MINISTRY OF EDUCATION AND TRAINING
THAI NGUYEN UNIVERSITY

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STUDY ON SOME EPIDEMIOLOGICAL CHARACTERISTICS OF LOWER REPRODUCTIVE TRACT INFECTION OF MOUNTAINOUS WOMEN IN THAI NGUYEN PROVINCE AND EFFECT OF INTERVENTION

Speciality: Social Hygiene and Health Administration

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THESIS SUMMARY

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INTRODUCTION

Reproductive tract infections (RTIs) is one of the most common disease of reproductive age women. This disease imposes negative impacts on reproductive health, working and quality of life of women. According to the World Health Organization (WHO), there are about 50% of reproductive age women have RTIs, mainly focus in developing countries. In Vietnam, the rate of RTI is relatively high, ranging from 40-80%, depend on research. Notably, this rate increased in rural areas as in Ha Nam low-lying rural (58.39%); Hai Duong delta rural (52.0%). In our country, RTIs prevention program has been implemented many years ago but the efficiency of the program is not high, especially in mountainous and remote areas. Rural women are at high risk of RTIs due to adverse factors about hygiene conditions, working conditions and living standards, ability for health services approach and knowledge, attitude and practices on RTIs prevention.

Thai Nguyen is mountainous and midland province, living standard of people is at moderate level; the reproductive health care still faces many difficulties. Thus, the rate of RTIs in women may high. Effective RTIs prevention solutions for rural women should be required. The question is: What is current situation of RTIs in mountainous reproductive age women? What are the risk factors of RTIs morbidity in reproductive women? What are the effective prevention solutions of RTIs in Thai Nguyen rural mountainous women? Based on these questions, we implement this project with the following objectives:

1. To describe some epidemiological characteristics of lower RTIs of mountainous married women at reproductive age in Thai Nguyen in 2012.

2. To determine factors of lower RTIs of mountainous married women at reproductive age in Thai Nguyen.

3. To evaluate the effect of RTIs prevention solutions for mountainous women in Thanh Cong commune, Pho Yen district, Thai Nguyen province after 2 years of intervention.

NEW CONTRIBUTIONS OF THE THESIS

1) Is a comprehensive study of RTIs for rural mountains women. Results showed that prevalence of RTIs was 35.4%; high RTIs prevalence focused on women aged 25-34; ethnic Tay, Kinh, Nung, Kinh; farmer women; poor women and women in low land areas of Thai Nguyen.

2) Has been identified 12 risk factors of RTIs in rural mountainous women in Thai Nguyen: Practice of RTIs prevention is not good; Unhygienic water; Knowledge of RTIs prevention is not good; do not have regular gynecological examination; Poor women; Do not get prevention counseling; Attitude of RTIs prevention is not good; Unhygienic bathroom; Farmer women; Kinh ethnic women; low education level women; women with more than two children.

3) *The community - based model on RTIs prevention for rural mountainous women in Thanh Cong commune, Pho Yen district, Thai Nguyen province* is accessible, practical and acceptable. The efficiency of models after 2 years of intervention: In intervention commune: the rate of good knowledge increased 66.0%, good attitude increased 28.0%, and good practice increased 43.0% ($p < 0.05$). The rate of women used hygienic bathroom and hygienic water in intervention commune increased 22.5% and 24.0%, respectively ($p <0.05$). After intervention, the satisfaction rate and and get counseling rate increased 22.5% and 43.0%; respectively, ($p <0.05$). Prevalence of RTIs in intervention commune decreased to 12.5%, compare with 35.5% before intervention ($p<0,05$). While in control commune, the changing is not significant.

STRUCTURE OF THESIS

The thesis is 114 pages, including: Introduction 02 pages; Chapter 1. Literature review: 26 pages; Chapter 2. Subjects and methods: 26 pages; Chapter 3. Study results: 35 pages; Chapter 4. Discussion: 22 pages; Conclusions: 02 pages, Recommendations: 01 pages.

The thesis results are presented in 25 tables, 12 images and 05 boxes. Thesis has 120 references, including 70 Vietnamese references and 50 English references.

KEY PARTS OF THESIS

Chapter 1. LITERATURE REVIEW

1.2. Epidemiological characteristics of RTIs in women

1.2.1. RTIs in reproductive age women worldwide. RTI is one of the most common disease in reproductive age women worldwide. According to WHO, there are about 50% of reproductive age women have RTIs, mainly focus in developing countries. The highest prevalence of RTIs are in the Africa countries, South Asia countries; this prevalence is lowest in European countries and North America.

1.2.2. RTIs in reproductive age women in Vietnam**.** Overall, the study in Vietnam report the rates of RTIs ranging from 40% to 80% depend on study setting, this is a demonstration for the necessary of more positive impact to reduce RTIs prevalence. Besides that, specific researches on RTIs for rural mountainous women still rarely mention.

1.3. Risk factors of reproductive tract infections in women

1.3.1. Health behavior of women. Previous study by Zhang X. J. et al (2009) showed that hygienic genitals behavior before having sex with husband is associated with RTIs (OR = 1.021; 95% CI: 1.005 to 1.037), the same with other studies... Some studies in Vietnam also reported that the main risk factors of RTIs are culture, hygienic

genital habit, women hygiene is not scientific, lack of RTIs knowledge: Lam Duc Tam (2011), Can Thi Hai Ha (2014)...

1.3.2. Environmental and social factors. The hygienic conditions such as clean water, bathrooms, are related to RTIs. Study of Zhang X. J. et al (2009), Jespers et al (2014) showed these risk factors. In Vietnam, study of Nguyen Trong Bai and Vo Van Thang (2009), Do Mai Hoa (2009), Pham Thu Xanh (2014) all reported that using unhygienic water or unhygienic, private bathroom are increased the risk of RTIs.

1.3.3. Health care system factors. Study in 07 different ecological regions of country showed that RTIs counseling is conducted on 14/24 health care facilities but only 10/14 health care facilities have ability for RTIs diagnosis and treatment. Family planning/ reproductive health (RH) care services is organized as the campaign, instead of regularly held at CHS which organized the campaign; which is affected to health care services approach of women in the community.

1.3.4. Demographic and other factors. Including demographic factors such as age, occupation, education level...; and obstetric factors such as number of delivery, or a history of abortion, history of RTIs... are closely associated to RTIs...

1.4. Reproductive tract infections prevention models

1.4.1. Some reproductive tract infections models in the world

1) Study of Aggarwal A. K et al (2004), conducted by health education in the community about RTIs and HIV/AIDS prevention, have significantly improved knowledge and health care services approach after intervention.

2) Study of Esere M. O (2008) by reproductive health education in schools has significantly improved knowledge, attitudes about and improved health risk behaviors in the intervention group.

1.4.3. Community - based model for health education in Vietnam

1) Mobilizing village teachers in the community participate in reproductive health care models by Dam Khai Hoan et al (2003) was conducted by reproductive health communication for communities through students and their parents. The changing results after intervention is remarkable on reproductive health indicators.

2) Sexual transmitted infections prevention model for workers in some factories. After 01 years of intervention, the result shows a remarkable change in knowledge, attitudes and practices of RTIs prevention.

Chapter 2. SUBJECTS AND METHODS

2.1. Subjects, setting and duration of study

2.1.1. Study subjects: Rural mountainous and married women in reproductive age (15-49 years old); Staffs of district preventive medicine centers, staffs of CHSs, village health workers, population collaborators; Leaders of governments, agencies and organizations in villages and communes and.

2.1.2. Study settings: Rural areas of 03 mountainous districts: Dong Hy (Van Lang and Linh Son commune), Pho Yen (Thanh Cong - intervention and Phuc Thuan - control commune) and Vo Nhai (Lau Thuong and Phu Thuong commune) in Thai Nguyen province.

2.1.3. Study duration: from January 2012 to December 30th 2014.

2.2. Methodology

2.2.1. Study design: Designed as Explanation sequential design model. The quantitative study design includes 03 epidemiologic studies: Cross-sectional study, case control study and community intervention with controll group.

2.2.2. Sample, and study sampling for quantitative study

2.2.2.1. Sampling for cross-sectional study. Estimating a population proportion with specific absolute precision formula, where p = 0.465 (RTIs prevalence in An Lao, Hai Phong), d = 0.04, calculate, rounded up n = 1200 (400 for each district).

* *Laboratory sample.* Select the RTIs subjects by clinical examination screening for gynecological exams, Pap tests and dye discharge, vaginal pH test, *Chlamydia* test.

2.2.2.2. Sampling for case control study. Use case control sample formula with the rate of married women 18-49 years old in the island areas, who does not have the bathroom in RTIs group accounted for 48.47% (p_1 = 0.4847) and p_0 = 0.40 in previous study. Substituting, rounded up n = 400. Select case/control group according to ratio 1: 1, 400 women for each group. This is match case control study with the match are age and village.

2.2.2.3. Sampling for intervention study

* *Sample size:* Use community intervention sample formula with p_1 is good RTIs prevention practices according to the results of previous study: 30%. p_2: the rate desire to achieve, is expected to be 70%. Substituting these number, rounded up n = 200.

* *Sampling method:* simple random sampling method.

2.2.3. Qualitative sampling method

- In-depth interview subject: The director of district health center; secretary of reproductive health care program in CHS and in district health center.

- Group discussion: (i) Group discussion with leaders of the Labor party committee, People's Committee, head of departments and heads CHS in three communes of 3 districts (3 group discussions); (ii) 3 group discussions with representatives of village leaders, village health workers and population cooperation staffs; (iii) 3 group discussions with representatives of the RTIs women.

2.3. Community intervention

2.3.2. Community - based model intervention

Model title: *Mobilizing community - based model on RTIs prevention for rural women in Thanh Cong commune, Pho Yen district, Thai Nguyen province*

Model developing process

1) Developing model resources: Establish the board of administrator and its tasks; training for board/committee's members; Building facilities.

2) Implementing community intervention activities: CHS strengthen the patient management, treatment and monitoring the communication activities in the commune. Coordination with community sectors and organizations to do health education communication about RTIs and environment sanitation.

3) Post- intervention evaluation: Evaluate the education intervention indicators, management indicators and effectiveness of model.

2.4. Study indicators

2.4.1. Classify study variables

* *Variables related to RTIs epidemiology:* Prevalence of RTIs women; RTIs among age groups...

* *Variables related to risk of RTIs:* Age, education level, ethnic, average income...

* *Variables related to community intervention*

- Inpute indicators: Training workshop resuts, Number of facilities and equipment were used, Budget...

- The activity indicators: Number of organizations and participants participate in the model; number of sessions, the content of communication; number RTIs patients management at CHS...

- Output: Knowledge, attitude and practice, level of satisfaction in healthcare service, counseling at CHS. Water, bathroom. Number of RTIs women.

2.5. Data collection

2.5.1. Quantitative data. Face to face interview woman aged from 18 to 49 at household, integrate with direct observation living conditions, housing, and other sanitation such as water wells, bathrooms of households. At CHS: implement clinical examination for RTIs disease screening and laboratory test (pap tests, dye the discharge, check pH vaginal, *Chlamydia* test) for women.

2.5.2. Qualitative data. In-depth inteview, group discussion with individuals and related groups.

2.6. Data alnalysis. Data entry by Epidata 3.1 program; data analysis by SPSS 19.0 program follow medical biostatistics. Evaluate the intervention results based on efficiency index (EI) and intervention effect (IE).

2.7. Ethical approval. This is a field trials study; this study does not affect human health and environment, it has received the acceptance of the community. This study has also been approved by the Science council of Thai Nguyen University of Medicine and Pharmacy.

Chapter 3. STUDY RESULTS

3.1. Epidemiological of reproductive tract infections women at rural mountainous area Thai Nguyen

3.1.1. RTIs prevalence. The pravelence of RTIs women at study setting is relatively high (35.5%). The first leading cause of this disease are complex bacteria infaction (43.3%); followed by *Candida* infection 28.0% and lowest was *Trichomoniasis* (11.5%.)

3.1.2. RTIs distribution

- By age groups: RTIs prevalence of the age group 25-34 was highest (43.6%); 35-49 years old (33.2%) and lowest at age ≤ 24 (20.8%).

- By education level: Prevalence of RTIs in women with primary school education level or lower was highest (43.2%), followed by women at secondary school education level (32.2%) and lowest in women with high school education level or higher (16.2%).

- By ethnic groups: Prevalence of RTIs women among Nung ethnic was 40.2%, followed by Kinh with 39.2%; Dao women or other ethnic minorities groups were 17.7%.

- By occupation, economic conditions: Farmers women have RTIs disease at 41.1%; higher than women in other occupations (25.0%); poor women have RTIs at 61.8%, higher than sufficient economic women (31.5%).

- By family size and living area: women with more than 2 children have RTIs prevalence at 65.6%, higher than women have 2 children or less (25.4%). The prevalence of RTIs in mindland mountainous region was highest (50.3%) and lowest in the high mountainous region was (21.8%).

Qualitative results: By group discussion and in-depth interviews with 99 participants (in all 3 districts), we obtained the main information as follows:

- RTIs disease is common in rural mountainous women in Thai Nguyen 93/99 comment (box 3.1).

- Although this disease is not high mortality rate but affect to the health and married life 81/99 comment, some typically comments is shown in box 3.1.

- RTIs appear long time ago but have slow decreasing trend; 74/99 comment, typically, have some comments in box 3.1

Box 3.1. Real situation of RTIs now a day

"...Many women has this disease in my area; most of them don't take examination and treatment. I wonder why to much women got this disease? In genneral, women who have this disease alway are shy and afraid of talk to others..."

Nguyen Thi T, Phuc Thuan Community, Pho Yen district

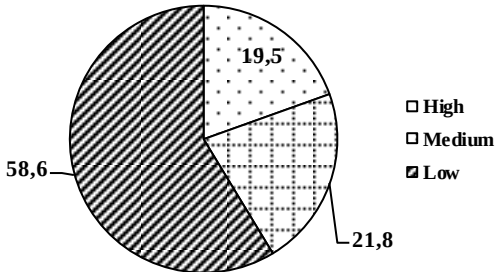
"...It's difficult to die immediately if got RTIs but this is annoying disease, affects to women's health, affects to sex activity; to sex partners. Uncomfotable in sex activity lead to unhappines ...".

Secretary of RTIs program, Pho Yen district health center

3.2. Factors related to RTIs

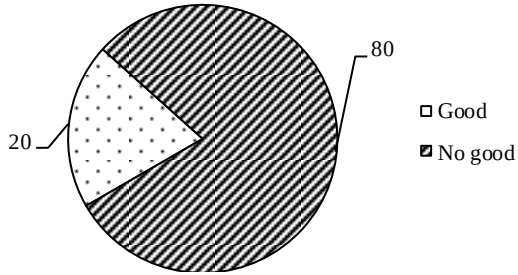
3.2.1. Factors affect the RTIs disease

Image 3.3. Figure for classification level of knowledge in reproductive tract infections prevention



RTIs knowledge of women is not good: knowledge at good level was low (19.5%), low level was high (58.6%).

Image 3.4. Figure for classification level of attitudes about reproductive tract infections prevention



Good RTIs prevention attitude was relatively high (60.5%) and not good attitude was 39.5%.

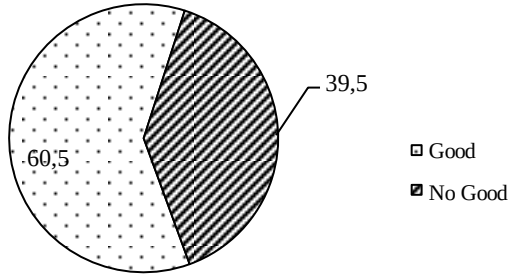


Image 3.5. Figure for classification of practice level on reproductive tract infections prevention

The rate of women with good RTIs prevention practices level was 20% and not good prevention practice was 80.0%.

Table 3.10. The rate of women get counseling and sastisfaction with the quality of RTIs healthcare services at CHS

Services		**n**	**%**
Number of women ever had gynecological examination at CHS		710	59.2
Number of women satisfy with RTIs healthcare sevices at CHS		511	72.0
Number of women get prevention counseling when do gynecological examination at CHS		370	52.1
Service quality (n=710)	Good (satisfied & and get counseling)	395	55.6
	No Good (remaing number)	315	44.4

The rate of women who ever go to CHS gynecological examination was 59.2% with the rate of not satisfaction was high (72.0%). The rate of women get RTIs counseling at CHS was 52.1% with 55.6% of total satisfied with quality of sevices.

3.2. Some risk factors of reproductive tract infections

- Women have primary education level or less had higher risk of RTIs than women have secondary education level and above with the odds ratio OR = 1.6 (95% CI: 1.2 - 2,1).

- Kinh women had high risk of RTIs than minorities with odds ratio OR = 1.7 (95% CI: 1.3 to 2.3).

- Farmer women had 2.2 times (95% CI: 1.6 to 3.0) times the odds of developing RTIs rather than other occupation women.

- Women in poor household had 4.6 times the odds of developing RTIs related to sufficient economy household with 95% CI: 2.8 to 7.5.

- Mothers have many children had higher risk of RTIs than mothers have 2 children or less with odds ratio OR = 1.5 (95% CI: 1.1 to 2.1)

- Women have not good knowledge had 6.2 times higher risk of RTIs than women have good knowledge (95% CI: 4.1 to 9.3).

- Women have not good attitude had higher risk than women have good attitude 3.2 times (95% CI: 2.4 to 4.4).

- Women have not good practice had higher risk than women have good practice 10.5 times (95% CI: 6.7 to 16.5).

- Women get consulting had 3.3 times higher risk of RTIs than women who get counseling (95% CI: 2.4 to 4.5).

- Women using unhygienic water had 6.3 times higher risk of RTIs than women used hygienic water (95% CI: 4.4 to 9.0).

- Women use unhygienic bathroom had 2.5 times higher risk than women use hygienic bathrooms (95% CI: 1.9 to 3.4).

- Women have regular gynecological examinations had 5.2 times high risk of RTIs than women do not have regular gynecological examinations (95% CI: 3.7 to 7.4).

Qualitative results about risk factors of RTIs.

By group discussions and in-depth interview about the risk factors of RTIs, we obtained the following comments:

- The leading risk factor of RTIs in Thai Nguyen rural mountainous women is prevention behaviors was not good (79/91 comments), typically some comments in box 3.2.

- The following risk factors of RTIs in Thai Nguyen rural mountainous women is disease prevention at the local level was not good (70/99 comments), typically have some comments in box 3.3.

- RTIs risk factors in Thai Nguyen rural mountainous women is living environment of local women was not good (65/99 comments), typically some comments in box 3.4.

Box 3.2. Reproductive tract infection prevention behaviors of women is not good

> *"... I think I got RTIs because my prevention behaviors are not good; lack of knowledge; attitude and practice of RTIs prevention lead to higher risk of RTIs in women... "*
>
> (Mrs. Tran Thi H., Pho Yen district)

Box 3.3. Reproductive tract infection prevention program at local level

> *"... In my opinion, CHS staffs and village health workers is not fully promote their role in disease detecting, prevention counseling in the RTIs prevention program, gynecological examination for RTI patients was not effective…".*
>
> Secretary RH program, Dong Hy district health centers

3.3. Intervention results

3.3.1. Developing the intervention plan

3.3.1.1. Developing the community - based model for reproductive tract infection prevention

**Step 1. Analyze the issues:* Cross-sectional study results: The prevalence of RTIs patients in rural women in Thai Nguyen province was 35.4%. RTIs knowledge, attitudes, practice prevention of rural women in Thai Nguyen was not good.

**Step 2: Causing analysis of priority issue and gather information for community intervention planning: results of attitude exploration at table 3.15:*

Table 3.15. Women attitude with some proposed solutions to prevent reproductive tract infections

Attitude	Percentage (%)				
	1	**2**	**3**	**4**	**5**
Health workers or women organizations invited women to participate in RTIs prevention activities in the community	9.6	54.4	26.0	5.4	
Develop RTIs prevention club for rural women at villages to share knowledge and help each other for disease preventing	1.0	9.3	63.8	17.8	
Invitation to participate in RTIs prevention club in the community	0.9	8.2	70.9	15.8	
Health workers or women invited to attend the RTIs prevention communication in the community	19.5	64.0	13.8	3.8	
Proposed to share RTIs prevention to relatives and neighbors	10.1	36.4	37.1	8.1	

Notes: 1. Strongly support 2. Support 3. No idea

4. Objection 5. Extremely objections

Using planning based community: Provide evidence, information; then discuss, analysis with the community to select priority issues for intervention. We obtained the following comments through local group discussions:

- To address RTIs prevention behaviors for rural mountainous women, enhance communication is the leading solution. (60/62 comments).

- To better RTIs prevention implementation: the preferred solution is to improve the capacity of village health workers, CHS staffs about professional skills and disease prevention health education communication skills (58/62 comments).

- Unhygienic water and bathrooms lead to high risk of RTIs, therefore, improve this problem is necessary.

The main solutions for cummunity intervention as follow:

1. Solution 1. Communication: Building a community - based model for RTIs prevention communications with the core is women's association in Thanh Cong commune; integrate with hygienic sanitation communication.

2. Solution 2. Enhance the capacity of RTIs prevention in Thanh Cong commune: Focus on improving the capacity of disease treatment, management and prevention communication.

** Step 4: Identify the solutions and specific activities*

1) Communication: (i) Communication based on Commune women association - village women associations - women and families; (ii) - Communications through village meetings; (iii) indirect communications through loudspeakers from the commune to the villages.

2) Enhance the capacity for health workers, women association staffs at both commune and village levels

- Open training courses for health workers communal, social workers women skills to detect disease clinical examination, treatment regimens, disease management approach.

- Open training courses about health education communication skills for CHS staffs in disease prevention, particularly counseling skills.

- Open training courses for village health workers / population cooperation staffs and village women association chairman about the

methods, skills of health education and the content of RTIs prevention and health management at household.

- Open training courses for village health workers / population cooperation staffs and village women association chairman about the methods, skills of health education about hygiene sanitation.

- Open training courses for heads of mass organizations in commune about hygiene sanitation (water, toilet, bathroom).

** Step 5: Develop check list tool for supervising / monitoring and evaluating to measure the output of interventions*

3.3.1.2. Implementation Plan intervention model

* Develop resources for model: Has established Steering Committee and active preventive as planned.

* Training of members of pattern: According to the tasks assigned in the model study.

Table 3.16. The capacity improving results for health staff participate in the RTIs prevention model before and after training workshop

Skill	Before		After		p (test χ^2)
	n	%	n	%	
Health education communication skills of board of administrator					
Good	5	33.3	12	80.	<0.05
Moderate	10	67.7	3	20.	
Low	0				
RTIs treatment management of CHS staffs and village health workers					
Good	5	16.7	24	80.	<0.05
Moderate	15	50.	6	20.	

Low	10	33.3	0		
RTIs health education communication skills of CHS staffs and village health workers					
Good	10	28.6	28	80.	<0.05
Moderate	8	22.9	5	14.3	
Low	17	48.5	2	5.7	
RTIs health education communication skills of commune and villages women union staffs					
Good	0		19	63.3	<0.05
Moderate	10	33.3	7	23.4	
Low	20	67.7	4	13.3	

There is a remarkable change after training by the increase of good skill rate, and decrease of low skill rate: Health education communication skills of board of administrator. RTIs treatment management of CHS staffs and village health workers. RTIs health education communication skills of CHS staffs and village health workers. RTIs health education communication skills of commune and villages women union staffs.

* Facilities/equipment for model: includes 50 RTIs prevention books for women, 50 books on hygienic sanitation, 50 books on communication skills and 1.000 leaflets relating to communication.

* Budget: mobilize 20 million VNĐ to spend for performing research model. Other remaining activities are cooperation activities, no fund activities.

3.3.1.3. Implementation of community interventions

Stick to intervention plan. Close monitoring using checklists.

3.3.2. The effect of intervention solutions

Table 3.23. Comparison the change of knowledg, attitude, practice of women bout RTIs prevention in two study communes

KAP	Period	Before intervention (n = 200)		After intervention (n = 200)		Difference (%)	p
		n	%	n	%		
Good knowledge	Intervention commune	39	19.5	171	85.5	66.0	< 0.05
	Control commune	39	19.5	47	23.5	4.0	> 0.05
Good attitude	Intervention commune	136	68.0	192	96.0	28.0	< 0.05
	Control commune	131	65.5	142	71.0	5.5	> 0.05
Good practice	Intervention commune	41	20.5	127	63.5	43.0	< 0.05
	Control commune	39	19.5	43	21.5	2.0	> 0.05

After intervention, the good knowledge extra increased 66.0%, good attitude extra increased 28.0%, and good practice extra increased 43.0%, statistically significant, in the intervention commune. While in the control commune, knowledge, attitude and practice of women also extra increased 4.0%; 5.5% and 2.0%, respectively, no statistically significant.

Table 3.24. The comparison of intervention effect (IE) with knowledge, attitude and practice

Effect of KAP	Efficiency index (%)		IE (%)
	Intervention commune	Control commune	
Knowledge	338.5	20.5	317.9
Attitude	41.2	8.4	32.8
Practice	209.8	10.3	199.5

Intervention effect for RTIs prevention knowledge in rural mountainous women was 317.9%, for attitude was 32.8% and practice was 199.5%.

Table 3.27. Effect of intervention with hygienic prevention conditions for reproductive tract infections

Effect of disease prevention	Efficiency index (%)		IE (%)
	Intervention commune	Control commune	
Water			
Hygienic	31.3	11.3	20.0
Unygienic	80.4	27.6	52.8
Bathroom			
Hygienic	55.8	14.6	41.2
Unygienic	42.1	11.7	30.4

Intervention effect with hygienic water was 20.0% and hygienic bathroom was 41.2%.

Table 3.30. Effect of intervention with the quality of RTIs healthcare service in two study communes

Effect of disease prevention	Efficiency index (%)		IE (%)
	Intervention commune	Control commune	
Number of satisfaction women when go for gynecological examination in CHS			
Yes	31.3	9.4	21.9
No	80.4	21.3	59.0
Number of women get RTIs prevention counseling			
Yes	77.5	12.2	65.3
No	96.6	16.5	80.2

The intervention solutions had efficiency with satisfaction when go for gynecological examination and get counseling were 21.9% and 65.3%, respectively.

Table 3.31. The change of reproductive tract infections in women of two study communes

Period Commune	Before intervention (n = 200)		After intervention (n = 200)		Difference (%)	Efficiency index
	n	%	n	%		
Intervention commune	71	35.5	25	12.5	-23	64.8
Control commune	69	34.5	61	30.5	-4	11.6
p, IE	$p_{intervention} < 0.05$; $p_{control} > 0.05$; IE = 53.2					

After intervention, the RTI prevalence of women in intervention commune was decreased when compare with this prevalence before the intervention (12.5% versus 35.5%, with

statistical significance); while this prevalence in control commune also decreased from 34.5% to 30.5%; no statistically significant. The intervention solutions had IE 53.2%.

Qualitative results. In Thanh Cong commune, we conducted group discussions and in-depth interviews of 34 subjects about the effectiveness of community intervention models, we have obtained main comments as follows: After intervention, women in the commune have good knowledge about the disease, know how to keep personal hygiene and disease prevention (31/34 comments). The intervention model are accessible for implementation, suitable with community needs, therefore, it is strongly supported by people in the commune, especially women and youth (29/34 comments). The ability to maintain research models is unity because the accessible, suitable, inexpensive (32/34 comments).

Chapter 4. DISCUSSION

4.1. Epidemiological characteristics of RTIs of mountainous married women at reproductive age in Thai Nguyen province

4.1.1. The prevalence of disease: Results showed that prevalence of RTIs was 35.4%. The result is not high when compare with other results, which are mostly higher than our results. Study of Tran Thi Duc and Cao Ngoc Thanh (2006) in Tho Xuan district, Thanh Hoa report RTIs prevalence 47.92%, Le Thanh Son and Tran Thi Trung Chien in Ha Tay (2005) is 64.45%... Our result is basically lower when compare with other studies, where study settings mainly locate in the flat, urban areas, while our study setting in mountainous area.

4.2. Factors related to reproductive tract infections

4.2.1. Knowledge, attitude and practice (KAP) of reproductive tract infections prevention factors of study subjects

4.2.1.1. RTIs prevention knowledge of study subjects. The study results showed women who have general knowledge about RTIs prevention at good level accounted for 19.5%, mostly have poor knowledge level (58.6%). This result is lower than study results of Tran Trong Nghia (2011); Luu Thi Kim Thanh (2012); Nguyen Van Hoc (2009) and Nguyen Thi Kim Hoa (2010).

4.2.1.2. RTIs prevention attitude of study subjects. Our good attitude results were relatively high (60.5%), which is comparable to the results of Nguyen Duy Anh (2009), but higher than the result of Nguyen Van Hoc (2011) with the rate of good attitude in women attitude is 38,2%. Good RTIs prevention attitude is one of the positive factors for implementing RTIs prevention behaviors.

4.2.1.3. RTI prevention practice of study subjects. The rate of women with general practice about RTIs prevention at good level accounted for 20.0%, which is slightly lower than the results of Luu Thi Kim Thanh (2012): 24.0%, Tran Thi Lai (2011) 25.7%, Nguyen Duy Anh (2009) 26.9%. Most of women in our study stay in rural mountainous areas, are farmers and have education level at primary school or lower; these reasons lead to lower good practice level when compare with other studies.

4.2.2. Risk factors of reproductive tract infections

KAP of disease prevention are related to disease. Women with not good KAP had 6.2 times (95% CI: 4.1 to 9.3); 3.2 times (95% CI: 2.4 to 4.4) and 10.5 times (95% CI: 6.7 to 16.5) the odds of developing RTIs, related to remaining women group. Study of Lam Duc Tam, Nguyen Thi Hue (2011) in Can Tho, Dinh Thanh Hue, Le Van Te (2004) in Quang Binh also performed conclusions about the association between KAP prevention with RTIs.

4.3. Effect of intervention. We have developed community - based model for RTIs prevention with the core is women union in Thanh Cong commune, Pho Yen district, Thai Nguyen province. Results obtained from solutions which were applied in our study model are high efficiency. After the intervention, all intervention solutions in research model have enhanced the RTI prevention behaviors of women, improved the quality and health care services accessibility, as well as lower RTIs rates study setting. This is the evidence for the managers, policy makers and local refer, apply, lead to contribute for improving the quality of reproductive health care for women. Acceptable evaluation of intervention model in local community: the intervention model is acceptable in the commune. We received the unity of commune leaders, CHS staffs, commune unions and organizations… and reproductive age women themselves by in-depth

interviews and group discussions. They declared that when participating in the program, they received the practical effect by the enhancing of RTIs prevention knowledge, practice. Besides that, the suitable, accessible and non costly model were motivated the positive participating of community, especially women.

CONCLUSIONS

1) Epidemiology of reproductive tract infections in rural mountains married women at reproductive age: RTIs prevalence of rural mountains married women at reproductive age in Thai Nguyen is 35.4%. The disease classification: RTIs prevalence was highest in women at aged 25-34 (43.6%); Tay, Kinh, Nung women had high prevalence of disease (38-41%), farmer women also had high prevalence of disease (41.1%). Women in poor households have higher prevalence of disease. Women in the lowland region of Thai Nguyen had highest RTIs prevalence (50.3%), lowest in the highland region (21.8%).

2) Some risk factors of reproductive tract infections in rural mountainous married women in Thai Nguyen: has been identified 12 risk factors as follows: (1) Practice of RTIs prevention is not good (OR = 10.5, 95% CI: 6.7 to 16.5), (2) Unhygienic water use (OR = 6.3, 95% CI: 4.4 to 9.0), (3) Knowledge of RTIs prevention is not good (OR = 6.2, 95% CI: 4.1 to 9.3), (4) do not have regular gynecological examination (OR = 5.2, 95 % CI: 3.7 to 7.4), (5) Poor women, (6) Do not get prevention counseling (OR = 3.3, 95% CI: 2.4 to 4.5), (7) Attitude of RTIs prevention is not good, (8) Unhygienic bathroom, (9) Farmer women, (10) Kinh ethnic women (11) low education level women, (12) Women with more than two children. These risk factors are discussed by community to determine the priorities and developing intervention solutions.

3) Effect of RTIs prevention solutions for mountainous women in Thanh Cong commune, Pho Yen district, Thai Nguyen province after 2 years of intervention:

- Effect of intervention about knowledge, attitude, practices of disease prevention in rural women are: knowledge 317.9%, attitude 32.8%, practice 199.5%.

- Effect of intervention about hygienic water use is 20.0% and hygienic bathroom is 41.2%.

- Effect of intervention for quality of RTIs healthcare services including: satisfaction rate of gynecological examination women is 21.9%, RTIs prevention counseling is 65.3%.

- Prevalence of RTIs in intervention commune decreased to 12.5%, compare with 35.5% before intervention ($p<0,05$), intervention effect 53.2%.

- The community intervention solution for RTI prevention in Thanh Cong commune are accessible, non costly, get the people's unity and willing to maintain.

RECOMMENDATIONS

1) Pho Yen district health center and Thai Nguyen health bureau should continue to strengthen the communication and health education about RTIs, to provide reproductive healthcare knowledge, especially the knowledge, attitudes, practice about women hygiene, menstrual hygiene and clean after sexual intercourse with husband, regular gynecological examination to early detect disease for reproductive age women.

2) For local governments in Thai Nguyen: promote the implementation of new rural program, noting to improve hygienic facilities such as hygienic water and hygienic bathrooms. Then improve the living condition, health care conditions, effective implementation the RTIs prevention solution and continue to develop model.

3) The intervention solutions and community - based model for RTIs prevention communication for rural women in Thanh Cong commune, Pho Yen district, Thai Nguyen province had high efficiency. Local government, district health center, Thai Nguyen health bureau and policy makers should conduct practical solutions to replicate the model, especially in rural mountainous areas; thereby improving the quality of reproductive health care for mountainous women.

LIST OF REPORTED PUBLICATIONS RELATED TO THESIS

1. **Nong Thi Thu Trang, Dam Khai Hoan, Nguyen Duc Hinh (2015),** "Epidemiology of reproductive tract infection in rural mountainous women in Thai Nguyen province", *Vietnam Journal of Practical Medicine,* vol. 950, pp. 64-66.
2. **Nong Thi Thu Trang, Dam Khai Hoan, Nguyen Duc Hinh (2015),** "Knowledge, attitude, practice of reproductive tract infections prevention in rural mountainous married women at reproductive age in Thai Nguyen province", *Vietnam Journal of Practical Medicine,* vol. 950, pp. 103-105.
3. **Nong Thi Thu Trang, Dam Khai Hoan, Nguyen Duc Hinh (2015),** " Effectiveness of reproductive tract infections prevention solutions in rural women in Thanh Cong commune, Pho Yen district, Thai Nguyen province after 2 years of intervention", *Vietnam Journal of Practical Medicine,* vol. 953, pp. 92-94.
4. **Nong Thi Thu Trang, Dam Khai Hoan, Nguyen Duc Hinh (2015),** "Some risk factors of reproductive tract infections in rural mountainous married women at reproductive age in Thai Nguyen province", *Vietnam Journal of Practical Medicine*, vol. 954, pp. 48-51.