INTRODUCTION

Reproductive tract infection is the reason of many clinical and disorder diseases of reproductive tract. There are 3 main reason groups: bacterial contamination, parasitic contamination as *Candida sp and Trichomonas vaginalis*….; virus contamination as: HPV, HIV. In many cases, diseases cause lots of severe consequences as: ectopic pregnancy, infertility, cervical cancer, increase of HIV, HPV contamination risks, and etc.

Reproductive tract infections are very popular over the world, especially in underdeveloped countries. According to World Health Organization, in 2008 there are 498.9 million people suffering newly from reproductive tract infections, in which there are 128 million affecting people in South East Asia, occupying 25.7%; there are 93 million people in Africa, occupying 18.6%; there are 126 million people in Africa and Caribbean, occupying 25.3%.

In Vietnam, reproductive tract infections, especially infecting from parasites *Candida* sp*, Trichomonas*… tent to increase. In Quang Ninh generally and in Quang Yen town particularly, until now there is not any really sufficient and scaled researching work to evaluate the situation of reproductive tract infections. Therefore, the research of reproductive tract infection situation is necessary, in order to orientations for prevention methods to improve women's health, we implement this topic for purposes:

1. Describing the current situation of reproductive tract infections caused by fungus, unicellular among married woman 18 – 49 years of age in Quang Yen town, Quang Ninh province.

2. Identifying several risky factors related to reproductive tract infections.

3. Treatment effects combined with disease prevention consultancy for disease cases and intervention methods for improving knowledge, practice attitudes in reproductive tract infection prevention among the object group stated above.

NEWNESS, SCIENCE AND PRACTICALNESS OF THESIS

The thesis contributes several new, practical and scientific points.

- Describing the current situation and risky factors related reproductive tract infections caused by fungus, unicellular among married woman 18 – 49 years of age in the research place.

- Evaluating effects of treatment methods and improving knowledge and practical attitudes of women 18 – 49 years of age in reproductive tract infection prevention.

- This is the first time to apply PCR advanced technologies and analyzing the genetic order to identify *Candida* sp.

STRUCTURE OF THESIS

The thesis includes 132 pages: Introduction (2 pages), Overview of document (31 pages), objects and research methods (28 pages), research results (23 pages), discussion (36 pages), conclusion and petition (3 pages). There are 138 references (64 references in Vietnamese and 74 references in English) and 7 appendixes.

Chapter I:
OVERVIEW

1.1. Epidemiology on reproductive tract infections

1.1.1. In the world

The reproductive tract infections among women is a health problem paid attention to at the global level. According to Center for Disease Control and Prevention, in US, 2008, there are 20 million people suffering newly from sexually transmitted diseases: syphilis, gonoerrhoea, vaginal flagellate, *Chlamydia trachomatis*. The statistics of World Health Orgnization in 2008, there are 498.9 million affecting newly from reproductive tract infections, in which there are 128 million infecting people in South East Asia, occupying 18.6%; there are 93 million people in Africa, occupying 18.6%, there are 126 million people in America and Caribbean, occupying 25.3%.

1.1.2. In Vietnam

The study of Le Thi Oanh in ecological sub-regions in Red River Delta and North Central Coast (in 2001), shows that: the rate of women infecting from reproductive tract infections fluctuates from 41.5% to 64.1%. Study of Le Thanh Son (2005), the rate of women infecting from reproductive tract infections is 64.45%. Study of Vu Duc Binh (2013), the rate of reproductive tract infections among married women 18 – 49 years of age through clinical examination is 79.0%. Study of Nguyen Minh Quang (2013), the rate of women infecting from lower reproductive tract infections is 67.1%. Study of Pham Thi Xanh (2014), there are 60.8% women infecting from lower reproductive tract infections. In Vietnam, the rate of women infecting from reproductive tract infections does not decrease, but it tents to increase highly.

1.2. Several factors related to reproductive tract infections

- Factor group on labor: The study of UNFPA (1995) shows that women in the North have risks for reproductive tract infections 3.1 times

as high as women in the South, which shows clearly for *T. Vaginalis* contamination (39/300 in comparison with 2/300), *Candida* sp contamination (22/300 in comparison with 6/300). The study of Cao Ba Loi (2013) shows when laborers soak their bodies under water while working and they clean their reproductive tracts improperly, they will have risks for reproductive tract infections caused by *Candida* sp and *T. Vaginalis* 2.12 and 1.9 times as high as people who do not soak their bodies under water when working and cleaning in menstruation time improperly.

- Factor group on individual: Le Thanh Son (2005), age has the significant impacts on reproductive tract infections, the rate of affecting women increases the most highly at the age group of 30 – 39. Vu Duc Binh (2013), the rate of reproductive tract infections is highest at age group of 36 – 49.

- Factor group on sanitation: Le Thanh Son (2005), people using dirty water have risks for diseases 1.86 times as high as people using clean water. Pham Thi Xanh shows that there is a relation between having private bathroom and reproductive tract infections among women.

- Factor group on parturition, abortion and family planning: UNFPA in 1995, shows that: Among women having children, women with 3 children and above suffer from reproductive tract infections higher than women with 1 – 2 children or no children (16% in comparison with 4%). Cao Ba Loi in 2013, in Tam Nong, Phu Tho shows that women aborting 3 times and above and placing uterus tools have risks for reproductive tract infections caused by *Candida* sp and *T.vaginalis* 2.05 and 3.97 times as high as women aborting under 3 times and not placing uterus tools.

1.3. Intervention for reproductive tract infection prevention

1.3.1. Intervention model for treating and managing patients suffering from reproductive tract infections

Nowadays, several countries have applied the intervention model to prevent effectively from reproductive tract infections; the results of applying models have difference between developed countries and developing countries. The study of Schmid G (2004) shows that the effective selection and treatment of syphilis among pregnant women can avoid many cases of dead foetus in each year, this number is equal to the number of children under 1 years old infecting from HIV though mother to child transmission. The study of Garnett and coworkers (2000), the improvement of control effects of reproductive tract infections includes: accessing qualified centers for disease control and prevention for male and female plays an important role in the success of disease control. Cao Ba Loi (2013), the study among married women 18 – 49 years of age shows that the treatment method by vaginal drugs reaches the high treatment effect after 10 day, occupying 97.0%.

1.3.2. Communications model for changing behaviors

There are many domestic and foreign studies on reproductive tract infections and intervention methods, as Schopper D. (1995), intervention tissue study for improving knowledge, attitudes and behaviors of inhabitants in the frame of HIV/ AIDS control and prevention program in Uganda. Aggarwal and coworkers have implemented several studies on reproductive tract infections and application of intervention model in the rural area of India with health education communications at medical stations combined with household communications to improve the service usage of customers. Study of Mba and coworkers (2007), in Negeria, Cao Ba Loi (2013), Nguyen Minh Quang (2013), Pham Thi Xanh (2014), effects of community-based intervention model.

Chapter II:
RESEARCH OBJECT AND METHOD

2.1. Research object, location and time

2.1.1. Research object

Married women 18 – 49 years of age in Quang yen Town.

- Sampling standards: Women voluntarily participate into the study, have permanent residence at the locality for 12 years and above, do not place vaginal drugs for 2 years before examining....

The age according to strategies of WHO and Vietbam according to obstetrical factors: Group I: 18 – 25 years of age, young women, Group II: 26 – 35 years of age (the best reproductive age), Group III: 36 – 49 years of age (old pregnant women).

- Elimination standards: Women is in menstruation time, is placing drugs for 2 weeks, women suffer from metal disease, are cut the whole uterus, women involuntarily participate into the study.

2.1.2. Research place

2.1.2.1. Researching in the field

***Descriptive study:**

The study is implemented at 3 communes: Lien Vi, Song Khoai, Hoang Tan belonging to Quang Yen town, Quang Ninh Province, are selected on purpose.

*** Intervention study:**

In implemented in Lien Vi, Song Khoai and Hoang Tan communes belonging to Quang yen town, Quang Ninh Province.

2.1.2.2. Study in laboratory

- The fungus growing technique is implemented at the laboratory of Quang Yen Medical Center, Quang Ninh province.

- PCR – RFLP technique and genetic order analysis are implemented at the genetic technique laboratory of Bio-technology

institute belonging to National Center for Natural Sciences and Technology.

2.1.3. Researching time

The study is implemented for 2 years from 2013 – 2014.

2.2. Researching method

The study is designed by two basic methods: descriptive epidemiology method with analysis and community-based intervention epidemiology method.

2.2.1. Researching design

Is implemented according to 2 researching designs: cross-sectional descriptive study with analysis and no control community-based intervention study.

- The description of current situation of reproductive tract infections among researched women shows the rate of reproductive tract infections through clinical syndromes among researched objects in 2013. Rate of reproductive tract infections through clinical examination and testing at researched objects. Rate of patients contaminated by *Candida* sp in general and each species of *Candida* sp. Rate of patients contaminated by *T. vaginalis*. Rate of patients contaminated by *Candida* sp. and *T. vaginalis*. Rate of contaminated patients according administrative geography, occupation and age…

- Identifying several factors related to reproductive tract infection prevention.

- Community-based intervention study includes:

+ The pre-intervention cross-sectional study to evaluate knowledge, practising altitude of disease prevention of researched objects for reproductive tract infections is implemented with cross-sectional descriptive study.

+ Intervention solutions:

* Treating and consulting all women who examine medically at 3 communes and affect from reproductive tract infections. Women contaminated by *Candida* sp and *T. vaginalis* are treated according to the following scheme:

If contaminated by Candida sp: Placing Neotecgynan into vagina: 01 tablet/ day x 10 days.

If contaminated by T. vaginalis: Drinking an unique dose of etronidazole 2 grammas or Metronidazole 500mg/ time x 2 times/day x 7 days, combining with placing Neotecgynal into vagina at night. Before sleeping, cleaning and placing medicine and treating their husbands.

If contaminated by T. vaginalis and Candida sp: Placing Neotecgynan into vagina: 01 tablet/ day x 10 days at night. Before sleeping, cleaning and placing medicine and treating their husbands.

* Communicating at community: propagandizing and educating health through forms: talking, images, video, and etc. to change knowledge, attitudes, practice of women about infections and reproductive tract parasite infections. Implementing continuously in each month at 3 intervention communes.

- The cross-sectional study and post-intervention evaluation include: treatment effects, comparing pre-intervention and post-intervention evaluation index.

2.2.1.1. Sample size of cross-sectional study

The minimal sample size for cross-sectional study with one ratio is applied the formula:

$$n = Z^2_{1-\alpha/2} \frac{(1-p)}{p\varepsilon^2}$$

In which: n: Minimal sample size

p: Estimated contamination rate of population, selecting p = 0.50 (Reproductive tract infection rate at provinces in the Northern delta from 41.5% - 64.1%)

$Z_{1-\alpha/2}$: Reliability coefficient, correlative to reliability 95%, $Z_{1-\alpha/2}$ = 1.96

ε: Designed relative error, selecting ε = 10%.

With the selected values, the sample size calculated for the study at Quang Yen town is 384, and rounded, the sample size for the whole town is 390.

2.2.1.2. Size sample for intervention study

- The desired sample size for changing 2 ratios is applied according to the formula:

$$n = \left\{Z_{1-\alpha/2}\sqrt{p_1(1-p_1)} + Z_{1-\beta}\sqrt{p_2(1-p_2)}\right\}^2/(p_1 - p_2)^2$$

In which: n: Minimal sample size.

p_1: Pre-intervention reproductive tract infection rate is estimated as 0.5, thus: p_1= 0,5, $q_1 = 1 - p_1 = 0,5$

p_2: Estimated post-intervention reproductive tract infection rate, expecting $p_2 = 0,3$, $q_2 = 1 - p_2 = 0,7$.

α: Mistake probability type I, selecting α = 0,05, correlative to $Z_{1-\alpha/2}$ = 1,96. β: Mistake probability type II, selecting β = 0,05, correlative to $Z_{1-\beta} = 1,64$

Changing into the formula, the calculated sample size is 75, to increase the sample force, we add 10% into sample, and thus the sample size is 90 married women 18 – 49 years of age. In fact, the whole selected women suffering from reproductive tract parasite infections is 131 at 3 intervened communes during the research time.

2.2.3. Sample selecting ways

*** Selecting the cross-sectional research sample:**

- Based on the list of communes in Quang Yen town, selecting at random 3 communes: Lien Vi, Song Khoai, Hoang Tan.

- Based the list of married women 18- 49 years of age of each commune, selecting at random 130 women in each commune. Therefore,

the sample size for whole study is 390; in fact we have researched 398 women.

*** Selecting the intervention research sample:**

- Based on the list of married women 18 – 49 years of age of descriptive cross-sectional study and examination and testing results at 3 communes: Lien Vi, Song Khoai and Hoang Tan. Taking all women contaminated by *Candida* sp and *T. vaginalis* according to the testing results into the intervention study. The number of selected objects: 131 married women 18 – 49 years of age at 3 communes: Lien Vi, Song Khoai and Hoang Tan.

2.3. Techniques in researching and collecting data

2.3.1. Clinical examination in obstetrics

The clinical examination aims at identifying clinical syndromes: lower abdominal pain syndrome, genital ulcer syndrome, vaginal discharge syndrome….

2.3.2. Testing technique

The fresh testing technique (direct test); fungus growing technique in Sabouraud environment; PCR technique and genetic order analysis; community interviewing technique.

2.3.3. Collecting date

- Descriptive cross-sectional survey: aims at identifying the rate of women suffering from reproductive tract infections, causative agent and related factors:

+ Interviewing the researched objects (appendix 1) to collect data on knowledge, attitude and practice related to reproductive tract infections.

+ Examining and testing to evaluate the situation of reproductive tract infections: Vulva: inflaming, itching and ulcerating; Vagina: vaginitis, whites…; Cervix: whites, ulcerating, peeling off, tumor, swelling with pustules, outgoing feeder.

- Community-based intervention: aims at identifying effects of intervention methods applied through evaluating the decrease of reproductive tract infection rate, changing knowledge, attitude and practice on reproductive tract infections of researched objects.

- Interviewing the researched objects according to the designed questionnaire.

- Examining gynecologically and testing, diagnosing reproductive tract infections.

- Treatment results of women contaminated by *Candida* sp and *T. vaginalis.*

2.4. Researching content

2.5.1. Current situation and several factors related to reproductive tract infections

- Reproductive tract infection syndromes are found through clinical test.

- Rate of reproductive tract infections through demographic factors: age, occupation, education level, rate of reproductive tract infections according to administrative geography.

- Rate of reproductive tract infections caused by *Candida* sp and *T. vaginalis* is found by microorganism test.

In the study, the rate of women contaminated each species of *Candida* sp is evaluated by PCR molecule biological method and genetic order analysis.

- Characteristics of researched objects: Age, occupation, education level.

- Sanitation condition: water source, bathroom…

- Evaluation on factors related to obstetrical prehistory, gynecological prehistory, and etc.

- Evaluation on factors related to knowledge, attitude and disease prevention practice of researched objects through calculating rates.

2.4.2 Treatment intervention and health education communications

Examining medically and consulting researched objects suffering from reproductive tract infections. Communicating and health educating: by forms: talking, images, videos, and etc.

Supporting medical officials: Officials of researching group and medical officials of Medical center of Quang Yen town 3 months/ 1 time to supervise support technically about procedures of medical examination and treatment, communications, consultancy for women on reproductive health caring services.

Effect evaluation: By a questionnaire in the intervention study, we will evaluate the intervention effects for 12 months with longitudinal comparison before and after intervention.

2.5. Data processing and analyzing methods

All survey cards are tested and cleaned before processing. The income quantitative data will be tested, and the observation and interview data will be inputted and analyzed by software SPSS 16.0, Epi - Info 6.04 and Stata. The data are analyzed and shown in form of data table and charts.

Calculating the efficiency index to consider the intervention effect:

- The treatment effects are calculated as follows

$$\text{CSHQ treatment intervention} = \frac{\text{Post-intervention infection rate} - \text{Pre-intervention infection rate}}{\text{Previous infection rate}} \times 100$$

- The effect of communications and health education for reproductive tract infection prevention is calculated as follows:

$$\text{CSHQ (TTGDSK)} = \frac{\text{Rate of women answering exactly post-intervention RTIs risks} - \text{Rate of women answering exactly pre-intervention RTIs risks}}{\text{Rate of women answering exactly post-intervention RTIs risks}} \times 100$$

2.6. Error control

- The sample size is big enough; the sampling method ensures the randomness. The interview card is designed clearly and easy to understand, unified in the research group. Researching on trial. The investigators are trained and experienced in the community heath field.

2.7. Researching ethics

Complying strictly with regulations in medical – biological study: Before interviewing, sampling the medical waste of researched objects informed and speaking clearly the researching purposes. Only researching at voluntary people.

Chapter III:
RESULTS AND DISCUSSION

3.1. Current situation of reproductive tract infections caused by fungus and unicellular

3.1.1. Characteristics of researched object

Table 3.1. Allocating according to age group of researched object

Individual characteristics		Quantity	Rate (%)
Age group	18 - 25(1)	52	13,1
	26 - 35(2)	154	38,7
	36 - 49(3)	192	48,2
	Total	398	100,0
	Average age	35,82 ± 7,841	

Remarks:

The average age of examined women is 35,83 ± 7,841. The age group (36 – 49) has the highest rate 48.2%.

Table 3.2. Allocating according to education level of researched object

Education level	**Quantity**	**Rate (%)**
Illiterate	8	2,0
Primary school	108	27,1
Secondary school	199	50,0
High school	67	16,8
Professional high school, university and potgraduate	16	4,1
Total	398	100,0

Remarks: The education level of researched objects in which the rate of women with secondary education level is highest, occupying 50.0%, primary education and illiterate rates are 27.1% and 2.0% in turn.

3.2. Current situation of reproductive tract infections through clinical examination

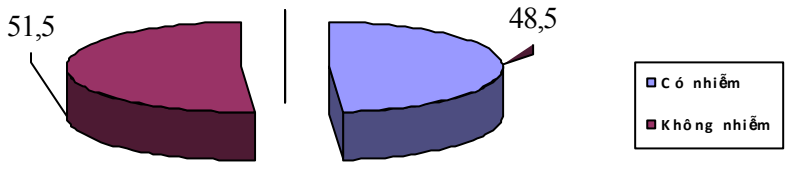

Figure 3.1. Current situation of RTIs through clinical examination

Remarks: The objects suffering from RTIs syndromes occupy the rate of 48.5%, objects without RTIs syndromes occupy the rate of 51.5%. This result is equivalent to Le Thi Oanh (2001) in Red River Delta and North Center Coast, it shows that: the rate of women suffering from reproductive tract infections fluctuates from 41.5% to 64.1%. According to World Health Organization in 2008, there are 489.9 million infecting newly with sexually transmitted diseases, in which in South East Asia, there are 128 million patients, occupying 25.7%, in Africa there are 93 million patients occupying 18.6%, in Africa and Caribbean there are 126 patients occupying 25.3%.

Therefore, the rates of reproductive tract infections in community and hospital are different; it depends on many factors as: knowledge of women on health, time, location, genital cleaning habits, manners and customs, occupation and environmental pollution, and etc.

Table 3.3. Rate of reproductive tract infections through clinical examination at researched communes.

Commune	Clinical examination number	Number of women uninfected	Number of women infected	Rate (%)
Lien Vi (1)	130	78	52	40,0
Hoang Tan(2)	131	85	46	35,1
Song Khoai(3)	137	43	95	69,3
General	398	206	193	48,5

Value p	p(1:2) < 0,05; p (3: 1; 2) < 0,05

Remarks: Rate of women with clinical syndromes is 48.5%. There is a difference on infection rate between Lien Vi, Hoang Tan and Song Khoai with values of 40.0% compared with 35.1% and 69.3% với p < 0.05.

Table 3.4. Rate of women contaminated by Candida sp *and T. vaginalis by direct testing method*

Agent	Test Number	Infection number (+)	Rate (%)	Value p
Candida (1)	398	64	16,1	< 0,05
T. vaginalis(2)	398	21	5,3	

Remarks:

The rates of researched objects suffering from reproductive tract infections caused by *T. vaginalis* and *Candida* sp are 5.3% and 16.1% in turn, this difference has the statistical meaning with p<0.05. Our research result is similar to several other authors as: study of Vu Duc Binh (2013) among 532 married women 18 – 49 years of age in Tam Nong, Phu Tho shows that *Candida* sp fungus discovered by saline test is 14.0% and by growing in Sabouraud environment is 25.3%, by both methods is 30.5%. The study of Pham Thi Xanh (2014) among 804 women 18 – 49 years of age in the island area of Hai Phong shows that *Candida* discovered by tests is 31.3%. According to judgement of UNFPA (1995), the rate of women contaminated by fungus in UNFPA study is (22/300), lower than our study (116/398). The rate of women contaminated by *T.vaginalis* in the North of Vietnam is (39/300) higher than our study (21/398). This result can be explained that women in the Northern rural area mainly work as farmer and frequently contact with dung and soil when soaking their bodies under water.

Table 3.5 Rate of women contaminated by Candida sp by directly testing and growing in Sabouraud environment

Testing method	Situation of *Candida* sp contamination		
	Testing No.	No. (+)	Rate (%)
Testing directly (1)	398	64	16,1
Growing (2)	398	116	29,1
Both method (3)	398	116	29,1
Value p	(1: 2; 3) < 0,01; (2; 3) > 0,05		

Remarks: The direct testing method only discovers 16.1% cases contaminated by *Candida* sp, while the fungus growing method discovers 29.1% cases contaminated by *Candida* sp.

There is a difference on fungus discovery rate between saline method and growing in Sabouraud environment with correlative rate: 16.1% compared with 29.1% with $p < 0.01$. There is not any difference on *Candida* sp discovery rate and between growing in Sabouraud environment and combination of direct testing method and growing in Sabouraud environment, with rates of 29.1% compared with 29.1% with $p > 0.05$. Therefore, *Candida* sp fungus testing method by growing in Sabouraud environment (Figure 3.3 and Figure 3.4) shows the higher discovery rate than direct testing method, growing fungus in Sabouraud environment is easy to implement, maintain and transport growing samples, favorable to identify species by PCR technique and genetic order analysis. In fact, *Candida* sp contamination diagnosis of authors is applied two testing methods, so that the diagnosis will be more exact.

Table 3.6. Rate of Candida sp and T.vaginalis contamination at researched communes

Testing result	Researched commune			Total
	Lien Vi	Song Khoai	Hoang Tan	
Test No.	130	131	137	398
Infected	38	29	49	116
Rate (%)	29,2	21,2	37,4	29,1

Table 3.7. Rate of T. vaginalis contamination at researched communes

Testing result	Researched commune			Total
	Lien Vi	Song Khoai	Hoang Tan	
Test No.	130	131	137	398
Infected	9	5	7	21
Rate (%)	6,9	3,6	5,3	5,3

Remarks: The rate of *Candida* sp contamination at 3 researched commune is 29.1%, in which Hoang Tan has the highest contamination rate of 37.4%. The rate of *T.vaginalis* contamination in 3 communes is 5.3%, in which Lien Vi commune has the highest contamination rate: 6.9%.

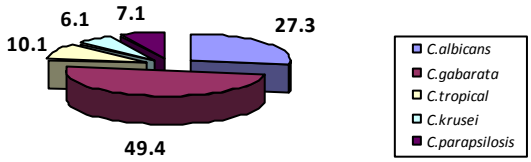

Figure 3. 2. Rate of Candida sp species through species identification by PCR

Remarks:

C.glabrata species predominates with 49.4%, next *C. albicans* with 27.3%, *C.tropical* with rate of 10,1%, *C. krusei* with rate of 6,1% and *C.parasilosis* with rate of 7,1%. Our result is suitable to the study of Cao Ba Loi and coworkers (2013), and several other authors also use the above technique: Mai Thi Minh Ngoc and coworkers (2014), Nguyen Khac Luc and coworkers (2013), SH. Mirhendi and coworkers (2001). Previously, most authors judge that the main reason of reproductive tract infections among women is *C. albicans*, next other *Candida* sp species as *C. glabrata.*

Table 3.8. Result of Candida sp species identification nucleotide chain order analysis

No.	Name of *Candida* sp species	Number of PCR ITSI - ITS4 products	Species identification nucleotide chain	Rate %
1	*C.glabrata*	49	27	55,1
2	*C.albicans*	27	15	55,6
3	*C.tropical*	10	6	60,0
4	*C.krusei*	6	1	16,7
5	*C.parapsilosis*	7	2	28,6
Total		99	51	51,5

Remarks:

There are 51 single nucleotide chains gained to access the genetic bank and to identify species by comparing genetic chain, occupying 51.5%.

Identifying species or species compound, including: *C. glabrata*: 27 chains with rate of 55.1%, *C. albicans:* 15 chains with rate of 55.6%, *C. tropicalis*: 6 chains with rate of 60.0%, *C. parapsinosis:* 2 chains with rate of 28.6%, *C. krusei*: 1 chain with rate of: 16.7%. This result is suitable to result of author Cao Ba Loi (2013) researching in Tam Nong, Phu Tho.

Table 3.9. Relation of age and Reproductive tract Candida sp infection rate

Infection situation	Age group			Total
	18 - 25 (1)	26 - 35 (2)	36 - 49 (3)	
***Candida* sp infection**				
Test No.	52	154	192	398
No. (+)	15	34	67	116
Rate (%)	28,8	22,1	34,9	29,1
Value p	(1; 2;3) < 0,05			
***T. vagilanis* infection**				
Test No.	52	154	192	398
No. (+)	7	4	10	21
Rate (%)	13,5	2,6	5,2	5,3
Value p	(1: 2; 3) < 0,05			

Remarks: Rate of general *Candida* sp infection at researched objects is 29.1%, in which women 36 – 49 years of age occupy 34.9%, women 18 - 25 years of age occupy 28.8%, and women 26 - 35 years of age occupy 22.1%.

Rate of general *T. vaginalis* is 5.3%. There is a difference between rate of *T. vaginalis* infection among women 18 – 25 years of age in comparision with age group 26 – 35 and 36 – 49 with correlative rates 13.5% compared with 2.6% and 5.2% with $p < 0.05$. This result is similar to the study of Vu Duc Binh in Tam Nong, Phu Tho. Age has a significant impact on reproductive tract *Candida* sp và *T.vaginalis* infection situation, the rate tents to increase highly at the age group of 36 – 49.

Table 3.10. Relation between domestic water source and reproductive tract infections

Water source	**Infected**		**Uninfected**		**Total**	
	Quantity	**Rate (%)**	**Quantity**	**Rate (%)**	**Quantity**	**Rate (%)**
Hygienic	112	44,6	139	55,4	251	63,1
Unhygienic	81	55,1	66	44,9	147	36,9
OR value	OR = 1,52; p < 0,05				398	100,0

Remarks: Married women using unhygienic domestic water source with the reproductive tract infection rate: 55.1% is higher than married women using hygienic domestic water with reproductive tract infection rate of 44.6%. This difference has the statistical meaning with OR = 1.52 and $p < 0.05$.

Similar to the research result of Pham Thu Xanh (2014), it shows that the relation between domestic water source of women and reproductive tract infections.

- There is a relation between abortion ≥ 3 times and gynecological examination in period with reproductive tract infection situation in researched objects, with values (OR = 2.34; $p<0.05$) and (OR = 2.92; $p<0.05$). Women who abort and do not examine gynecologically in period have risks for reproductive tract infections 2.34 and 2.92 times as high as women who do not abort 3 times and above and do not examine gynecologically. This conclusion is not suitable to studies of authors: Cao Ba Loi in Tam Nong, Vinh Phuc, Pham Thu Xanh (2014), according to Phan Thi Thu Nga (2013).

3.2. Treatment effects and reproductive tract infection prevention methods

The intervention effects after 10 days by medicine achieve 94.8%, the re-infection rate after 3 months is 9.2% and after 12 months is 13.8%. Our research result is similar to judgments of studies of National Hospital of Leprosy Dermatology (1999) in 5 provinces; Le Thanh Son (2005) in Ha Tay; UNFPA (1995); Cao Ba Loi (2013) in Phu Tho.

- There are effects before and 12 month after health education intervention in turn for factors:

The rate of women who know reproductive tract infections caused by abortion in many time increases from 21.1% to 91.1%, this difference has the statistical meaning with $p<0.05$ and the intervention effect is 76.8%. The rate of women who know reproductive tract infections

caused by unhygienic water source increases from 61.1% to 95.0%. The difference between pre-intervention and post-intervention has the statistical meaning and the intervention effect is 35.7%.

The rates of women who know about intervention by spousal faithfulness and using condom in sexual relation increases highly. The difference has the statistical meaning with $p<0.05$ and the intervention effect is also high.

- There is a clear effect change about several disease prevention practicing factors after 12 months in details: The rate of women who must examine gynecologically in period for reproductive tract infection prevention increases from 6.7% to 67.5%, this difference has the statistical meaning with $p<0.05$ and the intervention effect is 90.1%. The rate of women who examine at State medical units increase from 47.8% to 83.5%. The difference between pre-intervention and post-intervention has the statistical meaning with $p<0.05$ and the intervention effect is 42.6%.

The rate of women who improve their water sources and examine at private medical units increases highly, the difference has the statistical meaning with $p<0.05$ and the intervention effect is high.

Our research result is similar to the research results of Cao Ba Loi (2013), Pham Thi Xanh (2014), Nguyen Minh Quang. The intervention solutions have improved knowledge and practical attitude of women at research area about reproductive tract infection control and prevention.

CONCLUSION AND PETITION

1. CONCLUSION

1.1. Current situation of reproductive tract fungus and unicellular infections among married women 18 – 49 years of age in Quang Yen town, Quang Ninh province in 2013:

- The rate of women in the study suffering from reproductive tract infections is 48.5%, and women suffering from cervicitis occupy the highest rate of 50.6%.

- The rate of women suffering from reproductive tract infections due to *Candida* sp is 29.1% and *T. vaginalis* is 5.3%.

- The rate of *C.glabrata* species is highest: 49.4%. The genetic order analysis of 3 *Candida* sp species is totally coincide with *Candida* sp species in the world: *C. glabrata*, *C. albicans*, *C. tropicalis*.

1.2. Several risky factors related to reproductive tract infections:

- The rate of *Candida sp* infections among women 36 – 49 years of age is higher than the left age group. The rate of *T.vaginalis* infections among women 18 – 35 years of age is higher.

- Women who use unhygienic water source, have not private bathroom, and clean genital organs improperly have risks for reproductive tract infections ($p < 0.05$).

- Women who abort 3 times and above and do not examine gynecologically in period have risks for reproductive tract infections 2.34 and 2.92 times as high as women who do not abort above 3 times and examine gynecologically in period.

1.3. Evaluation of treatment effect and health education for improving knowledge, attitudes and practice in reproductive tract infection prevention:

- The rate of women recovering after treating reproductive tract infections caused by *Candida* sp and *T. vaginalis* after 10 days is 94.8%.

- The rate of women knowing that abortion in many times is a reason of reproductive tract infections increases 21.1% to 91.1%.

- The rate of women knowing that using unhygienic domestic water source is a reason of reproductive tract infections increases from 60.0% to 94.4%.

- The rate of women who examine and treat at State medical units when suffering from reproductive tract infections increases from 47.8% to 83.5%.

- The rate of women who examine gynecologically in period increase from 6.7% to 67.5%.

2. PETITION

Basing on research results, we have several petitions as follows:

- Strengthening to propagandize and improve knowledge for women of reproductive age about reproductive tract infections, and reproductive tract infection prevention methods. Guiding faithful and safe sexual relations.

- Providing sufficiently clean water for domestic activities and reproductive health caring services for inhabitants in Quang Yen town.

- Increasing to identify pathogenic reasons by testing to have treatment methods with high effects.