, the study was carried out by a multi-disciplinary team including members with different background such as venereology, gynaecology, pharmacy, nursing-midwifery, and public health, which has been valuable in discussing and analysing findings from different perspectives. These therefore, might have minimised natural bias due to single-methods, lone analysts, and single-perspective interpretations.<sup>86</sup>

As for qualitative studies in general, our results from the FGDs cannot be transferred directly to either people in the same setting or other settings. However, it can give valuable insights to other researchers working in similar research areas or be taken into consideration when designing information material to be used in the Vietnamese context.

### **Quantitative methods (Studies II, III and IV)**

Validity in quantitative research is an expression of whether the means of measurement are accurate and whether they actually measure what they are intended to measure.

*Internal validity* refers to how the results of an observation are correct for the particular group of people being studied. All sources of systematic error can threaten internal validity.<sup>7, 123</sup> Good design and attention to detail can minimise systematic errors.

In this thesis, all study tools were pre-tested and revised prior to use. The questionnaires, gynaecological examination, specimen collections and storage, and utilized laboratory procedures were standardized and quality assured by training of all involved personnel prior to data collection.

Pilot studies were conducted for Studies II and III in order to estimate the response rate, the time needed for the survey in each cluster including interview, clinical examination, laboratory specimen collection and transportation, and to check if the planned study procedures were working in practice.

The face-to-face interview data were collected by female surveyors of FilaBavi, who had been trained carefully in collecting data for FilaBavi in general and for this project in particular. The surveyors have also been trained to develop a good competence in carrying out household surveys. The quality of data is also safeguarded by adequate supervision, carried out by field supervisors and research students. The field supervisors were responsible for the review and checking of all forms before submitting them for data entry. Five percent of submitted forms were checked randomly by research students.

We had very high response rates from the women selected for the interviews as well as the gynaecological examination. One might question how we obtained such high rates of response. This is probably due to a number of different reasons. Firstly, we have had good cooperation with households and the commitment of local authorities to the FilaBavi. Secondly, the interviewers were female surveyors of FilaBavi, who have been well-trained in doing household surveys and have created good relationships with households. For the face-to-face interviews, the presence of the interviewers encourages participation and involvement of the participants.<sup>135</sup> Thirdly, the purposes and procedures of the study were clearly explained and women were eager to participate in the gynaecological examination to be performed by experienced female doctors from Hanoi together with some sophisticated tests and treatment provided free of charge. Lastly, when designing the study and planning for data collection, we deliberately chose

the most appropriate time of the year in order to avoid the harvest period and thus facilitate the participation of the study subjects.

According to the pretest and pilot study, it was apprehended that it was too sensitive and impossible to include questions about respondents' and/or their husbands'/partners' sexual behaviours or risks for STI/HIV. Therefore, we have no information about the magnitude of risks that women and their husbands/partners were engaged in, as well as the association between STI prevalence and risk behaviours among women and/or their husbands/partners. The topic of this study is possibly sensitive for face-to-face interviews and people may be reluctant to express their knowledge. Besides, respondents may feel that their answers were not anonymous since the surveyors were known to them and would also come back again for the collection of routine data of FilaBavi, therefore, they might have been less informative or open. Consequently, our results possibly underestimated women's knowledge about STI, especially unmarried women's. These problems might have been reduced by using a self-completed questionnaire.<sup>135</sup>

Furthermore, we discovered during the gynaecological examination that many women in Study III cleaned themselves inside the vagina before examination (even they were informed 1 to 3 days in advance not to do so) because they were afraid of being criticised for lack of cleanliness. Consequently, this might have influenced the accuracy and the sensitivity of the clinical diagnosis in relation to the laboratory findings.

A self-completed questionnaire survey, particularly when completed individually, may create chances for respondents to look up the answers before completing the questions. Low response rates have been documented to be more common in relation to surveys with self-completed questionnaires,<sup>135</sup> as compared to interviews. In Study IV, we tried to reduce the problems by gathering the participants in groups and asking them to complete the questions at the same time. This can be seen as an administrative convenience with a relatively low cost, a short period of time, and a high number of responses.<sup>135</sup> Furthermore, self-completed questionnaires allow anonymity, which encourages respondents to respond frankly. The use of written scenarios in Study IV may not, however, reflect the full actual capacity of the HCPs e.g. because of lack of information in the scenarios.<sup>74</sup> Additionally, social desirability biases or the sensitiveness of the issue could have affected some answers. For instance, the number of HCPs who actually treated STI patients may have been under-reported due to the impact of the state regulations that allows only medical doctors or assistant medical doctors to prescribe or treat patients.

#### *About laboratory diagnostic tests*

For accurate measurement of the prevalence of morbidity at the population level, a combination of both high sensitivity of diagnostics to detect as many cases as possible, and high specificity to avoid over-estimation of cases, is necessary. High sensitivity is desirable for conditions that have serious negative consequences and are treatable.<sup>141</sup> Given the psychosocial consequences of a misdiagnosis for STI and the risks of over treatment, the diagnostics should also be highly specific.<sup>121</sup> Nevertheless, clinical

diagnoses of STI/RTI among women are neither sensitive nor specific. Moreover, syphilis, gonorrhoea and chlamydia have serious consequences, yet are often asymptomatic.<sup>180</sup> In women, silent asymptomatic infections can be more serious than symptomatic ones. One of our aims in this study was to investigate the silent infections among women. Therefore, we tried to use the screening tests with high sensitivity as well as high specificity according to availability of the resources allowed.

Culture for *N gonorrhoeae* and *C trachomatis* may reach the level of specificity at 100%, but only 60-70% sensitivity.<sup>122</sup> For detection of *N gonorrhoeae*, culture is considered as the gold standard, and it also allows testing and monitoring for antimicrobial resistance. However, in our study, we came to the conclusion that the conditions during holding and transport of inoculated culture media might not be adequate to maintain the viability of organisms. In this case, PCR for detecting *N gonorrhoeae* is recommended.<sup>56</sup> PCR is one of the DNA amplification techniques which are documented as the test of choice,<sup>48</sup> especially for screening of *C trachomatis*, because they have higher sensitivities (90-95% vs. 50-70%) and specificities (98-100% vs. 95-99%) than ELISA and higher sensitivities than culture.<sup>17, 56, 75, 85, 96, 122, 180</sup> Though the PCR test is generally more expensive than ELISA or culture, it can detect more infected patients and consequently, increase cost-effectiveness.<sup>96</sup> It is therefore, recommended that DNA amplification techniques should be used for screening of *C trachomatis* in both men and women.<sup>56</sup> In women, both organisms primarily infect the endocervix, as the vagina is too acidic to support their replication.<sup>122</sup> Cervical swab specimens used for PCR in our study are considered to be more sensitive than vaginal swab<sup>96</sup> or urine specimens<sup>56</sup> especially for detecting *C trachomatis* in women.

Cross reactivity between *N gonorrhoeae* and nongonococcal *Neisseria* has been demonstrated for certain nucleic acid amplification tests (NAATs). However, nongonococcal *Neisseria* are infrequently recovered from the genitourinary tract.<sup>56</sup> Furthermore, an approach using additional NAAT after a positive PCR to increase test specificity is too expensive in Vietnam and it has only undergone limited evaluation.<sup>56</sup> Consequently, we considered all positive PCR tests for *C trachomatis* and *N gonorrhoeae* as presumptive evidence of infection. The multiplex PCR assay used in our study is a test using a master mix containing primers to simultaneously amplify *C trachomatis* and *N gonorrhoeae* in a single specimen, this also saved considerable time and cost.

Bacterial vaginosis can be diagnosed clinically by Amsel criteria according to which, at least three of the four characteristics should be fulfilled, including: *i*) homogenous discharge, *ii*) vaginal fluid pH of > 4.5, *iii*) Sniff test positive<sup>‡‡</sup>, and *vi*) “clue cells”<sup>§§</sup> seen on microscopy. In this thesis, the prevalence of BV was reported based on Gram staining using the Nugent score<sup>116</sup> though we also did assess vaginal fluid pH, Sniff test and clue cells in wet-mount preparation. The reasons for our preference were: *i*)

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‡‡ Fishy amine odour from the vaginal fluid when mixed with 10% potassium hydroxide solution

§§ “Clue cells” are squamous epithelial cells covered by many small coccobacillary organisms giving a strippled, granular look. The edges of these cells are not clearly defined, owing to the large number of bacteria present and the apparent disintegration of the cells.

Gram stain is preferable for vaginal specimens because it allows a good evaluation of the vaginal bacterial flora,<sup>22</sup> ii) the application of vaginal douches of the study women might bias the evaluation of the characteristics of vaginal discharge, further the elevation of vaginal fluid pH could be due to cervical mucus or semen or the presence of *T vaginalis*,<sup>22</sup> and iii) clue cells found in wet-mount preparation is less specific than Gram stain.<sup>22</sup>

**External validity** or **generalizability** refers to the extent to which the results of a study can be generalized or applied to other populations<sup>7, 123</sup> at other times and in different settings.<sup>123</sup>

Limitations that could affect the generalizability of the study should be considered. We excluded unmarried women from the gynaecological examination as a response to the traditional Vietnamese culture's view on pre or extramarital sexual relationships, as earlier mentioned. Unmarried women are not supposed to have gynaecological examinations because they are afraid of their virginity being damaged or being accused of possible deviant behaviour. Nevertheless, it could be possible to investigate STI/RTI, especially *C trachomatis* and *N gonorrhoeae* among unmarried women by non-invasive sample methods. The prevalence of STI/RTI found in this study may be considered to be representative for only the married women in the population.

It is difficult and complicated to conduct a population-based study, especially when investigating sensitive issues as the prevalence of STI/RTI. However, only through such studies, can a comprehensive and reliable overview of the STI/RTI situation among the general population be estimated. The organisational structure of FilaBavi is ideally suited for data collection, management and quality control. Therefore, the results presented in this thesis are presumably representative of the Bavi district and theoretically for many other rural areas of Vietnam. It can possibly provide valuable insights to other researchers working in other low-income countries or similar Demographic Surveillance Sites. Furthermore, the results in this thesis provide an overview on STI from both community and HCPs' perspectives, and accordingly could constitute an important basis for the development of further interventions and effective STI/RTI/HIV/AIDS control programmes in Vietnam.

## 6 CONCLUSIONS

This thesis highlights a number of issues regarding the STI/RTI situation in the general population in rural Vietnam. To our knowledge, the thesis presents the first study in Vietnam comprehensively investigating the prevalence of STI/RTI among women in the general population. In the thesis, STI was viewed from both community members' and healthcare providers' perspectives. In addition, the thesis demonstrates the management of STI among health providers at grassroots healthcare setting of Vietnam.

The key conclusions of the thesis are:

- 1) Misconceptions regarding various aspects of STI/RTI were found to be common among people in the community as well as among the HCPs.
- 2) People in the community perceived HCPs' behaviour as frequently negative towards STI/RTI patients.
- 3) Health-seeking for STI/RTI was reported to occur at a late stage within the public health sector. Furthermore, there was a difference between men and women in seeking care for STI/RTI i.e. self-medication was mentioned as a common practice among women, while men were more likely to seek healthcare from private providers.
- 4) Lack of STI knowledge was found among women of reproductive age, especially among young, unmarried women. Experience of induced abortions was associated with a higher level of knowledge about STI.
- 5) High prevalence of both symptomatic and asymptomatic RTI/STI was found among the married women. HCPs should be aware that asymptomatic STI/RTI are common, and that most of the infections among women in the general population are endogenous RTI.
- 6) Self-reported symptoms and clinical diagnoses had very low sensitivity and positive predictive value compared to laboratory diagnostics.
- 7) A current chlamydia infection was associated with high economic status, whereas using an intrauterine device was associated with an increased risk of bacterial vaginosis.
- 8) Daily vaginal douching, which was found to be a common practice among married women, was associated with an increased risk of vaginal candidiasis. Out migration of husbands increased the risk of HBsAg seropositivity among women.
- 9) Knowledge and reported practice regarding STI were sub-optimal among most healthcare providers at grassroots healthcare level. Although those who served STI patients or who received training had higher scores, overall knowledge and practice was still poor. Training courses on STI/RTI had impact on providers' practice but not on knowledge.



## 7 RECOMMENDATIONS AND FUTURE RESEARCH

- a) Health education interventions for the general population about early recognition of STI/RTI, benefits of prompt care-seeking and risk reduction is urgently needed. Especially the consequences of untreated STI/RTI and their role in the enhancement of transmission of HIV infection should be emphasized to encourage use of preventive and healthcare services.
- b) Basic knowledge about the symptoms, transmission, risks and prevention of STI/RTI should be provided to people in the community with the use of symptom terminology compiled with local terms rather than clinical terms. As a vulnerable group, young, unmarried women should be especially targeted. Also, basic knowledge and awareness of STI should be part of the school curriculum i.e. integrated into sex and HIV/AIDS education lessons at the secondary school level.
- c) A non-judgmental attitude and respect for patients should be promoted in healthcare providers' practice.
- d) There is an urgent need for interventions to improve STI knowledge and practice for healthcare providers at grassroots healthcare levels. Of which, healthcare providers who serve STI/RTI patients and who are pharmacists/drugsellers are the most in need and should be specifically prioritized. Integration of issues related to STI/HIV and other RTI into training programmes could be considered. Contents and methods of training should be tailor-made for each group of healthcare providers.
- e) Syndromic management guidelines should be supplemented by risk assessment in order to reduce under and over-treatment. Microscopic diagnosis could be applied in primary care settings to achieve more accurate diagnoses.
- f) Regular gynaecological check-ups for married women are important and screening of STI/RTI before choosing gynaecological procedures should be recommended. It is necessary to decrease the social stigma associated with STI/RTI and infected women by giving them social and moral support.
- g) Further studies on prevalence of STI are needed involving men and unmarried women and also including people from urban areas in order to have a full picture on STI/RTI situation of the whole general population.
- h) Knowledge and risk behaviours in relation to STI among migrants (both men and women) need to be investigated further.
- i) The impacts of self-reported morbidity of STI/RTI or STI/RTI related symptoms on women's health and socio-economic condition require further investigations.

## 8 ACKNOWLEDGEMENTS

I understand that all who read my work would consider this part i.e. “Acknowledgements” as more customary but may be some of them would really feel that my sentiments and acknowledgments to all those I mention here are very real and natural.

Firstly, I feel deeply indebted to all the community members, healthcare providers, surveyors and field supervisors who participated in my study in Bavi district. I would like to express my gratitude for their active participation and cooperation. Special thanks also to the local women, who made themselves available for us to examine and to take specimens for laboratory investigations. Thanks to the physicians, nurses, lab-technicians, from FilaBavi and the local medical staff for their enthusiasm and excellent contributions during the time of the data collection. I am also grateful to the local and district authorities for being supportive during the course of the entire study.

I am grateful to Sida/SAREC, Sweden and Health System Research Project (HSRP), Hanoi Medical University, Vietnam for funding this research and sponsoring my trips to Sweden, without which this study could never have become a reality.

My heartfelt thanks, gratitude and considerable appreciation go to:

- Associate Professor Cecilia Stålsby Lundborg, my main supervisor, for accepting me as her student when I first presented my field of interest in the FilaBavi workshop. I am very thankful for her excellent scientific guidance, continuous inspiration, warm encouragement and friendly support throughout my training period. She has remarkably broadened my knowledge and ability in doing research and writing up scientific papers using critical thinking and analysis. She usually encouraged me to work independently and go further, and at the same time, she always provided me with never-ending support, that made me feel more confident and self-reliant.
- Associate Professor Ingrid Mogren, my supervisor, for always giving me very quick, critical and encouraging comments from the beginning to the final stage of my research work, especially her valuable comments on the stage when we carefully planned how to integrate the interview and the gynaecological examination in the most appropriate way.
- Associate Professor Nguyen Thi Kim Chuc, my supervisor, coordinator of the HSRP in Vietnam for being very supportive and providing me with continuous encouragement and guidance during my research process, especially the field work and administrative issues.

I am thankful to Associate Professor Rolf Walhström for his teaching and sharing his experience of writing scientific papers, and for being an excellent acting opponent,

providing encouraging discussions and useful comments during and even after my predisputation.

I am also thankful to: Associate Professor Elisabeth Faxelid for being an excellent co-author, for sharing knowledge and experience in qualitative study; Professor Eva Johansson for being very supportive and giving valuable comments on my first paper.

I am grateful to Associate Professor Magnus Unemo, for a remarkable contribution by means of his great knowledge in microbiology that enabled us to collect and preserve specimens in the best possible conditions. I would also like to thank him and Birgitta Olsen, for being excellent co-authors of papers both inside and outside of the thesis, and giving me a good chance to enjoy not only the labwork at the microbiology department at Örebro University Hospital, but also enjoy the local food and the beauty of landscape in Örebro. I would also like to thank Dr Amphoy Sihavong for giving valuable advice in planning and implementing and valuable comments as co-author.

I am indebted to Dr Ho Dang Phuc, statistician and co-author, who contributed remarkably to the sampling process and contributed his precious time to help and work together with me in cleaning and analyzing the data and commenting on the manuscripts. Thanks for being patient while enriching my limited knowledge on statistics by “on the job training”.

I would like to express my special thanks to:

- Professor Göran Sterky and all members of Göran Sterky Foundation for their kind support and assistance.
- Professor Peter Allebeck, Professor Vinod K. Diwan, Professor Bo Eriksson, Dr Annika Johansson, Professor Göran Tomson, Associate Professor Gunilla Krantz, Associate Professor Anna-Berit Ransjö-Arvidson, Dr. Max Petzold, Dr Asli Kulane, Dr. Anna Thorson, Dr. Mattias Larsson, Dr. Birgitta Rubensson for their teaching as well as their valuable comments on my research work.
- Professor Vinod K. Diwan, Professor Hans Rosling and the IHCAR team for creating an excellent academic environment at IHCAR for which I am very grateful. Professor Lucie Laflame, Dr Asli Kulane for arranging such a useful KAPPA writing seminar, that I strongly recommend students who are at the final stage of PhD training to participate in.
- Gun-Maria Löfberg from the Social Medicine Department, Birgitta Linnanheimo, Anna Stina Ullrich, Kersti Rådmark, Gunilla Risberg, Thomas Mellin, Bo Planstedt, Elisabeth Kavén, Gun-Britt Eriksson as well as all other staff from IHCAR whose names I cannot mention for taking care of and providing me with excellent working conditions. Their contributions are truly remarkable and unforgettable.

- Nina Viberg, Anastasia Pharris, for valuable and useful discussions, comments related to research work, willingness to help, as well as encouragement. Gary Watson for effective help with English editing.
- My colleagues at IHCAR: Kristina Kindblom, Ketkesone Phrasisobath, Forouzan Rezapur Shahkolai, Sakineh Mohammad Alizadeh, Åsa Vernby, Mohsin Saeed Khan, Samina Mohsin Khan, Elin Larson, Linus Bengtsson, Saima Hamid, Anna Paula Kallström, Klara Johansson, Mohammad Palesh, Hamideh Mohammadzadeh, Lynn Atuyambe, Hervé Kuendig, Charlotta Zacharias, for encouragement and sharing experiences in many aspects.
- Prof. Nguyen Lan Viet, the Rector of Hanoi Medical University (HMU) and Director of the HSRP; Associate Professor Pham Van Hien, Chairman of Dermato-Venereology (DV) department of HMU and Chairman of Vietnam DV Association; Associate Professor Tran Hau Khang, Director of the National Institute of Dermato-Venereology (NIDV) and Vice Chairman of DV department of HMU, and Associate Professor Tran Lan Anh, director of research and training centre, NIDV and deputy chair of DV department of HMU, for their strong support and great encouragement.
- My colleagues in the Department of Dermatology and Venereology, HMU, and the National Institute of Dermato-Venereology, Hanoi, where I work, for their help and willingness to share my work when I am away for my training.
- Associate Professor Ingeborg van der Ploeg and all PhD students of the common diseases project in Vietnam for sharing your ideas and experiences in relation to individual student's research by organizing seminar series at KI.

I also would like to thank and to acknowledge the support from my colleagues and friends: Nguyen Binh Minh, Dao Dinh Sang, Tran Quang Huy, Nguyen Phuong Hoa, Nguyen Duy Khe, Ngo Van Toan, Nguyen Dang Vung, Le Thi Thanh, Pham Nguyen Ha, Nguyen Quynh Hoa, Le Thi Hoan, Hoang Van Minh, Tran Thanh Do, Ho Dang Phuc, Hoang Minh Hang, Vu Van Tam, Do Duy Cuong, Tran Khanh Toan, Dinh Thanh Huyen, Nguyen Thi Nguyet Minh, Dang Thi Tuyen, Truong Hoang Long, Hoang Truc Phong and many others whose names I cannot mention here.

I dedicate my heartfelt love and deepest gratitude to my late father, to my mother, to my parents in law, to my dear sisters and brothers, who always give me their love and never-ending encouragement, and who always believe in my success.

To my beloved family, I dedicate this thesis. My husband, Bui Duc Thinh, my two sons Bui Duc Nhat and Bui Duc Anh, for their love, sympathy, understanding, encouragement, patience, and tolerance. They patiently endured both my absence from home as well as my presence at home when I had little time to take care of the housework. I understand deeply in my heart that the foundation of this thesis is my own family, without whom I would have never been where I am today.

**Thanks to all!**

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## 10 APPENDICES

### Appendix 1

#### **Focus Group Discussion Guideline**

*For community members*

**I. Greeting, introduction of participants, moderator, note taker**

**II. Briefing the objectives of the discussion; asking for permission to tape-record.**

**III. Content**

1. Have you ever heard about RTI/STI?
2. Terms used for RTI/STI? Sources of information?
3. How would a person recognize that he/she has an RTI/STI?
4. What would you do if you had RTI/STI or any symptoms of RTI/STI?
5. What do you know about RTI/STI treatment?
6. To your knowledge, what are the causes of RTI? STI?
7. How can RTI/STI be transmitted?
8. How would an individual avoid getting an RTI/STI?
9. How do you and people in the community behave towards RTI/STI patients?
10. Who can women talk to discuss issues in relation to RTI/STI?
11. How do you feel and what will you do if you are informed that your husband/partner suffers from an RTI/STI?
12. In your opinion, what are the special needs for Vietnamese women regarding RTI/STI?
13. Anything to add?

**Thanks for your participation!**

**Appendix 2**

**Questionnaire on STI**

*For face-to-face interviewing women aged 15 to 49 in FilaBavi*

Date of interview:...../...../.....time.....	Date of supervision:...../...../.....
Name of interviewer:.....Duration.....	Name of field supervisor:.....
Comments of interviewer on respondent's cooperation.....	Comments of field supervisor.....
.....	.....

**I. General information:**

Commune..... Cluster number..... Household code.....  
 Name ..... Age..... ID number.....  
 Ethnic group: 1. Kinh 2. Muong 3. Other

**1. a, Your occupation:**

- 1. Farmer 2. Government staff 3. Worker
- 4. Trader 5. Student 6. Housewife
- 7. Unemployed 8. Hired labor
- 9. Service (please specify).....
- 10. Other (please specify).....

**b,** Do you have to soak your body into water while working? 0. No 1. Yes

**2. Your education:**

- 1. Illiterate 2. Primary 3. Secondary school
- 4. High school 5. College or University

**3. a, Your marital status at present:**

- 1. Unmarried 2. Married, living with husband/partner
- 3. Separated 4. Divorced
- 5. Widowed

**b,** Year of your first marriage?.....

**4. Have you had any children?** 0. No 1. Yes, If yes, how many .....

**5. Which of the following events have you ever experienced?**

	No	Yes	How many times	When was the last time?
1 Induced abortion				
2 Miscarriage				
3 Still birth				
4 Premature birth				
5 Neonatal death				

**6. What contraceptive methods are you currently using? (can be many)**

- 1. Intrauterine device 2. Condom
- 3. Calendar/mucus method 4. Withdrawal
- 5. Contraceptive pill 6. Male sterilization
- 7. Female sterilization
- 8. Others (please specify).....
- 9. None

**7. Your menstruation:**

**a,** Menstruation cycle:

- 0. Regular 1. Irregular 2. No menses 3. Menopause

**b,** How many days per cycle?.....days

**c,** Duration of bleeding .....days

**d,** When was the first day of your last period?

- 1. .... / ..... / 2005
- 2. Pregnant .....month(s)
- 3. Don't know

**e,** What kind of sanitation do you use during your period? (can be more than one)

- 1. Clothing 2. Disposable materials
- 3. Others .....

**8. What source of water do you use? (can be more than one)**

- 1. Shallow wells
- 2. Deep tube well
- 3. Piped water
- 4. Rain water
- 5. Other.....

**II. Questions about knowledge**

**9. a, What do you think about vaginal discharge in women?**

- 1. Normal
- 2. Abnormal
- 3. Don't know
- 1. Seldom
- 2. Common
- 3. Don't know

**b, How would you define vaginal discharge as abnormal? (can be many)**

- 1. Greater amount than usual
- 0. No
- 1. Yes
- 2. Odor
- 0. No
- 1. Yes
- 3. Yellow or green discharge
- 0. No
- 1. Yes
- 4. Powdery liquid
- 0. No
- 1. Yes
- 5. Foamy liquid
- 0. No
- 1. Yes
- 6. Blood-stained liquid
- 0. No
- 1. Yes
- 7. Don't know
- 8. Other (please specify).....

**c, In your opinion, does normal vaginal discharge vary during menstrual cycle?**

- 0. No
- 1. Yes
- 3. Don't know

**10. Do you know what are considered suspected symptoms of STI? (can be many)**

- 1. Abnormal vaginal discharge (female)
- 2. Urethral discharge (male)
- 3. Genital ulcers
- 4. Genital warts
- 5. Genital itching
- 6. Pain during urination
- 7. Pain during sexual intercourse
- 8. Lower abdominal pain (female)
- 9. Don't know
- 10. Other (please specify).....

**11. Please tell what are possible "causes" of STI? (can be many)**

- 1. Bacteria
- 2. Virus
- 3. Fungus
- 4. Bad hygiene of man
- 5. Bad hygiene of woman
- 6. Being unfaithful
- 7. Intrauterine device
- 8. Having sex soon after delivery
- 9. Sex during menses
- 10. Intravenous drug use
- 11. Blood transfusion
- 12. Multiple abortion/childbirths
- 13. Using unclean water
- 14. Soaking body in water
- 15. Other (please specify).....
- 16. Don't know

**12. a, Can STI transmit?**

- 0. No
- 1. Yes
- 3. Don't know

**b, If yes, what are routes of transmission? (can be many)**

- 1. Sexual intercourse
- 2. Blood transfusion
- 3. Sharing needle
- 4. Mother to child
- 5. Sharing clothes, things
- 6. Don't know
- 7. Other (please specify).....

**13. Is it necessary to treat the husband/wife/partner of STI patients'?**

- 0. No
- 1. Yes
- 3. Don't know

**14. a, In your opinion, can STI be cured?**

- 0. No
- 1. Yes
- 3. Don't know

**b, If yes, which ones (please specify).....**

**c, If no, which ones (please specify).....**

**15. What are complications of STI if untreated? (can be many)**

- 1. Infertility
- 2. Ectopic pregnancy
- 3. Cervic cancer
- 4. Premature birth
- 5. Still birth
- 6. Miscarriage
- 7. Neonatal death
- 8. Do not know
- 9. Other (please specify).....

**16. Can STI be prevented?**

- 0. No
- 1. Yes
- 3. Don't know

**If yes, how? (please specify).....**

**III. Questions about symptoms, healthseeking behaviours and treatment**

**17. a, Have you had any “inflammation” or STI during your life?**

0. No 1. Yes

**b, If yes, which disease/symptoms.....**

**c, If yes, how many times?.....time(s); when was the last episode?.....**

**18. Have you had any of the following symptoms during the last 6 months?**

	0. No	1. Yes
1. Abnormal vaginal discharge		
2. Genital itching		
3. Dysuria (pain during urination)		
4. Dyspareunia (pain during intercourse)		
5. Bleeding after sexual intercourse		
6. Warts in the vulva, vagina, anus		
7. Ulcers in the vulva, vagina, anus		
8. Lower abdominal pain ( <i>please specify if it relates to menstruation</i> )		
9. Bleeding between menses		
10. Menstruation extended in relation to previously		
11. Bleedings increased		

If "No" in all options GO TO Q 26

If yes, please continue

**19. a, Did you seek care from any health care provider/health facility because of these symptom(s)?**

0. No 1. Yes GO TO Q 20

**b, If not, what is (are) reason (s)? (*can be many*)**

- |  |   |
|--|---|
| <input type="checkbox"/> 1. It is normal                           | <input type="checkbox"/> 2. It is shameful                |
| <input type="checkbox"/> 3. Mild, unworthy of medical attention    | <input type="checkbox"/> 4. Mistrust of health facilities |
| <input type="checkbox"/> 5. Negative attitudes of health staff     | <input type="checkbox"/> 6. Fear of RTI/STI diagnosis     |
| <input type="checkbox"/> 7. Living far away the health facilities  | <input type="checkbox"/> 8. Lack of money                 |
| <input type="checkbox"/> 9. Fear of conflict with husband/partner  |   |
| <input type="checkbox"/> 10. Others ( <i>please specify</i> )..... |   |

**c, If not, did you use self-medication?**

0. No GO TO Q 25  
1. Yes (continue)

**20. Where was the first place that you looked for examination or treatment?**

- |   |  |
|---|--|
| <input type="checkbox"/> 1. Private provider (specify what type of provider)..... |  |
| <input type="checkbox"/> 2. Pharmacy/drug store                                   | <input type="checkbox"/> 3. Commune Health Station |
| <input type="checkbox"/> 4. District hospital                                     | <input type="checkbox"/> 5. Provincial hospital    |
| <input type="checkbox"/> 6. Central hospital                                      | <input type="checkbox"/> 7. Traditional healer     |
| <input type="checkbox"/> 8. Other ( <i>please specify</i> ).....                  |  |

**21. Why did you choose that place as the first one for treatment? (*can be many*)**

- |   |  |
|---|--|
| <input type="checkbox"/> 1. Confidentiality,                      | <input type="checkbox"/> 2. Convenient                   |
| <input type="checkbox"/> 3. Skilled provider                      | <input type="checkbox"/> 4. Friendly provider            |
| <input type="checkbox"/> 5. Cheap/Free of charge                  | <input type="checkbox"/> 6. Service available as desired |
| <input type="checkbox"/> 7. Good equipment                        | <input type="checkbox"/> 8. Prefer female examiner       |
| <input type="checkbox"/> 9. Recommended by friends/relatives      |  |
| <input type="checkbox"/> 10. Other ( <i>please specify</i> )..... |  |

**22. a, Duration between the first symptom and the first treatment?.....days**

**b, Which was the main symptom(s) that made you seek healthcare, incl self-medication?**

- |  |  |
|--|--|
| <input type="checkbox"/> 1. Abnormal vaginal discharge                       | <input type="checkbox"/> 2. Genital itching                  |
| <input type="checkbox"/> 3. Dysuria (pain during urination)                  | <input type="checkbox"/> 4. Pain during sexual intercourse   |
| <input type="checkbox"/> 5. Bleeding after sexual intercourse                | <input type="checkbox"/> 6. Warts in the vulva, vagina, anus |
| <input type="checkbox"/> 7. Ulcers in the vulva, vagina, anus                | <input type="checkbox"/> 8. Lower abdominal pain             |
| <input type="checkbox"/> 9. Bleeding between menses                          | <input type="checkbox"/> 10. Bleeding increased              |
| <input type="checkbox"/> 11. Menstruation extended in relation to previously |  |
| <input type="checkbox"/> 12. Other ( <i>please specify</i> ).....            |  |

**23. What was your diagnosis made by the person/health facility, which consulted?**

0. No inflammation                      1. Inflammation  
2. Do not know                            4. Other (*please specify*).....

**24. What kind of treatment did you get?**

	Types of drugs	Name of drugs	Ways of using	dose/day	Duration
<i>Example</i>	Tablet	Nystatin	Insertion	1 tab	6
Drug No. 1					
Drug No. 2					
Drug No. 3					
Drug No. 4					
Drug No. 5					

**25. a, Did you tell anyone about your symptom?**

1. No    2. Friends  
3. Parents, sisters, relatives            4. Husband/partner  
5. Others.....

**b, If yes, please specify the reasons (*can be many*)**

1. To get sympathy/help                      2. To share experiences  
3. Others (*please specify*).....

**c, If no, please specify the reasons (*can be many*)**

1. Hesitated, ashamed                      2. Had enough knowledge  
3. Not necessary                              4. Afraid of conflict  
5. Other reasons (*please specify*).....

**26. a, Do you have any following symptoms at present? *If no symptoms, go to Q28***

	<input type="checkbox"/> 0. No	<input type="checkbox"/> 1. Yes	If yes, how long?
1. Abnormal vaginal discharge *			
2. Genital, vaginal itching			
3. Pain during urination			
4. Bleeding after sexual intercourse			
5. Pain during sexual intercourse			
6. Warts in the vulva, vagina, anus			
7. Ulcers in the vulva, vagina, anus			
8. Lower abdominal pain			
9. Bleeding between menses			
10. Menstruation extended in relation to previously			
11. Bleedings increased			

**b, \* If having an abnormal vaginal discharge, please specify as followings:**

*1, Amount:*

1. Little    2. Moderate                                      3. Profuse

*2, Condition:*

1. Condensed                                      2. Watery    3. Powdery  
4. Foamy    5. Normal mucus

*3, Color:*

1. Clear    2. Whitish    3. Yellowish  
4. Greenish    5. Blood-stained

*4, Odor:*

0. No    1. Yes

**c, How do you think about your vaginal discharge at present?**

0. Normal, don't need any treatment                      1. Abnormal, need treatment  
3. Don't know

**28. a, Do you have sexual intercourse while having abnormal vaginal discharge?**

0. Never    1. Sometimes                                      2. Often

**b, Do you have sexual intercourse while having menses?**

0. Never    1. Sometimes                                      2. Often

**c, Do you use regular vaginal douching as part of your daily ablutions?**

0. Never    1. Daily  
2. ....times/week                                      3. ....times/month

#### **IV. Information about husband/partner**

**29. Your present husband's/partner's age? ..... year of birth**

**30. His education:**

1. Illiterate 2. Primary 3. Secondary school  
4. High school 5. College or University

**31. His occupation: (can be many)**

1. Farmer 2. Government staff  
3. Worker 4. Trader  
5. Soldier/policeman 6. Free worker (carpenter, builder)  
7. Unemployed 8. Service (please specify).....  
9. Other (please specify).....

**32. a, Husband's work place**

1. Within district  
2. Other place (please specify).....  
3. Mobile (please specify).....

**b, If not within the district, how long time he is present at home during a month?**

1. <1 week 2. 1- 2 weeks  
3. 3 weeks 4. 3 weeks

**33. Do you know if he has any other sexual partner?**

0. No 1. Yes 3. Don't know

**34. a, Has he ever previously had/complained about any following symptoms?**

1. Urethral discharge 2. Scrotum swelling  
3. Genital ulcers/warts 4. Genital itching  
5. Pain during urination 6. Pain during sexual intercourse  
7. None

**b, Did he go for examination? 0. No 1. Yes 3. Don't know**

**c, If yes, where did he go for examination and treatment? (can be many)**

1. Self-medication 2. Private providers  
3. Pharmacies/Drugstores 4. Commune health center  
5. District Hospital 6. Provincial/Central hospital  
7. Don't know 8. Others (please specify).....

**35. a, Does he currently have/complain about any following symptoms?**

0. No 1. Yes 3. Don't know

**b, If yes, which symptoms**

1. Urethral discharge 2. Scrotum swelling  
3. Genital ulcers/warts 4. Genital itching  
5. Pain during urination 6. Pain during sexual intercourse  
7. Others (please specify).....

**36. Do you have anything to add?**

**Thank you very much for your answers!**

*(After the interview completed, the surveyor will give the invitation letter to married women for clinical examination with an appointed time at a certain place)*

## Appendix 3

### Examination form

Date...../...../.....	Time.....	Cluster number.....	ID:.....
Year of birth.....	Age.....	Duration of examination.....	
Name of physician.....		Name of lab-technician.....	

*Present situation:*

1. Menstruating      2. Pregnant.....month(s)      3. After delivery  
4. Herectomy      5. Others.....

#### I. Clinical examination:

##### 1. Vulva, anus status:

1. No deviant findings      2. Ulcer(s)  
3. Wart(s)      4. Papule (s)  
5. Inflammation      6. Others .....

##### 2. Vaginal status:

1. Is there any vaginal discharge?  
1. No      2. Yes, very little  
3. Yes, moderate      4. Yes, profuse
2. Vaginal discharge condition:  
1. Homogenous      2. Condensed      3. Watery  
4. Powdery      5. Foamy      6. Normal mucus
3. Vaginal discharge color:  
1. Clear      No      Yes  
2. Whitish      No      Yes  
3. Light yellow      No      Yes  
4. Yellow      No      Yes  
5. Greenish      No      Yes  
6. Blood-stained      No      Yes
4. Mucus membrane condition:  
1. Normal color      No      Yes  
2. Red color      No      Yes  
3. Swollen      No      Yes  
4. Dry      No      Yes

##### 3. Cervical and pelvic condition:

1. Is there ectopia?      0. No      1. Yes
2. Does the cervix bleed easily when touched?      0. No      1. Yes
3. Size of the uterus:      1. Normal      0. No      1. Yes  
2. Enlarged → HCG test      0. No      1. Yes  
     • If yes:      0. Negative      1. Positive
4. Tenderness of the uterus:      0. No      1. Yes
5. Palpable of adnexal mass?      0. No  
1. Yes, on the right: .....cm  
2. Yes, on the left: .....cm
6. Pelvic tenderness/pain? Tick all relevant options  
0. No  
1. Yes, on the right  
2. Yes, on the left  
3. Yes, on the middle
7. pH test:      0. ≤ 4.5      1. > 4.5
8. Sniff test:      0. Negative      1. Positive
9. Wet mount:      0. Negative      1. Trichomonas  
2. Candida      3. Clue cells

#### II. Diagnosis:.....

**Appendix 4**

**Self-completed questionnaire for healthcare providers**

**I. General information:**

1. Age:..... Year of birth: 19.....
2. Gender: 1. Male 2. Female
3. Ethnicity:
4. Education: 1. Lower professional training (6-12 months)  
2. Intermediate professional training (2-3 years)  
3. University 4. Post graduate  
5. Other (*please specify*).....
5. Professional skill  
1. Medical doctor, speciality.....  
2. Assistant doctor, speciality.....  
3. Nurse 4. Midwife  
5. Lab-technician 6. Other.....
6. Working years in current position .....
7. Workplace: *can choose more than one*  
1. District hospital, dept..... 2. Polyclinic  
3. Family planning team 4. Preventive health team  
5. Commune health centre 6. Private clinic  
7. Village health worker 8. Other (*please specify*)...
8. How often do you deal with STI patients? (*please choose one*)  
0. No 1. Yes  
*If yes*  Daily Average number of patients/day.....  
 Weekly Average number of patients/week.....  
 Monthly Average number of patients/month.....  
 Sometimes
9. Beside your main occupation, do you sell drugs?  
0. No 1. Yes  
 If yes, do RTI/STI patients come to buy drugs? 0. No 1. Yes  
 Please specify how often 1. Daily 2. Weekly  
3. Monthly 4. Sometimes
10. Have you attended any RTI/STI training course? 0. No 1. Yes  
 If yes, how many courses?.....The last time was .....; duration.... days  
 Which organization gave training.....

**II. Questions about knowledge on STI**

11. Which following diseases do you consider STI? (*can choose many*)  
1. Gonorrhoea 2. Syphilis 3. Genital warts  
4. Hepatitis B 5. Genital herpes 6. Trichomonas  
7. Chlamydia 8. Adnexal mass inflammation 9. Pubic lice  
10. Bacterial vaginosis 11. Cervicitis 12. HIV/AIDS  
13. Candidiasis 14. Don't know
- 12.1. What are suspected symptoms of STI? (*can choose many*)

Symptoms	Yes	No
1. Abnormal vaginal discharge in female		
2. Urethral discharge in male		
3. Genital ulcers		
4. Genital warts		
5. Genital itching		
6. Pain during urination		
7. Lower abdominal pain in female		
8. Pain during sexual intercourse		
9. Bleeding after intercourse		
10. Fever		
11. Others.....		
12. Don't know		



**12.2. Among the symptoms that you have chosen from item No. 12.1, which one do you perceive as the most common symptom of STI in women?.....**

.....  
 Don't know

**12.3. Among the symptoms that you have chosen from item No. 12.1, which one do you perceive as the most common symptom of STI in men?.....**

.....  
 Don't know

**13. Do you know what the causes of STI are? (can choose many)**

- 1. Bacteria
- 2. Virus
- 3. Fungus
- 4. Parasite
- 5. Protozoa
- 6. Other (please specify) .....
- 7. Don't know

**14. Please tick as many of the risk factors of STI that you know**

- 1. Bad hygiene
- 2. Having multiple sex partners
- 3. Changing sex partners frequently
- 4. Prostitution
- 5. Homosexual
- 6. Sex during menses
- 7. Unsafe sex
- 8. Blood transfusion
- 9. STI history
- 10. Mobile work
- 11. Using alcohol, drug before sex
- 12. Other (please specify) .....
- 13. Don't know

**15. Please give your ideas about the possible routes of STI transmission? (can choose many)**

- 1. Sexual intercourse
- 2. Blood transfusion
- 3. Mother to child
- 4. Sharing needle
- 5. Sharing clothes
- 6. Sharing foods
- 7. Kissing (mouth)
- 8. Oral sex
- 9. Don't know
- 10. Other (please specify) .....

**16. Which following diseases, sexual partner(s) need to be examined/treated? (can choose many)**

- 1. Gonorrhoea
- 2. Syphilis
- 3. Genital warts
- 4. Hepatitis B
- 5. Genital herpes
- 6. Trichomonas
- 7. Chlamydia
- 8. Adnexal mass inflammation
- 9. Pubic lice
- 10. Bacterial vaginosis
- 11. Cervicitis
- 12. HIV/AIDS
- 13. Candidiasis
- 14. Don't know

**17. Can STI be cured?**

- 1. Yes, all of them
- 2. No, none of them
- 3. Some can be cured (please specify) .....
- 4. Some can't be cured (please specify) .....
- 5. Don't know

**18. What are the consequences of untreated STI?**

- 1. Infertility
- 2. Ectopic pregnancy
- 3. Cervical cancer
- 4. Miscarriage
- 5. Still birth
- 6. Premature birth
- 7. Neonatal death
- 8. Deformed child
- 9. Pelvic inflammation disease
- 11. Don't know
- 10. Others (please specify).....

**19. Can STI be prevented?**

- 0. No
- 1. Yes
- 2. Don't know

If yes, how to prevent people from getting an STI?.....

**20.1. Do you know STI syndromic management approach (recommended by WHO)?**

- 0. No go to Q 21
- 1. Yes continue

**20.2. If yes, do you apply the syndromic approach when you deal with STI patients?**

- 0. No
- 1. Yes

### **III. Case scenarios**

**In your working condition, please give your opinions how to deal with the following cases**

**21. A young unmarried woman, who ever has had sexual intercourses, comes to you with an abnormal vaginal discharge and vaginal itching.**

**21.1. Would you treat this patient?**

- 1. No, refer the patient to other place (*please specify*).....=> *Go to Q 22*
- 2. Yes => Please continue
- 3. What would this patient be possibly suffering from? .....

**21.2. What would you do to make a diagnosis? (can choose more than one)**

- 1. Use syndromic approach 0. No 1. Yes
- 2. Take history and observe the discharge 0. No 1. Yes
- 3. Make gynaecological examination (using speculum and bimanual)  
0. No 1. Yes
- 4. Request lab 0. No 1. Yes

*If yes, please specify*.....

- 5. Other (*please specify*) .....

**21.3. How would you treat this patient? (can choose more than one)**

- 1. Use syndromic approach
- 2. Based on lab tests
- 3. Based on history and discharge's characteristic
- 4. Based on the findings of gynaecological examination
- 5. Other (*please specify*).....

**21.4. Would you examine and treat the patient's partner? 0. No 1. Yes**

**21.5. What advice would you give the patient? .....**

**22. A man had unprotected intercourse. 3 days later, he comes to you with urethral discharge.**

**22.1. Would you treat this patient?**

- 1. No, refer the patient to other place (*please specify*).....=> *Go to Q 23*
- 2. Yes => Please continue
- 3. What would this patient be possibly suffering from? .....

**22.2. What would you do to make a diagnosis? (can choose more than one)**

- 1. Use syndromic approach 0. No 1. Yes
- 2. Take history and observe the discharge 0. No 1. Yes
- 3. Make gynaecological examination (using speculum and bimanual)  
0. No 1. Yes
- 4. Request lab 0. No 1. Yes

*If yes, please specify*.....

- 5. Other (*please specify*) .....

**22.3. How would you treat this patient? (can choose more than one)**

- 1. Use syndromic approach
- 2. Based on lab tests
- 3. Based on history and discharge's characteristic
- 5. Other (*please specify*).....

**22.4. Would you examine and treat the patient's wife/partner?**

- 0. No 1. Yes

**22.5. What advice would you give the patient? .....**

**23. A married woman comes to you with complaints about some small, painful ulcers on her vulvae.**

**23.1. Would you treat this patient?**

- 1. No, refer the patient to other place (*please specify*).....=> *Go to Q 24*
- 2. Yes => Please continue
- 3. What would this patient be possibly suffering from? .....

**23.2. What would you do to make a diagnosis?** (can choose more than one)

- 1. Use syndromic approach 0. No 1. Yes
- 2. Take history and observe the discharge 0. No 1. Yes
- 3. Make gynaecological examination (using speculum and bimanual)  
0. No 1. Yes
- 4. Request lab 0. No 1. Yes
- If yes, please specify*.....
- 5. Other (please specify) .....

**23.3. How would you treat this patient?** (can choose more than one)

- 1. Use syndromic approach
- 2. Based on lab tests
- 3. Based on history and discharge's characteristic
- 4. Based on the findings of gynaecological examination
- 5. Other (please specify).....

**23.4. Would you examine and treat the patient's husband/partner?**

0. No 1. Yes

**23.5. What advice would you give the patient?** .....

**24. A married woman comes to you with complaints about vaginal discharge for quite long time and now she has lower abdominal pain?**

**24.1. Would you treat this patient?**

- 1. No, refer the patient to other place (please specify).....=> Go to Q 25
- 2. Yes => Please continue
- 3. What would this patient be possibly suffering from? .....

**24.2. What would you do to make a diagnosis?** (can choose more than one)

- 1. Use syndromic approach 0. No 1. Yes
- 2. Take history and observe the discharge 0. No 1. Yes
- 3. Make gynaecological examination (using speculum and bimanual)  
0. No 1. Yes
- 4. Request lab 0. No 1. Yes
- If yes, please specify*.....
- 5. Other (please specify).....

**24.3. How would you treat this patient?** (can choose more than one)

- 1. Use syndromic approach
- 2. Based on lab tests
- 3. Based on history and discharge's characteristic
- 4. Based on the findings of gynaecological examination
- 5. Other (please specify).....

**24.4. Would you examine and treat the patient's husband/partner?**

0. No 1. Yes

**24.5. What advice would you give the patient?** .....

**25. Do you think that you have enough knowledge about STI?**

0. No 1. Yes 2. Don't know

Please suggest some suitable ways to improve knowledge on STI for HCPs...

.....  
.....

**Thank you very much for your answers!**