EFFECTIVENESS OF HEALTH POLICY IN SOUTH KOREA REGARDING THE PREVENTION OF LIVER FLUKE INFECTION : COMPARATIVE STUDY OF SOUTH KOREA AND THAILAND

Miss Sidawadi Pulsiriwit

A Thesis Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Arts Program in Korean Studies
(Interdisciplinary Program)
Graduate School
Chulalongkorn University
Academic Year 2015

ประสิทธิผลของนโยบายสุขภาพเกี่ยวกับการป้องกันการระบาดของโรคพยาธิใบไม้ในตับที่ได้รับมาจากอาหาร : กรณีศึกษาเปรียบเทียบระหว่างเกาหลีใต้และไทย

นางสาวศิดาวดี พูลศิริวิทย์

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาศิลปศาสตรมหาบัณฑิต
สาขาวิชาเกาหลีศึกษา (สหสาขาวิชา)
บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย
ปีการศึกษา 2558

Thesis Title	EFFECTIVENESS OF HEALTH POLICY IN SOUTH KOREA REGARDING THE PREVENTION OF LIVER FLUKE INFECTION : COMPARATIVE STUDY OF SOUTH KOREA AND THAILAND
By	Miss Sidawadi Pulsiriwit
Field of Study	Korean Studies
Thesis Advisor	Assistant Professor Pataporn Sukontamarn, Ph.D.

Accepted by the Graduate School, Chulalongkorn University in Partial Fulfillment of the Requirements for the Master's Degree

.....Dean of the Graduate School

(Associate Professor Sunait Chutintaranond, Ph.D.)

THESIS COMMITTEE

.....Chairman

(Associate Professor Buddhagarn Rutchatorn, Ph.D.)

.....Thesis Advisor

(Assistant Professor Pataporn Sukontamarn, Ph.D.)

.....Examiner

(Associate Professor Ki Soo Eun, Ph.D.)

.....External Examiner

(Assistant Professor Nithi Nuangjamnong, Ph.D.)

ศิดาวดี พูลศิริวิทย์ : ประสิทธิผลของนโยบายสุขภาพเกี่ยวกับการป้องกันการระบาดของโรคพยาธิใบไม้ในตับที่ได้รับมาจากอาหาร : กรณีศึกษาเปรียบเทียบระหว่างเกาหลีใต้และไทย (EFFECTIVENESS OF HEALTH POLICY IN SOUTH KOREA REGARDING THE PREVENTION OF LIVER FLUKE INFECTION : COMPARATIVE STUDY OF SOUTH KOREA AND THAILAND) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: ผศ. ดร. ปัทพร สุคนธมาน, 153 หน้า.

โรคพยาธิใบไม้ที่ได้รับมาจากอาหารยังคงเป็นปัญหาในหลายๆ ประเทศทั่วโลก ในประเทศเกาหลีใต้ ถึงแม้ว่าการระบาดของโรคพยาธิต่างๆ โดยทั่วไปจะลดลง แต่ความพยายามของรัฐบาลที่จะควบคุมการระบาดของพยาธิใบไม้ตับที่ได้รับมาจากอาหารกลับไม่ประสบความสำเร็จเท่าที่ควร และยังคงมีการระบาดตามหมู่บ้านหรือชุมชนในพื้นที่ใกล้แม่น้ำซึ่งถือว่าเป็นพื้นที่ที่เป็นแหล่งระบาดของประเทศ ในขณะที่ประเทศไทย การระบาดของพยาธิใบไม้ตับที่ได้รับมากจากอาหารยังคงมีอย่างชุกชุมในแถบภาคเหนือและภาคอีสาน และยังถือเป็นปัญหาสุขภาพหลักของคนในพื้นที่เนื่องจากก่อให้เกิดโรคมะเร็งและนำไปสู่การเสียชีวิต ซึ่งทั้งสองประเทศได้มีมาตรการในการจัดการกับการติดเชื้อของพยาธิใบไม้ตับ แต่สถิติการระบาดของโรคกลับไม่ลดลงอย่างต่อเนื่องและยังมีรายงานของผู้ติดเชื้อ ด้วยสาเหตุนี้ นโยบายและมาตรการที่ทั้งสองรัฐบาลใช้จึงควรได้รับการศึกษา ดังนั้นงานวิจัยฉบับนี้จึงได้ถูกทำขึ้นเพื่อศึกษาประสิทธิภาพของนโยบายด้านสุขภาพและมาตรการต่อการป้องกันและควบคุมโรคพยาธิใบไม้ตับของทั้งสองประเทศ รวมทั้งปัจจัยที่มีผลต่อการดำเนินการ และนำมาเปรียบเทียบ

สาขาวิชา เกาหลีศึกษา ลายมือชื่อนิสิต .....

ปีการศึกษา 2558 ลายมือชื่อ อ.ที่ปรึกษาหลัก .....

5687661120 : MAJOR KOREAN STUDIES
KEYWORDS: EFFECTIVENESS OF LIVER FLUKE INFECTION POLICY, FACTORS, COMPARISON, THAILAND, SOUTH KOREA

SIDAWADI PULSIRIWIT: EFFECTIVENESS OF HEALTH POLICY IN SOUTH KOREA REGARDING THE PREVENTION OF LIVER FLUKE INFECTION : COMPARATIVE STUDY OF SOUTH KOREA AND THAILAND. ADVISOR: ASST. PROF. PATAPORN SUKONTAMARN, Ph.D., 153 pp.

Foodborne Trematodiases still attacks in many poor and developing countries globally. In South Korea, although the overall parasitic infection rate has been reduced significantly, the South Korean government's effort of controlling Clonorchiasis do not seem to have been successful since Clonorchiasis still remains prevalent along the riverside areas. In Thailand also, the Opisthorchiasis is still being actively transmitted in northern and northeastern regions and considered a significant health problem since it contributes to the high mortality rate among northerners and northeasterners. Both of countries governments have been implementing national control measures. But since the prevalence has still not been sustainably reduced and cases of reinfection are commonplace, the effectiveness of the policy and strategies implemented by these two countries is still questionable. Thus, this study has assessed the health policy and strategy, focusing on its effectiveness as well as the factors influencing its outcome, then the cases of two countries compared.

Field of Study: Korean Studies Student's Signature .....

Academic Year: 2015 Advisor's Signature .....

ACKNOWLEDGEMENTS

It is a pleasure to thank those who made this thesis possible. Firstly, I would like thank my thesis advisor, Asst. Prof. Pataporn Sukontamarn, Ph.D., for her consideration, encouragement, and excellent guidance in every step of my thesis. It would not have been possible without her great supports.

Next, I would like to extend my appreciation to my thesis committee, Assoc. Prof. Buddhagarn Rutchatorn, Ph.D. who is the chairman and Asst. Prof. Nithi Nuangjamnong, Ph.D. for their valuable advice and comments enabling me to complete this thesis.

I also would like to thank the Korean Studies program coordinator, Miss Nongluck Boonthiem for all of her supports and consideration as well as my friends in Batch 11, 12 and 13 for their encouragements throughout the hard times.

And my appreciation also goes to all interviewees and their organizations for their cooperation and the valuable information obtained from them. This thesis would have been incomplete if I did not get the support from them.

Lastly, I would like to send my love and thanks to my family and friends for their big supports and wonderful encouragement. Without them, I could not get through all hardship and complete this thesis.

CONTENTS

Page

Page

LIST OF TABLES

Page

LIST OF FIGURES

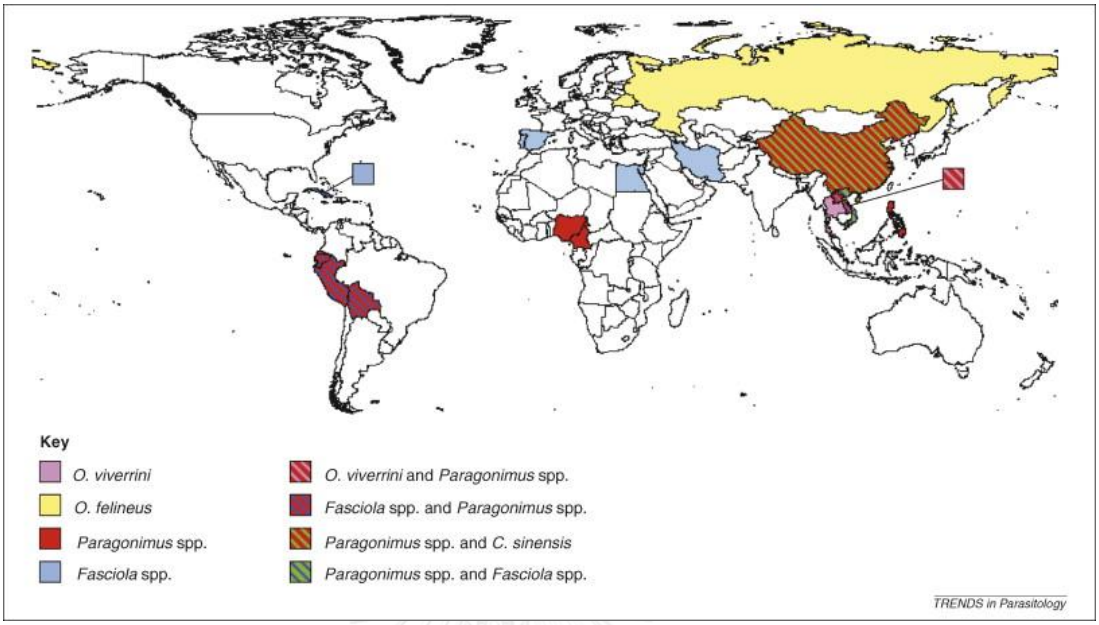
Page

CHAPTER I
INTRODUCTION

Public policy is a key instrument which is used to govern a country, and is a guideline for the operation of various governmental activities. Public policy can be categorized in many ways depending on the focus of scholars, but all such categories are common in terms of their huge impact on society. Public policy in the area of public health is also given great concern since it significantly affects the health of a population. The World Health Organization (WHO) defined health policy as a set of decisions or commitments to pursue courses of action aimed at achieving defined goals and targets for improving health (WHO 1999). The WHO's approach to public health policy 'puts health on the agenda of policymakers in all sectors and at all levels, directing them to be aware of the health consequences of their decisions and to accept their responsibilities for health' (Collins 2005). Hence, it's significant for governments to develop this kind of the policy to ensure the health of their nations. However, some health policies have not been operated successfully. There are cases when health policy did not seem to be effective. One example is a case of Foodborne Trematodiases (Trematode infections), which is still prevalent globally, and the governments of many countries still ignore its silent danger.

Foodborne Trematodiases, or Foodborne Trematode infections, are a group of parasitic infections caused by Trematodes, which are commonly known as Flatworms or Flukes, which are contracted by the ingestion of food contaminated with the larval stage of the parasites (WHO). It's also considered as an important group of Neglected Tropical Diseases or NTDs (Banchob Sripa, Sasithorn Kaewkes et al. 2010). Foodborne Trematodiases are comprised of liver flukes, lung flukes and intestinal flukes. Transmission is linked to humans through the , processing and preparation of the foods of any dishes containing raw fish, crustaceans and plants that harbor the parasite larvae, which are often components of the dietary tradition of many countries where the diseases are endemic. Even though the number of individuals who are affected by the diseases is difficult to calculate, the WHO states that at least 56 million people throughout the world have suffered from at least one Foodborne Trematodiases and the diseases are most prevalent in the East Asia and South America, even though medications are now available (WHO). The impact of these diseases is not only represented as a significant public health problem, but also in case of the economics by loss of livestock and aquaculture industries, as well as restrictions of exports and decreases in consumption demand.

Figure 1: Global distribution of major Foodborne Trematodiases.



Resource: (Jennifer Keiser and Utzinger 2007)

Table 1: Global estimated statistics of the population for the major Foodborne Trematodiases.

Food-borne trematodes	Species	Disease	At-risk population (millions)	People infected (millions)
Liver flukes	*Clonorchis sinensis*	Clonorchiasis	601	35
	Fasciola hepatica and *Fasciola gigantica*	Fascioliasis	91.1	2.4–17
	Opisthorchis viverrini	Opisthorchiasis	67.3	9.0
	Opisthorchis felineus	Opisthorchiasis	12.5	1.2
Lung flukes	*Paragonimus* spp.	Paragonimiasis	292.8[b]	20.7
Intestinal flukes	Numerous species	Intestinal fluke disease	ND	ND

a Source [13]. Abbreviation: ND, not determined.

b Ninety-five million of these people reside in China.

Resource: (Jennifer Keiser and Utzinger 2007)

Due to the polyphyletic group of the trematodes, the type of Foodborne Trematodiases in each country would be different. In China, several types of Foodborne Trematodiases are endemic, with Clonorchis sinensis infections as the most common. 80 percent of Clonorchis sinensis infection cases worldwide were concentrated in China. The morbidity of national level regarding the Clonorchis sinensis infection in the second survey in 2004 was raised by 75 percent from the first national survey in 1992 (Guo-Jing Yang, Lu Liu et al. 2014). Additionally, a special survey on Clonorchis sinensis infections in 27 endemic provinces/Municipalities/Autonomous Regions which was carried out in 2002-2004 showed prevalence at 2.40%, and the number of those infected at almost 12.5 million (Men-Bao Qian, Ying-Dan Chen et al. 2012). In addition, the number of other types of Foodborne Trematodiases such as Fascioliasis has also increased. Despite China's rapidly developing economy, the risk factors including consumption of raw freshwater fleshes and vegetables, the lack of proper sanitation and low educational attainment still have not received sufficient attention (Guo-Jing Yang, Lu Liu et al. 2014).

Vietnam is another significant endemic area of liver flukes, including Clonorchiasis (Clonorchis sinensis infection) and Opisthorchiasis (Opisthorchis viverrini infection). The number of Vietnamese who have been infected by these was estimated at one million in 1995. Meanwhile, a report in 2011 showed that Clonorchiasis was endemic in 21 northern provinces, with a prevalence rate that varied from 0.2-40.1 percent, while 11 provinces in the southern area showed high

concentrations of Opisthorchiasis. Additionally, the cases of Clonorchiasis were infected with other intestinal trematodes. Because the national survey has not been done and the previous surveys were mostly conducted at small scales and non-sampled, the exact number of infected Vietnamese is hard to determine (Men-Bao Qian, Ying-Dan Chen et al. 2012). However, if considering some factors such as the number of population at risk stated in the WHO report in 2009, or the local habit of raw or undercooked fish and the growth of freshwater fish production, the number of infected population is likely considerable.

According to the WHO in 1995, Opisthorchiasis due to the Opisthorchis felineus was the most prevalent in Russia. It was estimated that around 1.2 million people were infected. In addition, 3,000 people in the Amur River valleys in eastern Russia were infected with Clonorchiasis, and around 341,000 people were at risk. Lung flukes, Paragonimiasis were also endemic. Nevertheless, the current status is still unclear.

Foodborne-Trematodiases is not a problem only in poor countries, however, and is re-emerging and occurring even in various developed nations. Out of all 8.4 million individuals worldwide who are suspected to have Opisthorchiasis, 325,000 are in Europe. Opisthorchiasis from O.felineus have been found to be endemic in wide parts of western and central Eurasia. From the recent outbreak in 2010 and 2011 in Italy, the patients were infected due to two main reasons: travelling or eating raw fish and meat (Herman F. Wunderink, Wouter Rozemeijer et al. 2014). Also, several

species of lung flukes and intestinal flukes such as Paragonimus and Nanophyetus salmincola have been found in the Americas, such as in the United States, Canada and Peru.

Additionally, in many non-endemic countries which had reports of Foodborne Trematodiases, the infection was acquired either by travelling to endemic areas or from eating products imported from endemic areas such as the Clonorchiasis reported in Malaysia and Singapore (WHO 1995).

Because the data in some countries is not up to date, we could not know the exact number of the infected population. However, we could see the overview of the global distribution by using the data based on the information from WHO report in 1995 as shown in table 2 even though the current status and statistics have yet been reported.

Table 2: Global distribution of the Foodborne Trematodiases by WHO 1995

Country or area	*Fasciola*	*Clonorchis*	*Opisthorchis*	*Paragonimus*
African Region				
Algeria	C	–	–	–
Burkina Faso	–	–	–	C
Cameroon	–	–	–	B
Central African Republic	–	–	–	C
Côte d'Ivoire	C	–	–	C
Equatorial Guinea	–	–	–	C
Ethiopia	B	–	–	–
Gabon	–	–	–	C
Guinea	–	–	–	C
Liberia	–	–	–	C
Madagascar	C	–	–	–
Mali	C	–	–	–
Mozambique	C	–	–	–
Nigeria	–	–	–	B
Sierra Leone	–	–	–	C
Zaire	–	–	–	C
Zambia	–	–	–	C
Zimbabwe	C	–	–	–
Region of the Americas				
Argentina	C	–	–	–
Bolivia	A	–	–	–
Brazil	C	–	–	–
Canada	–	D	D	C
Chile	C	–	–	–
Colombia	C	–	–	C
Costa Rica	C	–	–	C
Cuba	B	–	–	C
Dominican Republic	C	–	–	–
Ecuador	C	–	–	A
El Salvador	C	–	–	C

Table 2: Global distribution of the Foodborne Trematodiases by WHO 1995 (Continued)

Table 2 (continued)
Geographical distribution of foodborne trematode infections[a]

Country or area	*Fasciola*	*Clonorchis*	*Opisthorchis*	*Paragonimus*
Nicaragua	–	–	–	C
Panama	–	–	–	C
Peru	B	–	–	A
Puerto Rico	C	–	–	–
United States	C	D	D	C
Uruguay	C	–	–	–
Venezuela	–	–	–	C
Eastern Mediterranean Region				
Egypt	A	–	–	–
Iran (Islamic Republic of)	A	–	–	–
Iraq	C	–	–	–
Kuwait	–	–	D	–
Lebanon	C	–	–	–
Morocco	C	–	–	–
Saudi Arabia	C	–	–	–
Syrian Arab Republic	C	–	–	–
Tunisia	C	–	–	–
Yemen	C	–	–	–
European Region				
Austria	C	–	–	–
Belgium	C	–	–	–
Bulgaria	C	–	–	–
Commonwealth of Independent States[b]	B	B	A	C
France	A	–	–	–
Germany	C	–	–	–
Greece	C	–	–	–
Hungary	C	–	–	–
Ireland	C	–	–	–
Israel	C	–	–	–
Italy	C	–	–	–
Norway	–	–	D	–
Poland	C	–	–	–
Portugal	A	–	–	–
Slovakia	C	–	–	–
Spain	B	–	–	–
Sweden	C	–	–	–
Switzerland	C	–	–	–
Turkey	C	–	–	–
United Kingdom	C	–	–	–
Yugoslavia	C	–	–	–
South-East Asia Region				
India	C	–	–	C
Indonesia	–	–	–	C
Myanmar	–	–	–	C
Nepal	C	–	–	C
Thailand	C	–	A	B
Western Pacific Region				
Australia	C	–	–	–
Cambodia	C	–	C	C
China	B	A	–	A
Hong Kong	–	B[c]	–	–
Japan	C	C	–	A
Lao People's Democratic Republic	–	–	A	B
Macao	–	B[c]	–	–
Malaysia	–	C[c]	–	–
Philippines	C	–	–	B
Republic of Korea	C	A	–	A
Singapore	–	C[c]	–	–
Viet Nam	C	A	–	C
Total[d]	61	9	4	39

[a] For *Fasciola* and *Paragonimus* infections, estimates are based on the numbers of cases reported since 1950 in the scientific literature and by ministries of health: A, more than 1000 cases documented; B, 100-1000 cases documented; C, less than 100 cases documented.
For *Clonorchis* and *Opisthorchis* infections, estimates are based on the best available information, mostly in the form of informal reports made since 1970: A, estimated number of cases around or more than one million; B, high infection rate reported in some communities or endemic foci; C, low prevalence; D, imported cases.

In South Korea, parasitic infection has decreased significantly due to the improvement of living conditions with mass screening and chemotherapy driven by the government. However, the liver flukes infection, Clonorchiasis still remains at high levels, particularly along riverside areas. Nationwide survey data has shown interesting information on the average prevalence of Clonorchiasis, with only small changes since 1971 (Jin-Kyoung Oh, Min Kyung Lim et al. 2014). According to the national sampled survey in 2004, the total number of the helminthiases was 1.78 million cases and 1.17 million cases were Clonorchiasis (Men-Bao Qian, Ying-Dan Chen et al. 2012). Along riverside areas where the highly endemic area is, the prevalent rate was as high as 30 percent. In addition, chronic Clonorchiasis is responsible for approximately 10 percent of cholangiocarcinoma cases in South Korea (Jin-Kyoung Oh, Min Kyung Lim et al. 2014).

As Clonorchiasis is directly linked to the consumption of improper food preparation, the dietary culture or eating habits of the Korean people in which they consume raw freshwater flesh is the major cause of infection. Therefore, the South Korean government's strategy for controlling the infection, run by public health centers at the county level, was to build up the health awareness of people and attempt to change individuals' health behaviors, especially eating habits. However, the South Korean government's efforts did not seem to work. Although a national control program and health campaigns aimed to change at-risk behavior were implemented and the people themselves have health awareness and knowledge of

prevention, these control measures have not been effective due to eating habits formed since childhood. Therefore, Clonorchiasis still remains common in Korea (Jin-Kyoung Oh, Min Kyung Lim et al. 2014).

While Clonorchis sinensis infections have become helminthiasis in the limelight of public health problems in South Korea, Opisthorchis viverrini infection have been in the eyesight of the Thai Ministry of Public Health for over 40 years. Opisthorchiasis is a liver flukes infection, which is prevalent in Thailand. In particular, it is a major health problem of the northeastern region. The Department of Disease Control stated that the population in the northeastern region has an infection rate as high as 85 percent. Furthermore, it is a major cause of cholangiocarcino and responsible for the deaths of at least 14,000 Thais per year, over half of which live in the northeast. From the data of the Thai Ministry of Public Health, the mortality rate of cholangiocarcinoma in 2007 was 28,000 people; an averaged 76 people per day (มหาวิทยาลัยขอนแก่น, สำนักงานหลักประกันสุขภาพแห่งชาติ et al. 2012).

Overall, the opisthorchiasis rate in Thailand tended to be lower from 36 percent in 1980 to 10 percent in 2002. However, due to the eating behavior and lifestyle of the northeastern people, it prohibits the decrease of Opisthorchiasis in many areas, even though the national control and management program consisted of health education, screening, surveillance and care system has been continuously intervened by government agencies, local authorities and even public sectors. Also, the health policy regard to the Opisthorchiasis in Thailand was usually passive rather

than proactive (Narong Khuntikeo 2012). The residents also did not cooperate or respond to the government policy as expected. Therefore, if the government still has not changed or strengthened its strategy to approach the people in at-risk areas, the problem of liver flukes will be difficult to eradicate.

With modern medical knowledge and technological evolution, all infectious cases can be accurately confirmed by various types of diagnostic techniques which vary in cost and sensitivity. Medication to treat Clonorchiasis and Opisthorchiasis is also available. In addition, good hygiene constituted by the increasing of living conditions and quality of life also plays a great role in reducing the risk of the infection, as does Government health policy and strategy. In South Korea, the overall level of parasitic infections especially due to the intestinal fluke has decreased due to group medication programs as well as health education and campaigns run by the government with the better living conditions of Korean people. Nevertheless, the prevalence of the Clonorchiasis hasn't decreased since the 1990s, particularly in riverside areas. Cases of reinfection, unsuccessful treatment and new infection have also been reported (Kyung Ja June, Shin Hyeong Cho et al. 2013). Meanwhile in Thailand, the prevalence of opisthorchiasis tends to be higher (Natthawut Kaewpitoon and Kaewpitoon 2010). As long as people in endemic areas still resist the need to change their eating customs, opisthorchiasis will not disappear.

Based on the facts mentioned above, we could see that the health policy and strategy in controlling the Fooborne Trematodiases is very important. In the case

of South Korea and Thailand, many studies on Clonorchiasis and Opisthorchiasis have already provided information concerning its epidemiology, pathology and risk factors. Thus, this study is focused on health policy and strategy and its effectiveness in order to find out the factors behind its success and failure, by comparing the cases of South Korea with Thailand.

Research Aim

The purpose of this study is to investigate South Korea and Thailand's health policy regarding Foodborne Trematodiases, which includes Clonorchis sinensis infection and Opisthorchis viverrini infection, as well as the effectiveness of these policies. Moreover, I will be examining the similarities and differences between Thai and South Korean health policy regarding the prevention of liver fluke infection in order to provide information and analysis that contributes towards the improvement of the effectiveness and quality of Thai health policy.

Research Questions

- Did South Korea and Thailand succeed in the prevention of liver fluke infection, especially in terms of trying to persuade residents in endemic areas to change their eating habits of raw freshwater fish consumption? If not, what are the reasons? And which kind of further strategy should be used?

- How are the situations and health policies of the two countries similar (or different) and which factors contribute to this similarity (or difference)?
- Are there any effective health policies or strategies where both countries could learn from each other and apply in their own countries?

Hypothesis

1. South Korea's government still has not succeeded in the prevention of the prevalence of Clonorchis sinensis infection, especially in the endemic areas along the riverside areas.
2. Thailand's government still has not succeeded in the prevention of the prevalence of Opsthorchis viverrini infection in endemic areas, including northern and northeastern regions.
3. South Korea and Thailand's governments' health policy and strategy regarding liver fluke infection is still not effective in sustainably decreasing the prevalence of the infection in endemic areas due to many factors, particularly in terms of stimulating behavioral change and raising health awareness of the people towards eating habit of raw freshwater fish consumption.

Objectives

1. To assess South Korea and Thailand's health policies and strategies on endemic liver fluke infection.
2. To evaluate the effectiveness of South Korea and Thailand's health policies and reasons or factors influencing the success or lack thereof.
3. To compare and analyze situations of the infection, health policy and factors between South Korea and Thailand.

Significance of Study

According to the recommendations for community diagnosis of WHO, the complementary intervention for example, health information, education and communication about the safe food practice should be implemented to reduce and control the infection rates. In order to do so, effective health policy and a comprehensive approach strategy is needed for long-standing and sustainable results of health behaviors. Although the South Korean government has operated health policy and strategy through health promotion programs and campaigns, it did not seem to succeed, just as in Thailand where the cases of morbidity and mortality resulted from Opisthorchiasis is consistently reported despite the implementation of national control programs. Consequently, there is a need to develop a framework for effective health policy. To do so, we need to carefully look at the effectiveness of the health policy and factors influencing the outcome.

Hence, this study would provide a significant contribution by analyzing the effectiveness of South Korean and Thai health policy to develop a framework for an effective and comprehensive liver fluke infection prevention strategy for the Korean and Thai population as well as compare cases of these two countries since the problem of liver fluke infection is an important public health problem among the endemic areas. This would help to find out the similarities between the two countries and significant implications that could be applied and lead to the development of Thai health policy. Lastly, this study would be useful not only for the health policymakers and those who are interested but would also have policy implications for knowledge utilization in other countries that are dealing with the same situation.

Expected Outcome

This study is expected to be a data resource for students in related programs or other people who are interested in this topic, as well as Thai health policymakers and government staff for knowledge utilization in order to improve the effectiveness of Thai health policy in the future.

CHAPTER II
BACKGROUND AND LITERATURE REVIEW

2.1 Background

Foodborne Trematodiases (Foodborne Trematode infections) have been globally concentrated in various countries. The severity of the prevalence in each country depends on several factors influencing parasitic transmission. Additionally, due to the variety of the species, each country would be different in terms of types of infection and the clinical manifestations. However, the Foodborne Trematodiases directly and indirectly affect the productivities and economies of these countries. As the scope of this study would examine this issue, more knowledge related to the Foodborne Trematodiases such as the types, clinical manifestations, pathology and pathogenesis are needed to increase the understanding about the characteristics of the diseases before moving on to the other parts of this research.

Table 3: Epidemiological characteristics of foodborne trematodiases

Disease	Infectious agent	Acquired through consumption of	Natural final hosts of the infection
Clonorchiasis	*Clonorchis sinensis*	Fish	Dogs and other fish-eating carnivores
Opisthorchiasis	*Opisthorchis viverrini*, *O. felineus*	Fish	Cats and other fish-eating carnivores
Fascioliasis	*Fasciola hepatica*, *F. gigantica*	Aquatic vegetables	Sheep, cattle and other herbivores
Paragonimiasis	*Paragonimus spp.*	Crustaceans (crabs and crayfish)	Cats, dogs and other crustacean-eating carnivores

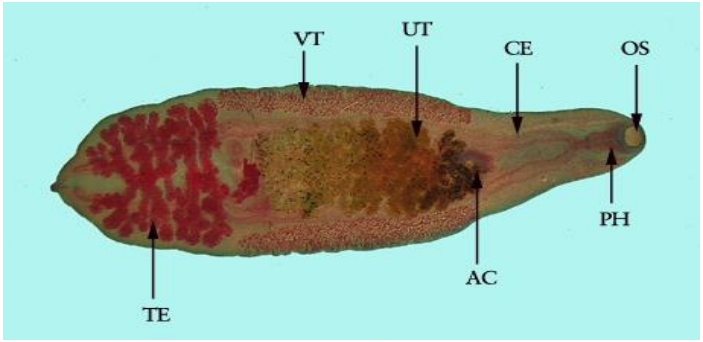
Resource: (WHO)

Because of the variety of the species, the types of Foodborne trematodiases vary on the species of the trematodes. There many species of trematode worms causing the diseases and some of them induce only mild pathogenic forms of the infections. However, severe pathology in humans is caused by four main genera including Clonorchis spp. (liver flukes), Opisthorchis spp. (liver flukes), Fasciola spp. (liver flukes), and Paragonimus spp. (lung flukes). Since all foodborne Trematodiases are zoonoses, the diseases will firstly affect animals, then transmit to humans; direct transmission is impossible because of the complex life cycles of the parasites which usually consist of a stage in intermediate non-human hosts. So, the transmission will occur when humans take part in the parasitic life cycle and replace its natural final host. Each type of parasite has different transmission cycles, but they are common in

terms of the complexity and their intermediate hosts, which usually are fish, mollusks and crustaceans.

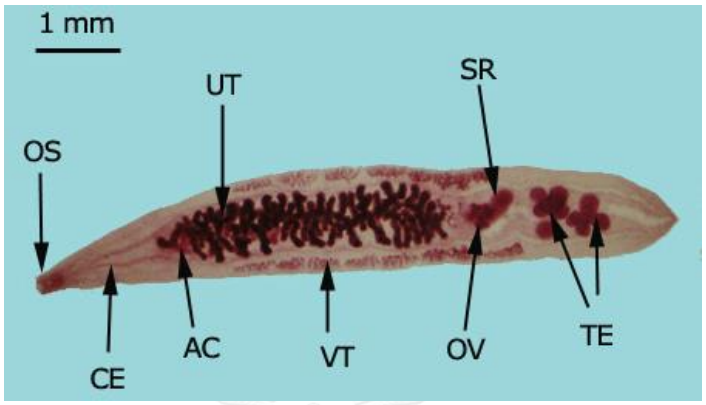
This study will only focus on Clonorchiasis (Clonorchis sinensis infection), which is caused by Clonorchis sinensis (C. sinensis), commonly known as the Chinese liver fluke or Oriental liver fluke, and the Opisthorchiasis or Opisthorchis viverrini infection. These two species belong to the family Opisthorchiidae. Clonorchis sinensis is the most common type of human liver fluke in East Asia (Sung-Tae Hong and Fang 2012) particularly in South Korea, China, Taiwan, Japan, Northern Vietnam and even in the far Eastern part of Russia (Rim 2005). However, Clonorchiasis has been reported also in non-endemic areas through Asian immigrants, or through the consumption of imported, undercooked, pickled or poorly prepared freshwater fish contained with parasites. Meanwhile, Opisthorchis viverrini is usually found in Southeast Asia, particularly in Thailand, Cambodia and Laos.

Figure 2: Adult *Clonorchis sinensis* stained with carmine. Clearly visible in this image are the oral sucker (**OS**), pharynx (**PH**), ceca (**CE**), acetabulum, or ventral sucker (**AC**), uterus (**UT**), vitellaria (**VT**) and testes (**TE**).



Resource: Centers for Disease Control and Prevention Website (2013)

Figure 3: Adult *Opisthorchis viverrini* stained with carmine. Clearly visible in this image are the oral sucker (**OS**), uterus (**UT**), seminal receptacle (**SR**), ceca (**CE**), acetabulum, or ventral sucker (**AC**), vitellaria (**VT**), ovary (**OV**), and testes (**TE**).

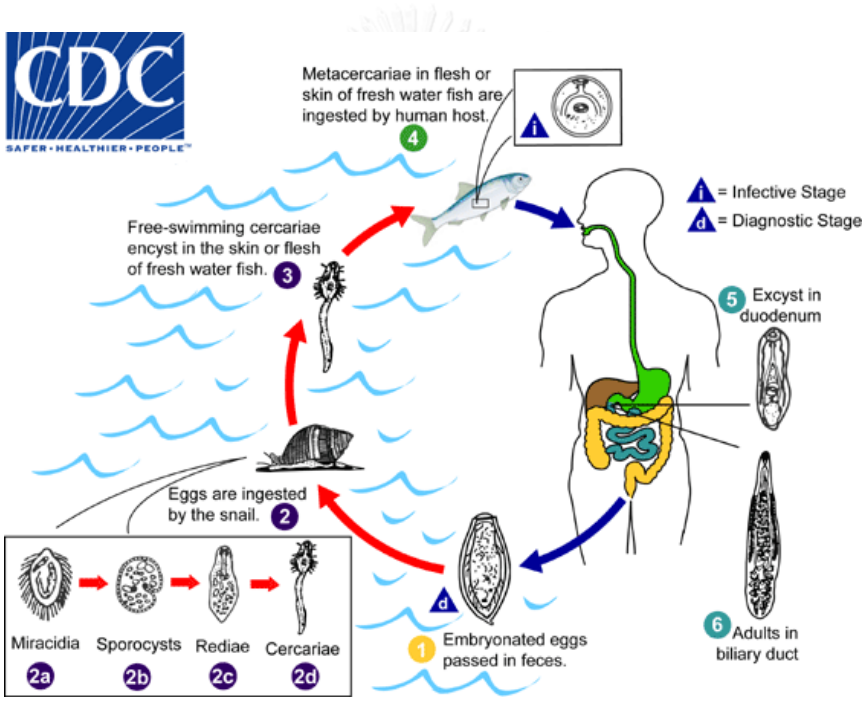


Resource: Medical Care Development International (website)

The morphological characteristics of the adult worms of O. viverrini and C. sinensis is a flattened or lancet shape, transparent but macroscopic, 10-25 mm. long, 3-5 mm. wide (Public Health Agency of Canada, 2014) and 1.0 mm. thick (Han-Jong Rim, 1990). The size of the flukes varies according to its age, host, number of the worms in host and its habitat in large or small biliary tracts. The life cycle of the C. sinensis and O. viverrini are also similar. It begins when eggs are delivered with the defecation of the hosts. When the eggs reach freshwater, they will develop into miracidia and float until ingested by the first intermediate host which is snail, mainly is the Alocinma sp. and Parafossarulus sp. for C. sinensis and Bithynia sp. in O. viverrini (Wongsawad 2012). Then, live inside the snail body, the miracidia will further develop into several stages including sporocysts, rediae and cercariae. The cercariae

leave the snail body and float in the freshwater to penetrate into the freshwater fish as the second intermediate host where they will develop to the metacercariae, the infective stage. When the definitive hosts, carnivores, eat raw freshwater fish, the metacercariae will excyst in the intestine and migrate to the bile ducts then complete the cycle by maturation within 1 month.

Figure 4: Clonorchis sinensis and Opisthorchis viverrini's life cycle



Resource: Centers for Disease Control and Prevention Website (2015)

Infection in humans will occur when the humans replace the reservoir host by eating raw, pickled or poorly processed freshwater fish contaminated with the metacercariae. Pathological manifestations mostly come from the inflammation and obstruction of bile ducts. Light infection or acute clonorchiasis/opisthorchiasis may

be asymptomatic or manifest as mild symptoms such as fever, fatigue, loss of appetite, nausea, and diarrhea, while heavy or chronic infections (re-infection over time) can result in severe symptoms and diseases such as weight loss, abdominal pain at right upper quadrant or epigastric pain, colic pain, fibrosis of ducts, jaundice, cholangitis especially the bile duct cancer, cirrhosis, and cholangiocarcinoma. Several studies, particularly those conducted by the International Agency for Research on Cancer, or IARC, have proved and categorized it as the group 1 agent, carcinogenic to humans since year 2009 (Sung-Tae Hong and Fang 2012).

Both liver fluke infections have likely been endemic among humans for a very long time, like the case of Clonorchiasis, which has been around humans for hundreds of years without being recognized as a parasitic infection until 1874. Although we do not exactly know how long this kind of fluke has been infecting humans, we can assume that we have inherited it from our primate ancestors, as suggested by the historical record of Clonorchiasis found in an ancient corpse buried in 278 B.C. in China. However, the current understanding of the fluke began in 1874 in Calcutta, India by James McConnell, who was a professor of pathology and a resident physician. He did an autopsy of a Chinese carpenter corpse who was working in Calcutta and finally found the fluke in bile passages. It was also found discovered in Japan in 1875, but not described until 1883; it was subsequently found at endemic levels in South China in 1908.

Situation in South Korea

Followed the accomplishment of economic development, health care and universal health coverage have been successfully provided to the people In the 1970s, South Korea had no national health insurance plan consequently not more than 9 percent of the population had health care provision. Health care was only 2.8 percent of the GDP and the government expenditure was a modest 12 percent (Lee 2012). However, health expenditure has been increased in recent years, as has the government spending on health. The total health expenditure as a percentage of GDP has grown to 6.6 percent and 7.4 percent in year 2008 and 2014 respectively (Lee 2012) (WorldBank). Also, the government health expenditure as a percentage of total health spending increased to 54.9 percent in 2008 and 54.1 in 2014. Although the government spending in the year 2014 was marginally decreased, it still accounted for more than half the total health expenditure of the country. So, this may imply that the South Korean Government has taken the greater part in providing health care for their population. As economic and health care objectives have been achieved, the situation of the overall parasitic infections has also improved. Nevertheless, the liver fluke infection caused by clonorchis sinensis is still endemic.

Table 4 : major healthcare indicators of South Korea.

	2008	2014
Total health expenditure as a percentage of GDP	6.6	7.4
Government health expenditure as a percentage of total health expenditure	54.9	54.5

Resource: (Lee 2012) (WorldBank)

In Korea, Clonorchiasis is one of significant parasitic infections highly endemic in riverside areas since in the past and is usually rare in areas far away from the river where intermediate hosts are absent (Sung-Tae Hong, Kisung Yoon et al. 1998). The first case of Clonorchiasis was recognized in 1912 from a Korean autopsy by Japanese physician Matsumoto (Rim 1990). Furthermore, Clonorchisis sinensis eggs also were found in the feces of a 15th century child mummy (Gideon, 2015) . After the Korean War in 1950-1953, South Korea gave more attention to preventing Clonorchiasis because the health problems of South Korean people were aggravated. It's estimated that around 4.5 million South Korean people were infected, and many cases of liver cirrhosis in Korean people were caused by it (Walton and Chyu 1959). In the late 1950s, Korean scholars conducted studies of Clonorchisis sinensis about its biology, epidemiology, pathology and treatment. Afterwards, epidemiological

surveys commenced throughout the country since the 1960s. Since then, Clonorchiasis has become one of the most widely studied subjects (Rim 1990).

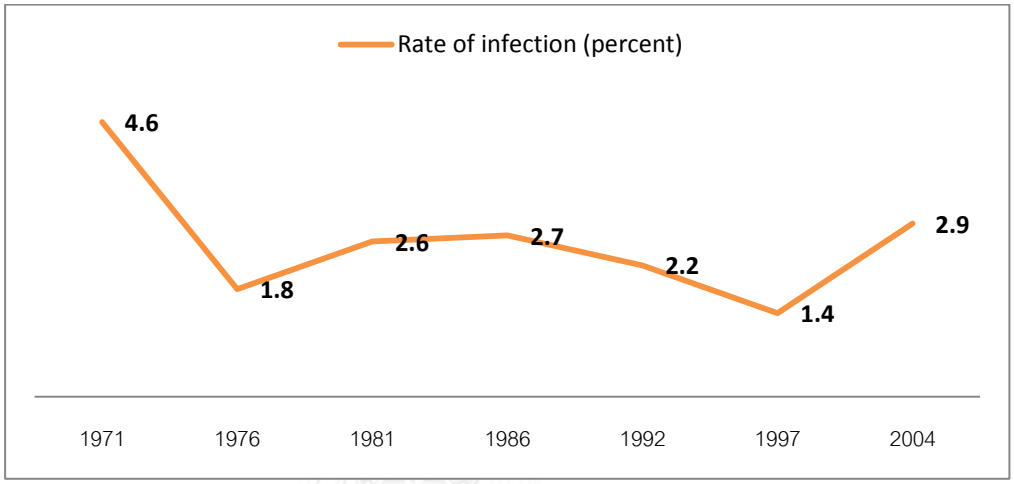
Figure 5: Picture of Major Rivers in South Korea

Resource: American Pink (website)

With regards to the national survey conducted by the Government and related agencies, we could see the trend of the Clonorchiasis in the general population in South Korea has remarkably decreased as follows: 4.6% in 1971, 1.8% in 1976, 2.6% in 1981, 2.7% in 1986, 2.2% in 1992, 1.4% in 1997, and 2.9% in 2004. This reduction could be the result of the nationwide control program continuously run by the government as well as the information acquired through research which

has promoted the source of knowledge for combat with the worm. However, the infection status still fluctuates despite the availability of anthelminthics. This may suggest some gap or weakness in the health policy and its control program.

Figure 6: Rate of infection presented by the national survey between 1971-2004



On a smaller scale, the number of the infected rate in the endemic regions is still relatively higher than other helminthiases even though the rate has become reduced overall. The most prevalent and intensive areas are along the riversides. The residents living in the river basins generally show higher rates of infection. In 1981, Seo et al examined the stools of people living near several rivers. They found that the overall infected rate of 21.5 percent. The Nakdong river basins and Yeongsan river basins showed the highest rate as the first and second rank as 40.2 percent and 30.8 percent respectively. On the other hands, Geum river basins and Mangyong river basins were the less endemic areas with rate 12 and 8 percent respectively. Additionally, approximately 830,000 to 890,000 of a total of 4 million residents living

in the survey areas were infected with Clonorchiasis (Rim 1990). If we compare this with similar and more recent studies, we might see more changes.

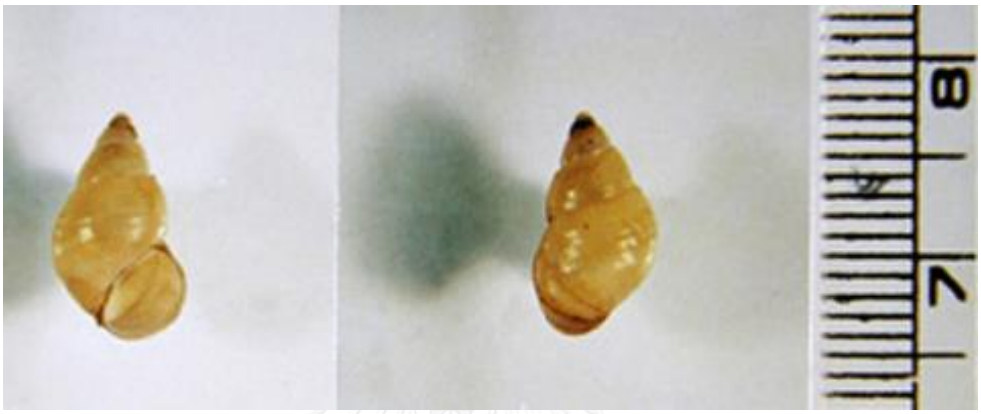
From a survey study in 2006, the highest rate was still detected in the river basin of Nakdong at a rate of 17.1 percent, but the second rank was by the Seomjin river basin with a rate of 11.2 percent while Yeongsan river basin fell down in rank with a rate of 5.5 percent, and the Geum River basin came in last at 4.6 percent. The study indicated that the average infected rate in males (13.6 percent) was higher than in female (8.9 percent), and that the prevalent age changed from 40-50s in the past to 60s (12.8 percent).

The reason why males were infected at a higher rate than females is that males more frequently join in social activities where it's normal for drinking to be one an important part of their meeting. At these times, raw fish is often served. Also, this why the incidence in children is low while the incidence is higher as age increases. However, the infection is also reported in young children because some mothers have strong belief in the importance of feeding their children raw fish, hoping that it would help the children grow healthy (Rim 1990).

The geographical distribution of the Clonorchis sinensis is linked with the intermediate hosts in either snail called Parafossarulus manchouricus or fish because of its life cycle process as I have mentioned before. Approximately 40 species of freshwater fish serve as a 2nd intermediate host that are also often improperly eaten by humans, such as Pseudorasbora parva, Cyprinus carpio and Carassius carassius.

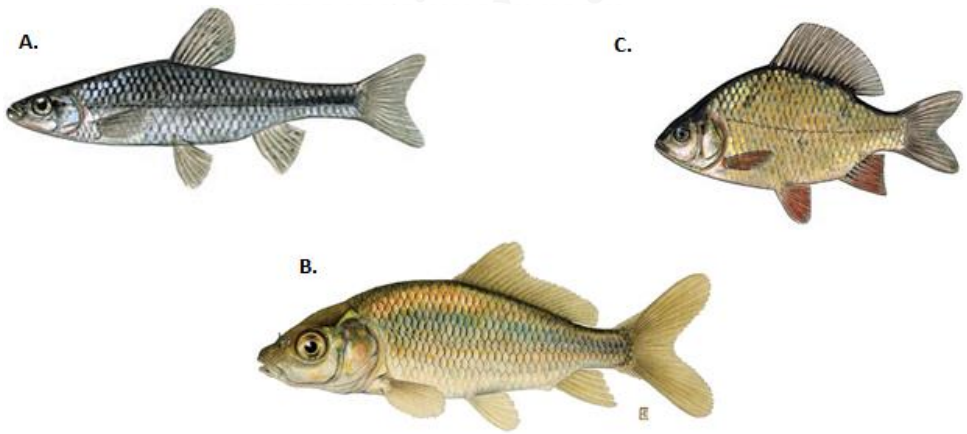
Although some fishes might have low rates of infection, repeated eating of these raw fishes finally leads to heavy infection.

Figure 7: Picture of Parafossarulus manchouricus, the most common freshwater snail host of C. sinensis in endemic areas of Southeast Asia.



Resource: Centers for Disease Control and Prevention (website 2013)

Figure 8: Picture of freshwater fish including A. = Pseudorasbora parva, B. = Cyprinus carpio and C. = Carassius carassius



Resource: https://www.behance.net/gallery/434157/Fishes, (Gori, Fernandez et al. 2016)(Gori, Fernandez et al. 2016)(Gori, Fernandez et al. 2016)http://www2.dnr.cornell.edu/cek7/nyfish/Cyprinidae/common_carp.html

Especially when the working age group suffers from Clonorchiasis, productivity can fall, requiring support from other family members. Eventually, those infected people might suffer an early death. This causes a heavy burden on families and, ultimately, countries. To control the infection, the government has implemented national control programs. Since praziquantel was introduced, the government conducted a pilot project to seek the appropriate and most effective dose of the medication. Then the medication has been used in the mass treatment program launched afterward, resulting in the remarkable decrease of Clonorchiasis, both in prevalence and intensity. In addition to the treatment, health education was provided to change attitudes and build awareness of the intake of raw fish. Moreover, economic development and changes in the traditional ways of living in South Korea such as chemicals and pesticides used might also have affected parasitic ecology (Rim 1990). Although the theoretically simple measures in controlling the Clonorchiasis is to avoid eating the raw or improperly cooked fish, it's very difficult to carry out because people in the endemic areas still have not changed their eating habits. Besides, they have overconfidence in treatment and ignore the risk of asymptomatic infection even though their awareness of Clonorchiasis and its prevention is quite high (Jin-Kyoung Oh, Min Kyung Lim et al. 2014).

Situation in Thailand

In Thailand, the majority of the health delivery system is provided by the public sector. So, there was no doubt that the government spending on the populations' health should be high. From the table below, we can see that both total health expenditure and government health expenditure have increased between 2008 and 2014. It is clear that the government is providing the greater part of health care funding, more than 70 percent or ¾ of all health care spending of the country. Compared to South Korea, the Thai government has been taken a much higher part in health care financing, as can be seen from the government health expenditure as a percentage of total health expenditure. This may imply that the Thai government has taken the major role in terms of supporting the health of the population and dealing with health issues. Although, the Thai total health expenditure as a percentage of GDP is relatively smaller than Korea, 4 percent in 2008 and 6.5 percent in 2014 while South Korea's total health expenditure was 6.6 percent and 7.4 percent in 2008 and 2014 respectively.

Table 5: major healthcare indicators of Thailand.

	2008	2014
Total health expenditure as a percentage of GDP	4	6.5
Government health expenditure as a percentage of total health expenditure	75.1	86.0

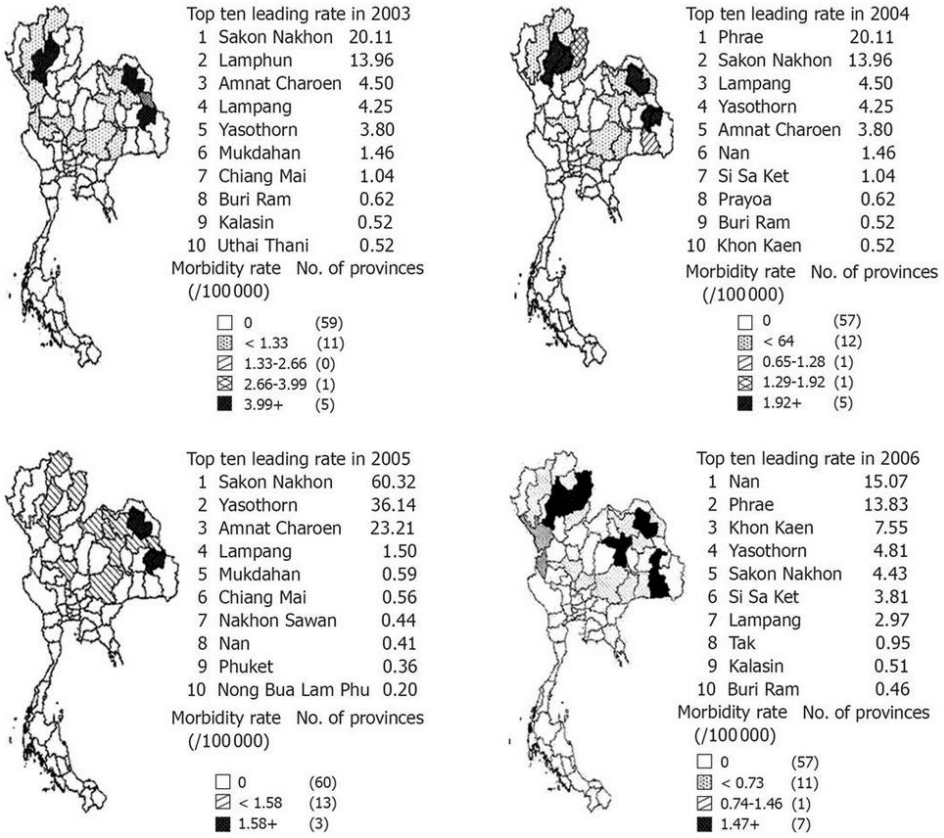
Resource: (Lee 2012) (WorldBank)

However, cholangiocarcinoma still remains as the most critical health problem of the northeastern region in Thailand. It causes a high mortality rate of the Thai population. According to the Thai Ministry of Public Health, those infected with the disease accounted for more than half of all deaths of northeasterners in 2007 (มหาวิทยาลัยขอนแก่น, สำนักงานหลักประกันสุขภาพแห่งชาติ et al. 2012). Moreover, Thailand was in the first rank of having the most cholangiocarcinoma patients in the world. This phenomenon is directly linked to the prevalence of liver flukes infection due to the custom of freshwater fish intake of the local people in the endemic areas.

The first case of the liver flukes infection in Thailand was noted in 1911 by Leiper during an autopsy of a corpse in Chiang Mai. At that time, flukes were identified as the Opisthorchis felineus species. Then in 1927, there was a report of liver flukes found in the biliary ducts of a body in Roi Et, which was again identified as Opisthorchis felineus. However, in 1954-1956, there were studies concluded and confirmed that the prevalent species of the liver flukes is Opisthorchis viverrini, not Opisthorchis felineus (Natthawut Kaewpitoon and Kaewpitoon 2010). Since the first case of Opisthorchiasis (Opisthorchis viverrini infection) had been recognized and the report of patients was noted, the presumption of the relation between the liver flukes and Cholangiocarcinoma was set until the 1963, when the relation between them was reliably confirmed from the analysis of liver tissue. The result of this study has become a significant foundation which encourages extensive research study to this day (มหาวิทยาลัยขอนแก่น, สำนักงานหลักประกันสุขภาพแห่งชาติ et al. 2012).

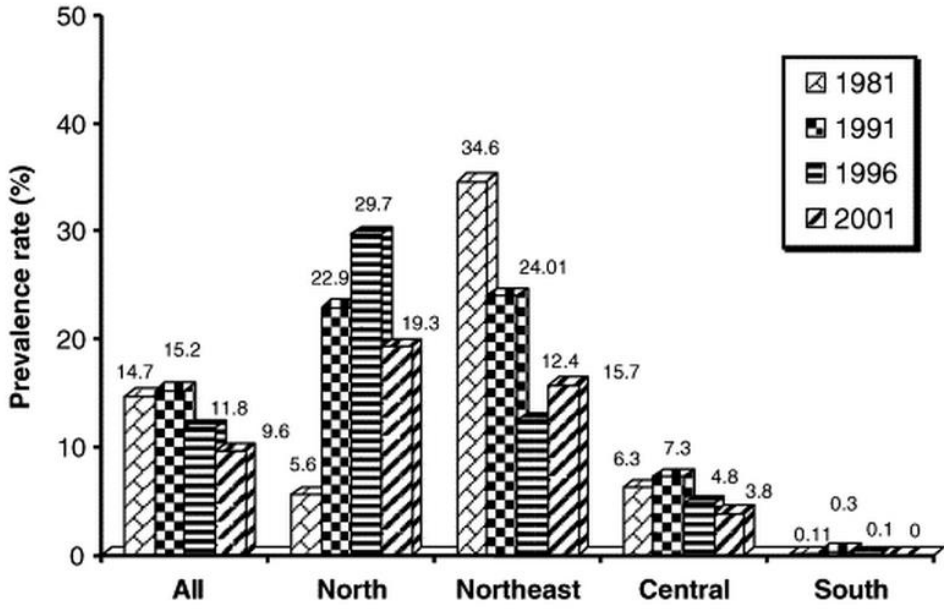
In 1966, the prevalence rate nationwide was 22.1 percent. From this survey, the northeastern area was the most endemic area, with an infection rate of 29.8 percent. The northern and central regions were measured at 10.3 and 0.3 percent, respectively. From the data of the Bureau of Epidemiology under the direction of the Department of Disease Control, the prevalent ratio of infection tended to decrease since 2003. However, it rose in the years 2006 and 2007 (Natthawut Kaewpitoon and Kaewpitoon 2010). In 2009, the percentage of the nationwide infectious rate was 8.7 and the most endemic areas were the northeastern, 18.7 percent and northern regions, 10.0 percent. When we consider at the level of the village in each region, the northeastern region (85.2 percent) has a much higher prevalence rate than the northern region (45.6 percent) (มหาวิทยาลัยขอนแก่น, สำนักงานหลักประกันสุขภาพแห่งชาติ et al. 2012). The age-specific group which found the highest prevalence is 45-54, 55-64 and 35-44 years, with a higher rate of infected males than females (Natthawut Kaewpitoon and Kaewpitoon 2010).

Figure 9: Reported cases of Opisthorchiasis in Thailand per 100,000 populations classified by province during 2003-2006



Resource: (P. Jongsuksuntigula and Imsomboonb 2003)

Figure 10: Prevalence of Opisthorchiasis in Thailand in 1981, 1991, 1996 and 2001 classified by regions.



Resource: (Natthawut Kaewpitoon, Soraya J Kaewpitoon et al. 2008)

Because they are in the same family, Opisthorchis viverrini and Clonorchis sinensis have share common characteristics. Therefore, the life cycle, endemiology and complications are the same. With regard to this fact, the theoretical practice in prevention and control is certainly not different. In Thailand, the goal of controlling Opisthorchiasis is to reduce the infection in order to reduce the cholangiocarcinoma rate among Thais. The Ministry of Public Health is the mainstay. Through integration, various institutes starting from the ministry level and policy makers, universities, and down to the agency level are involved in the process. The main strategies include screening and surveillance of infectious cases, management of environmental sanitation and health education by emphasizing the consumption of properly cooked foods. Thailand has also received either technical support or aid from the US and German governments. Furthermore, the control program was involved in the 5-year National Public Health Department Plan since the 6th edition in 1987. This was a crucial development of the control program (P Jongsuksuntigul and Imsomboon 1998).

However, the prevalence of Opisthorchis viverrini didn't decline at a satisfactory rate, and it still endemic in the same areas, with a persistently high rate of cholangiocarcinoma patients. This is due to several reasons. First, the integration of various agencies lacked unity. So, management of the knowledge and healthcare system is not potential, resulting in ineffective screening, surveillance and treatment (มหาวิทยาลัยขอนแก่น, สำนักงานหลักประกันสุขภาพแห่งชาติ et al. 2012). Then, stategies which should have been proactive were passive instead. Furthermore, people were

not aware the deadly risk of improperly cooked fish and some of them rely too much on antihelminthic drugs (Wongba N, Thaewnongiew K et al. 2011). Therefore, Opisthorchiasis is an important public health problem in Thailand.

In sum, liver flukes from the family Opisthorciidae are a significant foodborne trematodiases problem in both South Korea and Thailand. Although the species of liver flukes prevalent in the 2 countries are different, both countries are facing the same crisis. From studies, the endemic areas are always the same areas. The prevalence fluctuates, but the rate has still remained high or has not yet decreased satisfactorily. Moreover, we could notice more similarities in terms of the gender and age of infectious populations which both show the same trends in males and older aged groups. These all resulted from the ineffective strategies of the government or the lack of potential in health policy to build up strong health awareness towards the deadly risk which is the most important barrier for liver flukes transmission.

2.2 Literature Review

2.2.1 South Korea

Prevalence and geographical distribution

Foodborne Trematodiases are known to as the most important group of parasites in many countries due to its extensive and intensive prevalence as well as its impact on the productivity of the country. According to the trends in Parasitic Diseases in the Republic of Korea, written by Eun-Hee Shin and colleagues (Eun-Hee

Shin 2008), Clonorchiasis has been included in the fish-borne trematodes which is the largest type regarding the number of species. The capability of it was recognized in causing significant morbidity and mortality by its causative agent of bile duct inflammation and cancer, particularly in villagers living along riverside areas such as the area of Nakdong River which a rate of cholangiocarcinoma approximately 5.5 per 100,000 people.

Many studies have also proven this significance in the same direction that the disease is a very important problem in public health dimension in the previous decades. Sung Tae Hong and his coworkers (Sung-Tae Hong, Kisung Yoon et al. 1998) confirmed this by presenting the high prevalence of Clonorchiasis from the national surveys of overall egg positive cases in Korea in 1971, 1976, 1981, 1986 and 1997. This statistic was also mentioned in many studies done later. Also, the estimated number in the 6th national survey has been shown. From these provided data, they concluded that this liver flukes infection is the most prevalent parasitic infection.

Woon-Mok Sohn (Sohn 2009) and Shin-Hyeong Cho et al. (Cho 2008) made the same statements in their studies. Clonorchis sinensis is still the most important helminth species in the aspect of South Korea's public health because it still remains at a relatively high level, and repeated infection was detected in the same endemic areas, even though the endemicity has declined to light or moderate levels.

Han-Jong Rim (Rim 1997), a professor in parasitology of Korea University, stated that since the epidemiology of Clonorchiasis had been widely studied during

1960s, we could clearly specify the high endemic areas which are concentrated all over the country along riverside areas, particularly the Nakdong River.

Based on the survey data published in 1981 reported by Seo et al (Seo 1981), residents living in villages within 6 kilometers of the seven major rivers including Nakdong, Yeongsan, Seomjin, Han, Tamjin, Geum and Mangyeong Rivers and nine small streams in the southern and eastern coasts were selected for stool exams in order to examine the status of Clonorchiasis in riverside areas. The evidence showed the highest positive rate was found in the Nakdong River area. However, Seo et al further suggested that the rate in each area along the Nakdong River differed due to the water stream and distribution of the intermediate hosts. The estimated number of cases was also set up. However, this number could not be used as the national figure. Actually, there were a lot of efforts among Korean indicators to estimate the accurate number of cases or the infected rate. Nevertheless, each survey could not give the real number because the endemic status and infected rate varied considerably river by river and village by village.

Shin-Hyeong cho et al (2008) also found out that the highest infected rate in the Nakdong River basin at Sancheong-gun County. On the other hand, the Geum River basin was shown the lowest rate. Shin-Hyeong cho et al. compared their work with the study of Seo et al (1981). They observed that the positive rate in the Geum, Yeongsan, Seomjin and Nakdong River basins has decreased remarkably. However, the most consistently endemic area is still the Nakdong River basin. Seomjin River

basin showed only little change when compared with other river basins. As in the study by Hyun Kyung Kim and colleagues (Hyun-Kyung Kim, Hyeng-Il Cheun et al. 2010), the highest endemic area obtained from their survey of 5 major river basins was the Nakdong River basin, while the Han River basin was in the last place.

On the other hand, the results obtained in 2009 by K.J. June et al. (Kyung Ja June, Shin Hyeong Cho et al. 2013) presented differently the highest prevalent area, concentrated around the Seomjin River basin, while the Nakdong River basin fell to second place. This evidence was markedly different from the areas presented by Seo et al. (1981), Shin-Hyeong cho et al. (2008) and H.-K. Kim et al. (2010). However, Nakdong River basin is still relatively higher, compared to the rest of the river basins.

From the many studies I have mentioned earlier, the positive rate of Clonorchiasis was highly observed in older age groups rather than the younger generation. Shin-Hyeong cho et al (2008) and H.-K. Kim et al. (2010) indicated that the age group between 50-59 years has the highest rate while the highest infected age group presented by K.J. June et al. (2013) was age 40s in males and 60s in females. However, Walton and Chyu (Walton and Chyu 1959) also found the infection in children as young as 2 years old. This might have happened through mothers feeding their children raw freshwater fish due to beliefs about healthy food.

In terms of gender, all studies have manifested the same trend, which is that there is a higher infectious rate in males.

In 1959, Bryce C. Walton and Il Chyu reported a prevalent survey using an intradermal test of Korean population in eight out of nine provinces; including both areas the Ministry of Health had and had no information of endemicity. From the survey, the highest rate was observed in males rather than females. According to the questionnaire distributed to each participant in the study of K.J. June et al. (2013), the rate would be higher not only in residents who consumed raw freshwater fish, but also in people with smoking experience, drinking four or more times per month, and in those with a history of Clonorchiasis. Females are much less exposed to the risk of Clonorchiasis since they more infrequently participated in social gatherings. Therefore, we can understand why the higher infectious rates usually were detected among males in an older age group because they tended to regularly carry on the risk factors written above.

To sum up, although the highest endemic areas have varied somewhat, the fact presented in all studies is that the riverside areas are the place where Clonorchiasis is found the most in South Korea, and either intensity or infection has decreased slightly when compared with the past. However, the distance of the surveyed areas to the rivers and the size of the sample should be considered as the factors of the differences found in each study.

Management and control

After the Korean War, parasitic infections were recognized as one of the crucial public health problems in Korea. It was estimated that at least 90 percent of the whole population were infected with various types of parasites in the late 1950s due to poor hygiene and the traditional way of using human excretion as fertilizer. At first, the Korean government was not directly involved in parasitic infection control. It was rather the doctors or civilian specialists in public health or medicine who held an organization for handling the problem, and they would receive either technical or financial support from overseas when they lacked the necessary resources. However, as the economy of South Korea developed, the government began to provide more support. Therefore, mass examination and treatment for parasitic infections were carried out in all primary, middle and high school students in 1969. Then the 1st national survey of intestinal helminthic infections among rural people was made in 1971. This contributed to the remarkable decrease of infectious rate in the 1980s. However, this decrease was able to be claimed as the result of multiple factors, such as the improvement of the socio-economy, use of chemical fertilizer, and national industrialization, not merely control implementation (Yeo 2008).

The recognition and concern of the government toward Clonorchiasis can be seen in the intervention in parasitic infections issue although sometimes the government took only a very small part in that execution. In the study of Seung-Yull Cho (Cho 2009), the history of parasitology in Korea was described. From this, we

could see the overall progression of the Korean government and its departments' operation since the past decades. The South Korean government had provided legal support to the law of parasitic diseases prevention and promulgated as well as the Ministry of Health and Social Affairs of the government collaborated with the WHO in parasitic control during the period of 1960. In the 1970s, the economy of South Korea has improved, and modern medicine has developed. Public health, therefore, became a priority. The Ministry of Health and Social Affairs provided support to civilian organizations acting in parasitic diseases by securing the budget for a national survey of the country's whole population. Therefore, the surveys of prevalence of intestinal parasitic infection were conducted every 5 years in 1971, 1976, 1981, 1986, 1992, 1997 and 2004. The surveys were a good measurement for parasitic control even though it limitedly covered to intestinal helminthes. Moreover, by the surveys, the organizations had finally determined a reasonable estimation of the national burden of diseases. After the initiation of the national survey, local surveys became more focused on various hidden endemic areas of Clonorchiasis and others. In addition to the surveys, the government had also purchased and distributed praziquantel to local health centers in rural areas for treatment of infected cases during the 1980s.

The parasitic eradication program or PEP performed by the Division of Malaria and Parasitic Diseases, National Institution of Health and Korea Centers for Disease Control and Prevention in 2005 and 2007 was also another evidence of the great

concern and efforts of the government which was mentioned in the studies of Cho Shin-Hyeong et al. (2008, 2010, 2014). Additionally, many of their studies were also supported by the governmental divisions under the direction of the Ministry of Health and Welfare. This shows strong governmental support in terms of the knowledge development which is a benefit for either Clonorchiasis or other parasitic control.

According to data reviewed by Han-Jong Rim (1990, 1997, 2005) epidemiological surveys undertaken during 1960s helped us to specify the high endemic areas in South Korea. Apart from hygiene and other general infrastructural development, praziquantel is used for Clonorchiasis treatment. Before providing this medication, the Ministry of Health and Social Affairs and the Korea Association for parasite eradication conducted a pilot project for praziquantel treatment to find out the dosage schedule. A mass treatment project was then driven by the government during 1984-1990, which led to a remarkable decrease in the egg positive rate of people in the project areas. This made the improvement of the Clonorchiasis status, not only the infected rate but also the proportion of heavy infectious cases. Therefore, this could evidently prove that chemotherapy or the medication so-called praziquantel was rapid and really effective control. In particular, when it was used together with either health education or governmental aid, the disease would be reduced. Nevertheless, Sung Tae Hong et al. (1998) and J.K. Oh et al. (2014) were on the other side by stating that Clonorchiasis prevalence still remains at high levels

because of the difficulty in case detection due to people's low levels of cooperation with fecal examination, as well as the treatment failure of detected cases.

To prove this, Sung Tae Hong and team (1998) tried to study the effectiveness of repeated medications every 6 months and evaluated the efficiency of diagnosis by sonography. The selected samples would be provided health education as well as follow-ups with the 6 month-interval stool examination. After the evaluation, although the egg positive rate had declined, the result in study was still unsatisfactory, and this control method was not effective. The participants were quite reluctant to change their eating habits. Most of them who had been treated had repeated infections. Hence, this is why the control of Clonorchiasis in South Korea was ineffective. In addition, the treatment failure due to incomplete doses of medication was also involved. Additionally, the sonography was less sensitive and specific than stool exam in the case of light infections and the pathological change of bile ducts resulting from other diseases.

There are several reasons South Korean people still maintain their dangerous eating habits which have been listed in various studies. Lee Gye-Sung et al. (Gye-Sung LEE 2002) have stated that government's control programs by medication and health education have lowered the rate of infectious cases. However, the people may have repeated their consumption of raw freshwater fish. This was proven by reinfection of treated cases because of eating raw fish after treatment in their study. This may be because the habit of raw freshwater fish consumption is a deeply rooted tradition of

the people. Meanwhile, Kim HG et al. (Ho Gak Kim, Jin Bong Kim et al. 2009) has pointed out different reasons. They mentioned that although many Koreans knew the transmission route and prevention, they still enjoyed raw freshwater fish consumption because they have a strong belief in the effectiveness of medication and thought that the infection would not result in a serious condition. Similarly, J.K. Oh et al. (2014) explained that residents in endemic areas have too much confidence in praziquantel and ignore its asymptomatic infection as well as the taste addiction. Therefore, stressing its severe complications in health education is recommended.

The reduction of overall intestinal parasites could suggest the largely successful of the national control program. However, national data on Clonorchiasis showed only small changes since 1971 and it's still common in riverside areas. By this statement, J.K. Oh et al. (2014) have evaluated the efficiency of intervention and control program that have been implemented in an endemic area, Sancheong county, by conducting different interventions with 3 groups; A, B and C. The group A was provided only praziquantel treatment and poster of mass health campaigns which is the part of the national control program, while the health education emphasized prevention and the risks of Clonorchiasis would be added to community leaders in group B and to individuals in group C. For comparison, the effective control was reported in group B and C. This suggested that the combination of health education and the national intervention program was more effective. However, health education program provided to community leaders (group B) was

more effective in controlling Clonorchiasis after 3 years. Furthermore, the lowest rate of reinfection in group B also implied that community leaders might be able to promote changing eating habits in community for a longer period. The individual health education program, group C, was more effective in terms of prevention of the new infection in people who did not report raw fish consumption. Nonetheless, J.K. Oh et al. stated that there might be selection bias in the study due to some limitations of follow up, age, sex, education and occupation.

All of the above studies done on the control and prevention of Clonorchiasis could indicate that the South Korean government has actively driven management toward this infection over decades. Even though the prevalence has decreased at varying levels, the status of Clonochiasis has significantly improved. This also might be a result of studies and surveys continuously carried out by various agencies either government or nongovernment. Moreover, changes in traditional lifestyle, economic development, and chemical used could be part, affecting the parasites and its intermediate hosts (Choi, Ahn et al. 1976). However, the persistence of raw freshwater fish consumption, overconfidence of treatment and ignorance of the deadly consequences of Clonorchiasis (Jin-Kyoung Oh, Min Kyung Lim et al. 2014) are still important factors in the eradication of this condition.

2.2.2 Thailand

Prevalence and geographical distribution

In Thailand, liver flukes infection, or Opisthorchiasis, has been recognized as a major public health problem in the northeastern and northern regions for a long time. The following literature presents the evidence.

According to the study of P Jongsuksuntigul and T Imsomboon (1998), surveys of epidemiology conducted during the past decades indicated a high infectious rate in the northeastern region from years 1953 to 1981. From the nationwide evaluation in 1996, the prevalence rate throughout the country is not homogenous and varies widely region by region. The most concentrated area was the northern region while the northeastern region was in the lower rank. This result might be affected by other intestinal flukes in northern region and the impacts of control program in the northeastern region. When we compared the results of 1981 with 1996, the prevalence of the condition in the northeastern region remarkably dropped but the prevalence in northern and central regions considerably rose.

Kaewpitoon N et al. (2008) have studied the national survey by P Jongsuksuntigul and T Imsomboon (2003) and mentioned that the highest prevalence rate was found in northern region. The northeastern region was second. Third was the central region, and there was no significant rate of prevalence in the southern region. However, in 2003-2006, the northeastern region rose to the first rank, replacing the northern region. The central region showed only a few cases and there

were still no cases reported in the south. Although the prevalence in the northeast was higher than the north, the morbidity rate in the northern region was relatively higher. In terms of provinces, from 2003-2006, Sakhon Nakhon and Yasothon ranked at the top, with Opisthorchiasis cases being detected every year.

Unlike other studies, Ram Rangsin et al. (2009) have indicated that the prevalence was not different between sexes but different in each age group, in which the higher risk was found in older age groups. On the other hand, Kaewpitoon N et al. (2008) have suggested that the high prevalence rate was among males rather than females due to frequent drinking and social participation.

The difference between genders might not be found in some of the above studies; however, all studies indicated that the prevalence rate varied diversely among the age groups. E.S. Upatham et al. (1988) indicated that older people usually have higher rates. Within each age group, the intensity of pre-treatment infection would affect the intensity of reinfection. The heavy pre-treatment infection tended to have higher infection rates. They found the highest reinfection rate in heavy pre-treatment cases that aged 40 years old or older. P Jongsuksuntigul and T Imsomboon (1998) observed the lowest rate in age 0-14 year-old group and highest in 40-49 year-old age group. As well, the prevalent rate was higher as age increased. Nonetheless, the rate was considerably high in younger groups. Kaewpitoon N et al. (2008) suggested some differences in the order of prevalence within age groups, but older age groups between 55-64 years were still found to have the highest rate, and it was

found that infection began in the 0-4 years age group. Ram Rangsin et al. (2009) also presented higher prevalence in older age groups and the people over 60 years old had a greater risk of infection as indicated in Suwannahitatorn et al. (2013) study. Also, people aged 65-69 years with chronic Opisthorchiasis were more likely to develop cholangiocarcinoma than other age groups.

Additionally, E.S. Upatham et al. (E.S. Upatham 1988) conducted research in selected communities in Khon Kaen Province which were known to be high endemic areas of Opisthorchiasis in order to answer two main questions: how rapid was the reinfection in the successfully treated cases, and the relation of pre-treatment worm loads and the rate of reinfection. As a result, the positive rate of infection had gradually changed to negative after 2 weeks and 2 months of treatment. However, after 10 months, the positive rate increased again and the intensity of infection was stronger after one year. It was indicated that the reinfection would happen and at almost the same level as the previous level within one year after treatment. Also, the relation between the original infected rate and reinfection rate were found. The reinfection rate of previous heavy infections was approximately twice and more rapid reinfection than in previous light infected cases.

Management and control

In Thailand, Opisthorchiasis has been as a major problem of local public health in the northern and northeastern regions for over forty years (P

Jongsuksuntigul and T Imsomboon, 1998). This fact has drawn the attention of the government to take part against the infection. An Opisthorchiasis control program was included in the national public health development plan. Thus, the nationwide control operation was firstly started since the sixth health development plan (1987-1991) (Suwannahitatorn et al., 2013). According to both P Jongsuksuntigul and T Imsomboon (1997&1998) and Suwannahitatorn et al. (2013), the main strategies of the national control program were contained by three approaches based on control and prevention. These were stool examination and treatment with praziquantel to eliminate the human host reservoir, health education focusing on avoiding the consumption of raw and undercooked fish to interrupt an infection of liver flukes and environmental sanitation development for hygienic defecation to interrupt transmission of disease. To do so, several activities, including the organization of mobile stool examination team, community preparation, mobilization of individuals, family members, community participation, and health education were eventually designated.

In the study of P Jongsuksuntigul and T Imsomboon (1997, 1998), They assumed that the reduction of overall prevalence among northeastern population in 1994 might be the effect of sustaining control program in the northeastern region. However, they also found some evidence of reinfection in the treated cases and the infectious rate remained high in some areas. They claimed that it was because of a lack of follow-up stool examination as well as the weakness and ineffective

management of healthcare services and public health workers on many levels. So, they have recommended that the control activities have to be strengthened, and that the whole process of all operations should be seriously considered. And the strong support in terms of policy and budget from the government are important factors for the control program.

The national control program and its activities may be blamed because of its gap in terms of coverage and comprehensiveness. Suwannahitatorn et al. (2013) have pointed this out in their study conducted on a village of the central region where the majority of the villagers are farmers who have traditional northeastern culture and lifestyle including eating habits. The study showed that the northeastern community that was outside the northeast region was neglected since the national control program would mainly cover endemic areas in the northeastern and northern regions. The participants of the study lacked important knowledge which resulted in low awareness of infection and the dangers of raw freshwater fish consumption. It made them lack concern of its asymptomatic symptoms and did not realize the risk of cholangiocarcinoma. In addition, the continuing habits of raw fish consumption also occurred due to unspecific raw fish consumption prevention campaign because they thought they have to stop eating all kinds of them including their main ingredient, Pla ra which were actually safe due to the concentrated salt used in the cooking process. This made them feel as though it would be difficult to follow the campaign. Since the Koi pla is a major risk factor for acquiring Opisthorchiasis, the

prevention and control program should have emphasized on reducing consumption of Koi pla and the general term of uncooked fish consumption should not be used. In other words, a clear message should be used to make the health promotion campaign more effective. Moreover, they found high levels of unhygienic defecation of immigrant workers and villagers while working in the rice paddies despite the availability of improved sanitation. Therefore, they suggested carrying out frequent control campaigns and improvements of both diagnosis and treatment at the local health center level as a national strategy, because communities of northeastern Thai people are distributed in many areas around the country.

There were campaigns regarding the raw fish consumption and providing praziquantel for years, but the rate of Cholangiocarcinoma showed no signs to decline. In addition to a lack of knowledge, there were other factors that made the efforts of the Ministry of Public health fail. The study of Narong Wongba et al. (2011) presented more reasons for the continued consumption of raw fish from the perspective of housewives as follows: traditional food, more delicious, and easy to purchase, as well as the habit of taking the antihelminthic drug among the participants in their study.

Narong Wongba et al. (2011) conducted an action research on the prevention and control of liver flukes at a village in Khon Kaen Province. Firstly, they provided the health knowledge on liver flukes using various methods such as lectures, video, exhibitions, experience and discussion. Because of the frequent use of antihelminthic

drugs in the villagers, the researchers also provided education on the medication about the possibility of liver cancer from the overuse of this drug. After participating, the villagers showed a good attitude toward liver fluke prevention. They showed a greater degree of acceptance towards having stool examinations. They tended to change their eating habit, indicated by the decrease in the proportion of liver flukes after the study and the complete absence of reinfection cases. Narong Wongba et al. praised that the success also came from the "Club of non-eating raw fish" established by the participants themselves. In this club, the villagers not only could exchange their ideas but also follow up the risk family. They made daily records to take note of any risk. So, this suggested that visiting and follow ups on at-risk family members is another effective way to reduce liver flukes. Additionally, the villagers could learn to communicate and cooperate to strengthen the club and provide information to the others. The conclusion drawn from this study was that the participants or villagers are the most crucial mechanism in sustaining the prevention and control of liver flukes in the community.

As the most preventive method to stop the transmission is to avoid eating raw freshwater fish, health education was provided to people in endemic areas to build up the health awareness which would contribute to the change of eating habits. However, it still has not fully succeeded due to the involvement of many other factors. According to Ram Rangsin et al. (2009), the health education could not effectively work especially with the elderly because older people still strongly

maintain their habits. Thus, it might be better to focus on the young people who might be able to change.

Due to the interest in the resolution of liver flukes infection, Buri T and Prawat B. (Buri Tippanas 2009) have studied the changing habit of raw fish consumption in Chiangkwan district of Roi Et to find out the impact on this habit. To do so, they divided the villagers into two groups; an experimental group and a control group. The experimental group was added with the changing eating behavior pattern created by the researchers which was composed of various extra activities such as villagers' meeting for information announcement design and method of solution, surveillance of risk behavior in family by family members and the demonstration of helminth in raw fish by using a microscope. Meanwhile, the control group received only a normal control program as implemented in other areas. After using this special measure, the villagers in the experimental group tended to have a stronger attitude toward prevention and control compared to the control group. Also, health performance has improved significantly. They increased the cooperation in stool test and the rate of infection has markedly declined. This result implied that the habit of eating raw fish has changed. This has suggested that villagers in the experimental group have been created health awareness from knowledge and information gained from the meeting. The researchers mentioned that a significant contribution to the success of the program in the experimental group was the demonstration of helminth via microscope, as this provided concrete evidence to

the villagers that there were really liver flukes in the fish they regularly consumed. The researchers stated that this measure should be further developed and applied in the future.

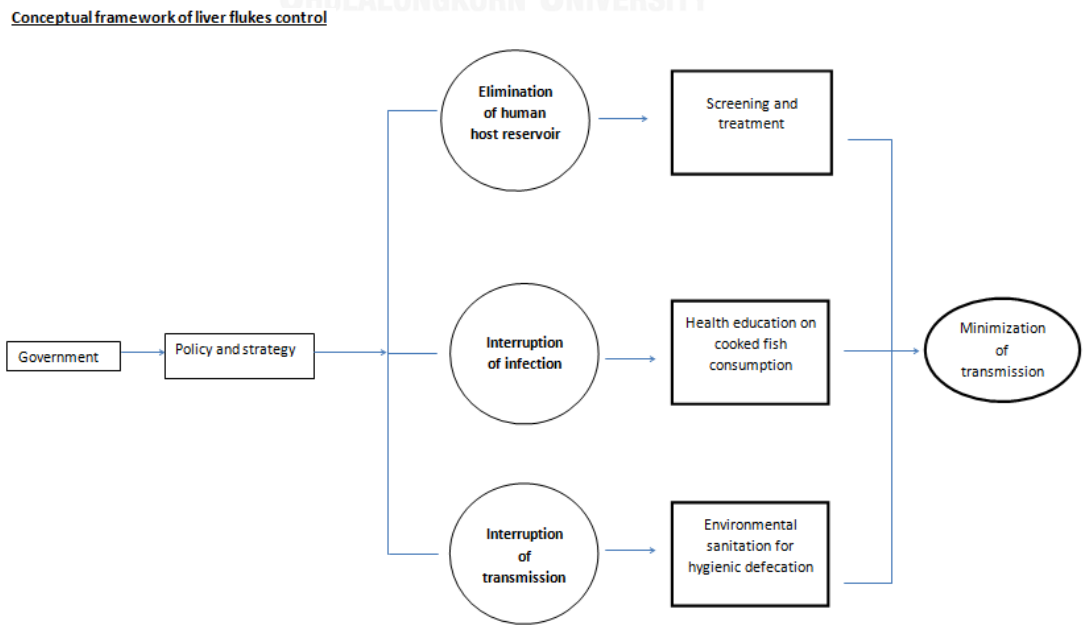
CHAPTER III

CONCEPTUAL FRAMEWORK

To restrict the scope of the study, this chapter reviews different frameworks and researches to understand the concept of liver flukes control. This review was finally constructed to be a comprehensive conceptual framework for the analysis of the effectiveness of health policy toward liver fluke infection. However, the examination of effectiveness alone is still not enough to answer the research questions as well as to fulfill the objectives. Therefore, the policy analysis framework would also be adopted to highlight the factors that contributed to either negative or positive outcomes of the health policy after implementation. Besides, there is a need for a conceptual framework for the comparison of the policies between South Korea and Thailand since it is one of the key aims in this study. So, these 3 conceptual frameworks would be described how they could be approached and developed as well as identified the elements implied by these proposed conceptual frameworks.

3.1 Effectiveness of health policy examination

The effectiveness of the policy will be evaluated based on the social indicator and its implementation. The social indicator is statistics which are used to measure and describe social, economic, or political conditions and their changes over time. The indicator is comprised of numeric indices such as the amount, quantity or rate observed from any situations, and the subjective or perceptional indices, like perception, contentment, or realization towards some issues (Yavaprabhas 2014). So in this study, the numeric index which is the infection rates from either nationwide or regional surveys of the endemic areas since the 1970's will be used to evaluate the effectiveness of the policy in terms of the minimization of liver fluke infection. Also, the implementation will be evaluated based on the scope of the conceptual framework of liver flukes control to determine whether the implementation was operated effectively or not.



This first conceptual framework originated from the conceptual framework of liver fluke control, Opisthorchis viverrini, which revealed in the study of P. Jongsuksuntigul and T. Imsomboon (2003). In their study, they have suggested the strategic approaches for the liver fluke control by giving the main strategies which were comprised of 3 interrelated approaches that I would introduce. But before talking about the elements of the strategic approaches part, it's important to consider the key player, which is the government.

Government

The government can be considered as the most crucial player in the process of health policy regarding liver fluke control due to its responsibility in policy formulation, implementation and control. However, the central government alone could not handle the whole process, particularly when it comes to implementation on the local level. So, various agencies and local divisions are necessary as one of the important cogs to drive the success of a public health strategy, particularly when the healthcare facility and service needed to be offered to the mass.

While the central government plays an important role in South Korea's healthcare policy and provision, the local government takes an auxiliary role in supporting the central government policy. That is, all health policy decisions normally have been made by the central government. The Ministry for Health, Welfare, and Family Affairs (MIHWFA), as the central government department, has

played a role in deciding on major health policy and supervision in the management of the divisions under its control such as the National Health Insurance Corporation (NHIC) and the Health Insurance Review and Assessment Service (HIRA) as well as allocating government subsidies. Moreover, the MIHWFA would set up special organizations such as the Centre for Disease Prevention to work on some issues to reinforce the effectiveness of the health policy and system. In broad terms, MIHWFA plays a leadership role and has overall supervisory responsibility for the health system by using various regulatory mechanisms as specified by the National. As a supportive player, the local government will function in public health aspect which mainly focuses on preventive health and promotion. One of the major responsibilities is to operate public health centers to provide primary public healthcare services for local residents, including vaccinations, health education, health promotion and so on. In the study of K.J. June et al. (2013), primary healthcare posts have functioned in providing primary health care services to residents in riverside areas where Clonorchiasis is endemic (Chang Bae Chun 2009).

Similarly, public health services in Thailand are provided by the central and local administrations. The Ministry of Public Health (MoPH) is the government ministry of the central administration that is responsible for health policy, and it is defined as the pivotal organization in the public health system. Like the MIHWFA of South Korea, the MoPH is the keystone which has authority in determining both the national and international health policy and strategy as well as governing various

divisions under its control in order to make sure the policy operation is correctly done. These sub divisions have to be set up to provide healthcare service and facility according to the health policy especially for the local area residents whom are always limited in healthcare accessibility. An important sub division is the Bureau of Rural Health Administration that is responsible for the local level. This division is also divided into sub-regional units, including the provincial public health office, district health office and public healthcare. This complexity is to ensure the coverage of health services provided for the population. Furthermore, the allowance of community participation, such as community health volunteers, is also a meaningful way of supporting health policy implementation in terms of developing trust with local residents, providing healthcare services, and community preparation by encouraging the ability to take care of themselves, family and community. So, it will contribute to the awareness among the people which will bring to the public cooperation. Also, the National Health Assembly, in which the government also takes part, is defined as one of the key instruments for both stronger civil society participation in health and the advance of health policy at national level.

To ensure the equity of accessibility in healthcare service among the population, South Korea and Thailand governments have provided health financing support and improved the delivery of healthcare, particularly attaining and sustaining the coverage. In South Korea, the healthcare system consists of two main providers the public and private sectors, but as public healthcare investment was small, the

healthcare system was designed to allow more accessibility to the private sector. As a result, the private sector has taken the major part in the healthcare delivery system, 90 percent (Chang Bae Chun 2009) (Lee 2012). However, the government itself has accomplished universal health coverage with the introduction of the National Health Insurance program (NHI). Initially, South Korea had used different insurers for the diverse social sectors. However, problems of double insurance policy enrolment and varying beneficial contribution among the insurance companies were identified. Therefore, all health insurances were integrated into one single national health insurer, which helped to secure the support for all social levels. The NHI was implemented and its coverage extended to the various social sectors, covering almost all of the total population in year 2007. Meanwhile, the remaining population approximately 3.7 percent, who were mostly the poor, received benefits from the Medical Aid Programme (Lee 2012).

While South Korea has been using the single health insurer system, Thailand has still relied on various health insurance schemes within the majority of its public delivery system. Before the “30 baht treatment for all” was introduced, there were four main public health protection schemes including civil servants medical benefit scheme for civil servants and their dependents, low income card scheme for low income families, individuals, and people with disabilities, voluntary health card scheme, and social security scheme for workers (Lee 2012). There was an attempt by the government to integrate all these schemes into a single national insurance

system because their function overlapped, but the government's effort was resisted by the formal sectors that acquired benefit from dual coverage. Consequently, to implement a single national insurance system the 30 baht scheme, the voluntary health card and low income card schemes were carefully consolidated into the Gold Card Scheme. This was divided into two tiers; one which included the 30 baht co-payment and one which did not. To regulate the schemes, the government gained authority from the National Health Act (NHA) in 2002 for both quality and financial control. The various health schemes such as the Gold Card have benefited Thailand by extending the coverage of health insurance across the population, both rural and urban, and developed universal coverage (Lee 2012).

Policy and strategy

Since liver fluke infection has a significant impact on countries, it is clear that both South Korea and Thailand would focus on health policy and strategy to control infection. In South Korea, the first national survey of Clonorchiasis by eggs was conducted by the Ministry of Health and Social Affairs in 1958. Then, the Korean Association of Health under the direction of the Ministry of Health and Social Affairs undertook surveys of the prevalence of intestinal parasitic infections every 5 years in 1971, 1976, 1981, and 1986 (Rim 1990). However, the implementation of control was still not operated until the 1980s.

Practical control measures were actually attempted in 1981 when an antihelminthic drug called praziquantel was found. After the introduction of the medicine, the Ministry of Health and Social Affairs and the Korean Association for Parasitic Eradication or KAPE conducted the pilot project of treatment by using this medication. This was done in order to find out the most convenient and effective dosage and schedule when providing it for mass chemotherapeutic control, which the Korean government launched between 1984-1990 (Rim 2005). Recently, the national control program is still being implemented. As a part of the national control program, mass health campaigns aim to change the risk behavior of raw freshwater fish consumption have been implemented and promoted using such implements as posters. The praziquantel treatment is also offered in egg-positive cases detected from mass screening with stool exam in endemic areas (Jin-Kyoung Oh, Min Kyung Lim et al. 2014).

In the case of Thailand, the Department of Health has set up and organized various units in many provinces since the 1950s, such as intestinal helminthiasis control units and a liver fluke control unit. The services provided by these units were diagnosis and case treatment because these were a main strategy of Opisthorchiasis control at that time. Later on, control activities were emphasized in community health education with a variety of approach strategies such as cooked fish demonstrations, the provision of low-cost cooking pots, and so on. In 1980, studies on the effective dosage of praziquantel conducted by the Faculty of Tropical

Medicine, Mahidol University was helpful to the control of liver fluke infection in the later period.

However, the significant development of liver fluke control operation started when it had been included in the 6th 5 -year National Public Health Development plan (1987 - 1991). According to the plan, all health facilities in the Northeast must be responsible for liver fluke diagnosis and treatment under the technical support of the Department of Communicable Disease Control. Then, the promotion of community health through parasitic control in seven northeastern provinces was established during 1989-1992. Through this project, cases were detected and received treatment. The liver fluke control program was expanded to all provinces in the north and some provinces in central Thailand in 1992. Even now, the control activities are integrated into comprehensive rural health service of all target provinces in which the degree and extent of activities vary situationally in each province (P. Jongsuksuntigula and Imsomboonb 2003). Additionally, the governmental sector also participates in health assembly which is the cooperation of every sector, whether governmental or nongovernmental sectors, in order to develop the public health policy and solution.

Approach

According to Rim (2005), there are many approaches that can be used for controlling liver flukes such as the promotion of diagnostic techniques,

chemotherapy, the provision of satisfactory sanitary facilities, environmental control, health education and application of the Hazard Analysis and critical control point. However, the above approaches are quite wide and complicated since there are many aspects to evaluate. So, the strategic approaches for liver fluke control suggested in the study of P. Jongsuksuntigul and T. Imsomboon (2003) have been adopted because it's easier and clearer to utilize as a conceptual framework for the evaluation of the effectiveness of health policy since it is comprised of only 3 interrelated approaches. These are eliminating the human host reservoirs, interrupting the infection of the liver fluke and interrupting disease transmission. By this framework, the crucial strategy of health policy of both South Korea and Thailand would be evaluated as follows:

- *Eliminating the human host reservoirs*

Since freshwater fish are a popular food, the human enter and complete its biological life cycle by consuming those fishes and acts as the final host. So, the way to control the liver fluke infection is the eradication or elimination of human host reservoirs. To do so, screening for positive cases of infection is necessary to be carried out throughout endemic areas. Basically, there are many types of medical techniques to determine the infected cases. However, the method of stool examination is frequently used since it does not take much time and has a low cost, and is also more convenient because it does not require any special preparation

from the patients. Moreover, it's very sensitive in the detection of the eggs of helminth. So, it's especially suitable when used with numerous people, like in mass screening. In addition, treatment should be offered to egg-positive cases. Praziquantel, thus, would be provided as the drug of choice for liver fluke infection. This medication proved to be the most rapid and effective method to control liver fluke infection, which both South Korea and Thailand have been relying on for a long time. However, the control program consisting of these two measures is still questionable in sense of its effectiveness due to the comprehensiveness in distribution, particularly in remote or undeveloped areas where the people lack knowledge about disease and their rights in medical care service accessibility. So, this is in need of evaluation in order to improve the intervention of infectious control.

- *Interrupting infection of the liver fluke*

In addition to screening and treatment, the most practical way of preventing human infection is to avoid eating raw or undercooked freshwater fish. In order to do so, health awareness should be constructed through knowledge of liver fluke infection and cooked fish consumption. According to Rim (2005), in the areas where it is customary to consume raw freshwater fish, educational propaganda stressing the importance of cooking fish appears to be the most effective measure of prevention. Buri Tippanas, et al. (2008) and Naraong Wongba, et al. (2011) have supported the significance of health education in changing or improving the appropriate eating

behavior of people by raising both health awareness and attitude. When the participants of studies have awareness, they would be able to prevent the infection. Also, changing the eating behavior is the way to resolve the problem at its source. Therefore, regular effective health education is a useful means of changing the eating habits in endemic areas. Both South Korea and Thailand also seem to place emphasis on providing health education to their population in recent decades. Nonetheless, it is exceedingly hard to carry out this measure in areas with centuries-old traditions. So, this aspect on interruption of infection by effective health education is absolutely necessary.

- *Interrupting disease transmission*

The first approach to be implemented in countries may be the construction of hygienic toilets and environments in most endemic areas. Apart from the hosts, environmental factors directly affecting the completion of larval development. So, the environmental sanitation development to improve hygienic defecation could interrupt the transmission of the disease because it prevents the human feces containing liver fluke eggs from contaminating local water sources. As a consequence, the eggs would not be eaten by snails, burrow into fish bodies and definitely could not develop into the infectious stage. Hence, the infection will be reduced. However, Rim (2005) stated that it depends on the development of infrastructure. Generally, both South Korea and Thailand have developed significantly

in terms of infrastructure, especially South Korea, which has already achieved the stage of developed country. But the problem of poor hygiene still appears as the major problem in many local areas of Thailand. From the study of Picha Suwannahitatorn, et al. (Picha Suwannahitatorn, Saranapoom Klomjit et al. 2013), unhygienic defecation occurred while the residents were working because there were no latrines in the rice paddies. Also, most immigrant workers defecated in the field, because they did not stay in house like local villagers. Based on this information, the environmental sanitation should be investigated.

Minimization

The control of the liver fluke infection is fundamentally directed at reducing or eliminating disease transmission so that no more new infection, reinfection or super infection occurs. In this study, therefore, the effectiveness of policy regarding liver fluke control will be determined and evaluated based on the outcome of the policy in terms of efficiency in the minimization of the infection, both sustainably and continuously, particularly when many crucial factors influence its implementation.

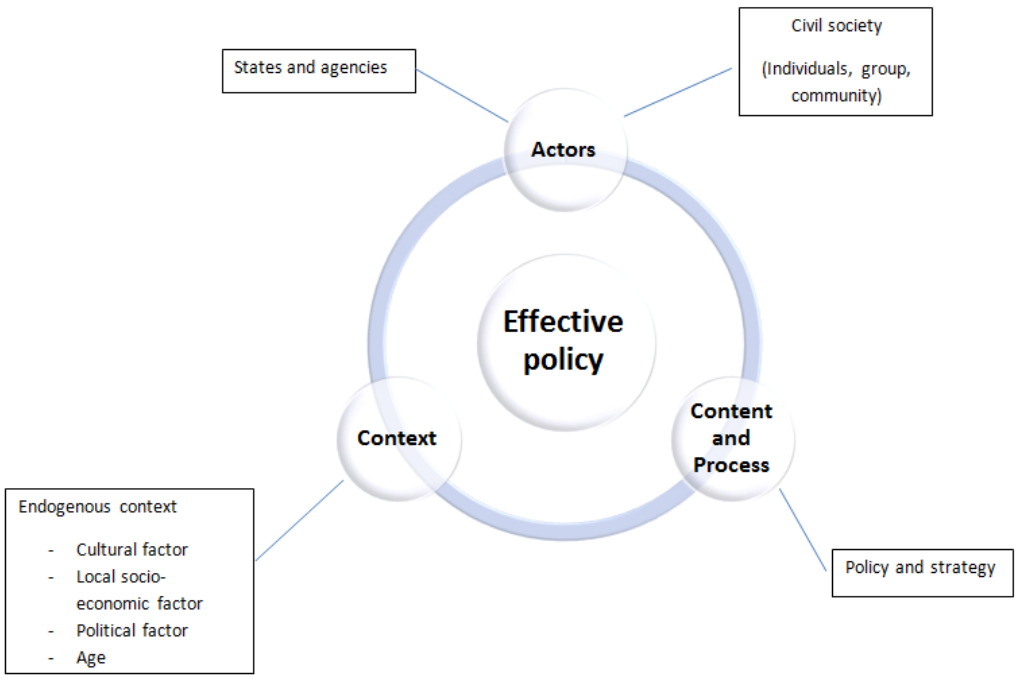
The strong support from the government and agencies in terms of policy is crucial in the continuation and maintenance of liver fluke infection control. Appropriately active action must be carried out through the endemic areas where the infection does exist. Primary health care facility infrastructure and facility have to

be provided in all target areas. Importantly, the extensive of hygiene, health education, screening and treatment should be given the attention. Therefore, all these 3 matters will be approached in order to evaluate the effectiveness of health policy in minimizing the infection by conceptual framework of liver flukes control. However, this framework can assess only one aspect of health policy. In order to provide comprehensive information, factors contribute to the result of the policy must be also investigated further by using the suitable policy analysis framework.

3.2 Factors of the health policy outcome identification

In order to find out the factor influencing the outcome of health policy, it's necessary to utilize framework particularly for policy analysis. Thus, I have created framework by using concept obtained from a framework suggested by Sukhontha Kongsin & Sukhum Jiamton (2007). My policy analysis framework would focus on 3 approaches including actors, context, content and process.

Policy analysis framework



1. Actors

This is an important mechanism in the policy process due to a major function of policy formulation and implementation and the actions of these implementers can determine the success or failure of the policy. For comprehensive analysis, it's necessary to approach both in the aspects of states and people who respond by following the released policy.

1.1 States and agencies

According to the institutional model proposed by Thomas R. Dye, policy is a product of institutions or organizations. So before analysis, an understanding of the

political system should be made. It's necessary to clarify what are the principle institutions and their functions in policy formulation, as well as the other institutions which are responsible for the operation and enforcement of policy in society (Sukhontha Kongsin and Jiamton 2007). In other words, this model specified and suggested a relationship between various institutions and how they all work together for a successful policy implementation. Under this model, institutions in society are seen as complementary in the policy process. The success of policy depends on the ability to fulfill their tasks and this ability is linked to the crucial factor, which is people in each organization. As the policy process is concerned with a large number of human resources at different levels, the major obstruction usually occurs from ineffective management together with noncompliance and the lack of support between divisions. Moreover, the great attention of the government is also important because agencies under its direction will be more concerned and give priority only on the issue which the government emphasizes. So, if any policy has been ignored by the government, its agencies will rarely be active in that policy implementation. According to Rebecca Sutton (1999), implementation makes change of policy in some degree, that is, policy is often changed as it moves through the central to local level where it is implemented. This may occur by the distortion of officials either from misunderstanding or disagreement. So, the function performed by these institutions is a major factor determining effective policy implementation that should be considered.

1.2 Civil society

This refers to the public sector: the individuals, group or community which takes an important role as responders who follow the policy. Implementation of policy among this sector can be defined as a crucial approach for policy evaluation, indicated by how people perceive and respond to it. The problem and obstruction of policy implementation mainly is the lack of public cooperation and participation. This may be influenced by some reasons, for example, a lack of motivation and health awareness which resulted from knowledge deficiency or some local context. Moreover, it may cause by disagreement or resistance of local people toward policy. Therefore, public preparation is also important for developing trust with people.

2. Context

The context is significant since it greatly impacts social action, events and statements. The same activity or behavior may have different consequences depending on different contextual meanings (Neuman 2014). Based on many studies, several factors related to the occurrence of liver fluke infection can be evidently identified in all cases. These factors occurred internally in the country as endogenous context. Some examples are cultural, local socio-economic, political factors and age. These made people increase contact with the source of infection and promote the dissemination or transmission of the disease, resulting in rising prevalence. If this is

still ongoing, the infection will definitely continue to emerge. Among all factors, the culture, belief and values of people seems to be the main barrier for liver fluke control in either South Korea or Thailand where a traditional dietary and social custom are deeply settled in daily living since a long time ago. The social gathering for drinking and raw freshwater fish consumption has frequently participation by males (Kyung Ja June, Shin Hyeong Cho et al. 2013). Some mothers feed raw fish to their children, believing it's healthy for their growth (Rim 1990). However, the consumption of raw or undercooked freshwater fish dishes is commonly found in all generations, particularly in the elderly who still prefer to maintain this eating habit even when health education has been provided (Ram Rangsin, Mathirut Mungthin et al. 2009).

With regard to Picha Suwannahitatorn, et al. (2013), the relation between age and ability to change habits is presented. They have suggested that promoting liver fluke infection control is better provided to younger generations like school children, because they are more open and adaptive. Similarly, Ram Rangsin, et al. (2009) suggested health education should focus on the young generation because they are more likely to change. This suggests that the age of people is also one factor which affects the ability for adaptation.

Other factors, such as socioeconomic, may also be involved. According to Narong Wongba, et al. (2011), raw fish dish is easy to purchase. Moreover, it is a low cost meal since it does not need cooking equipment, fuel or fire to prepare (Picha Suwannahitatorn, Saranapoom Klomjit et al. 2013). So, this is also convenient

especially for the housewives who have a duty to prepare food for the family. Additionally, the political situation and unstable political institutions should be concerned. Frequent changes of political authority may impact policy and its operation in terms of continuity, control and follow-up (อังศุชวาล 2012).

3. Content and Process

Apart from the actors and factors surrounding health policy, the content and process of policy is also very important since it covers the whole part of policy. The content of policy is significant in indicating problems, purpose of policy, desired outcome, scope, action, and responsibility, as well as the regulations or requirements for its operation. So, policy content can directly affect an administrative system of various institutions of the country, both political and social. In other words, the content of various policies will provide principles in guiding performance. Therefore, policy must be clearly delivered to implementers and people in order to prevent misinterpretation which might result in unexpected outcomes.

The problem regarding the clarity of policy can occur in any step due to some careless actions such as unclear policy objectives, processes, responsibility specifications or problem identification. This also can occur during implemented phases like when an unclear massage was passed to the people. In the study of Picha Suwannahitatorn, et al. (2013) can provide a good example of an unworkable

preventive campaign when a general or unspecific term of uncooked fish consumption was promoted. The villagers found it impractical to follow because they believed that they were being told that they have to stop eating even fermented fish, known locally as Pla ra, which is one of the main ingredients in local dishes. But in fact, Pla ra is safe since highly concentrated salt in its 6-month fermentation process make the metacercariae of O. viverrini impossible to survive. Only the consumption of chopped raw fish or Koi pla is a risk for infection. So, if a clear massage such as “avoid Koi pla consumption” is used in this case, the health promotion campaign will be more practicable and feasible.

For policy process, each step will usually follow the order listed and make sure that the process is done correctly. Process means not only when the policy was implemented but it refers to any steps taken since the problem was identified until the evaluation of the result is completed. In many cases, these steps are turned into a cycle, with each step being repeated as changes occur; when a policy is evaluated. Scholars have a different way of classifying the steps of policy process depending on their own focus. If we consider processes in general, all classifications are similar. However, the classification of policy process proposed by Dror (Yavaprabhas 2014) of policy formulation, policy implementation and policy evaluation will be adopted for convenience (Yavaprabhas 2014).

The problems that arise during any process can surely affect the effectiveness of the policy. To formulate policy, it’s very important to carry out problem

identification. This process needs collaboration from many groups of people and requires great analysis before making the decision. Nevertheless, this process is hard to manage because problems are difficult to identify. This may happen due to the complexity of problems. If the information is insufficient and careful analysis is not conducted, policy will fail to achieve its goals as the size of the problem is not noticed and possibility regard to available resource is not considered. Additionally, policy may lack effectiveness when it comes to the process of implementation due to many reasons, especially human resources and organization, as previously mentioned. In addition, it is caused by material or budget. All of these are big barriers in policy enforcement and implementation. As a result, administration will become more complex and the continuity of policy will be blocked. So, this process should be considered together with actors when the policy is approached. Policy evaluation is necessary in follow-ups for accurate and effective policy implementation as well as in problem and obstruction detection. This process is not only for outcome but it's also a meaningful tool of decision-making for policy change, development or cancellation. So, it's very essential to clearly set up policy objective. Otherwise, evaluation of policy outcome will be impossible. Additionally, validity and reliability in evaluation is also in concern.

As a contribution to the policy analysis, this framework will shed light on the factors that impact policy implementation. These are divided into three basic categories as I have listed earlier and given some details in general. Many of these

factors are interrelated. For example, the consumption of raw or improperly cooked freshwater fish dishes among the residents of endemic areas is considered a habit influenced by traditional culture. This dietary culture inherited from predecessors has built up ultimately harmful beliefs and attitudes. If health education was not effectively provided to those people, they would lack health awareness. As a consequence, the infection will surely continue to emerge. Therefore, the state and its agencies should take an active role in controlling the infection. However, if the political issue is raised and various state agencies lack unity, the policy and strategy will not be effective, and it will be impossible for it to succeed. Also, if the content of policy is unclear, its operation will not be undertaken properly. This can affect trust and motivation or bring about resistance from the public toward the government. Further discussion on these contributing factors will be more deeply presented in the following sections that will make a significant appearance as a result and conclusion of this study.

3.3 Comparison between South Korea and Thailand

According to the objective of the study, this final framework was created to use for comparing South Korea and Thailand. To compare, Thai health policy regarding the Opisthorchiasis will also be analyzed by the same frameworks as South Korea's health policy. After that, the result obtained from these analyses of South

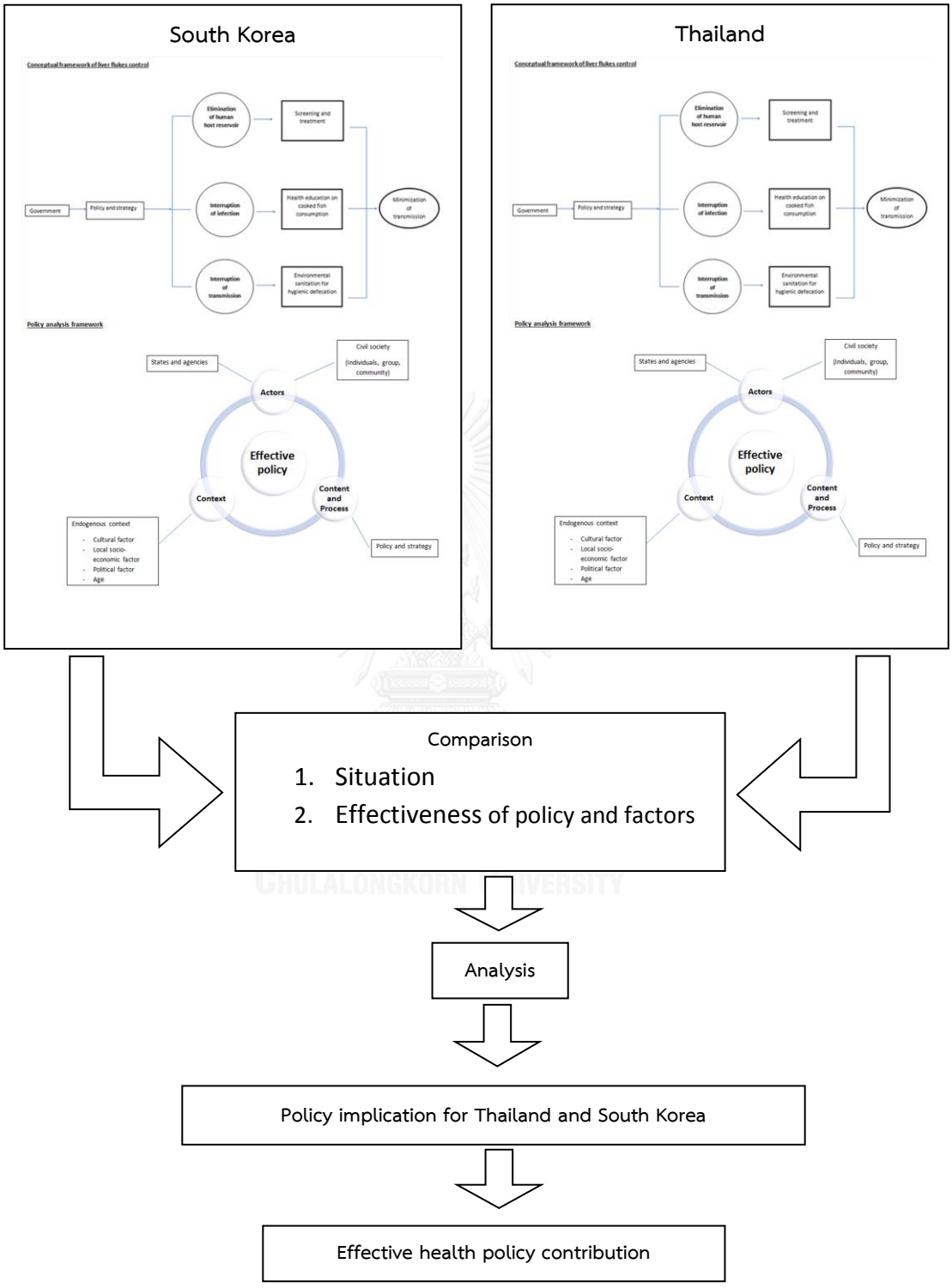
Korean and Thai health policy will be compared by the third framework which has been shown in figure 11.

The comparison will mainly emphasize policy and its effectiveness as well as the situation of the disease in both countries so as to inspect for similarities. This process of analysis will help to find out how both countries may be able to learn and apply in their own countries particularly the policy implication for Thailand that will help to generate a practically effective health policy for liver fluke infection control.

From the information provided in previous chapters, these two countries look similar since the liver fluke infection is a significant health problem of South Korean and Thai people in the endemic areas of the countries. This means that both countries are facing the same crisis of either morbidity or mortality among their own popularition, especially in Thailand, where cholangiocarcinoma cases have been consistently reported. In general, the prevalence fluctuates and still remains at relatively high levels despite the countries' development of infrastructure and health facilities, especially the effective anthelmintic drug. The infection has still been concentrated in the same endemic areas, gender and age group of both countries. According to T. Collins (2005), the appearance of a health problem that needs intervention can indicate an ineffectiveness of existing health policy. So, the analysis should be held to address the problem and be explored for alternatives. With this statement, it can imply that the health policy of two countries is not capable, even

though the national control program was implemented over a long period of time. Lacking strong health awareness in eating behavior seems to be identified as the major barrier in both countries. Although the previous data has shown some similarities, it is too early to make a conclusion. Therefore, more information will be carefully analyzed within the scope of this comparison framework.

Figure 11: Conceptual framework of Health policy comparison



CHAPTER IV
RESEARCH METHODOLOGY

4.1 Research design

Research design must be planned and customized in advance before the research operation in order to facilitate the efficient and smooth process, as well as to maximize information with a minimized expenditure of cost, time, and effort. Since we are going to deal with the effectiveness of health policy in the coming chapters, this study has been designed as the descriptive research by using the qualitative approach.

According to W. Lawrence Neuman (2014), descriptive research is the type of research which describes a social phenomenon or which describes how things are. So, this type of research will focus on presenting a picture of the specific details of any situation or relationship by describing the pattern which will help to clarify a process or mechanism as well as report the background and context of the situation that will help to locate data. The well-defined issues and accurate description of an outcome will be a detailed picture of the issue, which is the answer to the research question. As a part of public policy, health policy can be described as a social activity which contains a lot of steps, processes and mechanisms, and it has a huge relationship and impact on society. Conversely, the background and contextual

elements of society has a great effect on health policy, both in terms of its formulation and implementation. In other words, the health policy and society as well as its context have a deep relationship which cannot be separated. Therefore, there is no doubt that the success or failure of the policy depends directly on these factors. Hence, to assess the effectiveness of health policy and strategy, these important elements have to be accurately clarified. So, the key point of descriptive research should be adopted in this study.

To evaluate the health policy, the assessment could be carried out by two aspects: through the view of policy makers and related agencies or based on the population facet. However, taking the outlook of the population is time-consuming and more complicated since it's necessary to operate a large-scale survey. Therefore, it is not feasible given the time frame. Hence, the viewpoint of health policymakers and those agencies is a better choice for this study. To obtain the data on perspective, a qualitative approach should be adopted. The quantitative approach is usually based on hard data which is in the form of numbers. Additionally, the quantitative approach usually follows a linear research path. So, the quantitative approach is not a good way to reflex an insight of any phenomenon since it is not able to neither clarify the multifaceted phenomenon nor generate the depth and detail of the data to explain the context surrounding the issue.

Meanwhile, the qualitative approach allows the researcher to discover more details. In fact, the social setting, event or statement depends greatly on the context

in which it appears, such as socio-cultural, emotional or spatial context, and so on. With different contextual meanings, the same actions or behavior will have different consequences (Neuman 2014). The outcome of health policy implementation also depends directly on these contextual elements. So, when health policy and strategy are going to be examined, the context should also be considered. However, looking at context only is not enough since the health policy has its own dynamic process which needs to be considered. In a qualitative study, the context is significant toward the interpretation and the dynamic is necessary in understanding the process of the issue (Podhisita 2013). Therefore, the qualitative approach will emphasize either the context or the dynamic of the process as well as provide the holistic approach to the data. Hence through the holistic approach, we will understand the complexity and can get more insight since we can look through every dimensions of the issue that we are going to study. Moreover, we will be able to clarify the contextual relationships included in the issue (Podhisita 2013). As a result, an answer for research questions will be extensively obtained. Hence, the qualitative approach is suitable for application in the study of health policy assessment since it can help to identify and provide a fuller picture of the study.

Apart from the advantage in deepening the data, a qualitative approach is also of great benefit in terms of its flexibility in research design for data collection and tools. According to Joseph D. Comtois (1982), to assess the public policy, various strategies should be adopted in order to understand the actual outcome of that

policy. Furthermore, the method should be flexible and open (Yavaprabhas 2014). The adaptability of the qualitative approach will allow for any modification that might occur later with regard to the source of data and situation. For example, the researcher may change the respondent or key informant if the respondent cannot provide enough information. This will help the researcher to access the data fully and reliably, which will result in promoting depth of study as well as provide opportunities for new ideas. This makes qualitative studies significantly different from the quantitative approach with its fixed standard of data collection tools. This comparative advantage has made the qualitative approach become more suitable for this study. Thus, assessing the effectiveness of health policy, particularly when it comes to viewpoints, fits with the utilization of the qualitative approach. Combined with the concept of descriptive research design, the health policy and strategy issue will be accurately and comprehensively examined. However, the data used in a qualitative approach can be obtained from many sources. So, qualitative data, whether primary or secondary, will also be added to provide maximal information and results of the study regardless of the perspective toward the effectiveness of health policy.

Because this study has been designed to be a comparative study, the method of the comparative research design should also be adopted. According to the literature of Peter Lor (Lor 2011), there are three main comparative research designs including single-country studies or case studies, many-country comparison, and few-

country comparison. Since I have been concentrating on comparing two countries, South Korea and Thailand, this study will be of the few-country comparison design. This kind of the comparative research design allows comparing a small number of cases, as few as two or three countries. It is considered as the case-oriented comparative method under the qualitative approach. This method should help to generate insights, and thus it is appropriate to adopt it in this study.

4.2 Data Collection

Adequate data will help to provide a great study. So, collecting information from various sources is very important. The data can be gathered through various ways. Nonetheless, before starting the data collection, the researcher should keep in mind that there are two types of data to be used for the study; primary and secondary. As mentioned above, both data sources would be adopted and presented.

4.2.1 Primary data

Primary data is fresh data collected for the first time. So, it happens to be original in character. This data could be obtained from observation and direct communication which can occur through several methods. Although I would like to focus on relevant literature surveys in this study, the interview method would have strong synergy with documentary analysis.

Interview technique

The semi-structured interview technique has been chosen since the structured and unstructured interview seems to have some limitations. The structured interview may be advantageous in data collection because of the thoroughly prearranged question set which will surely cover all details. However, this set of questions makes the interview not flexible, since it will not allow new ideas to emerge. Furthermore, the interviewer will mainly focus on the questions listed in the paper rather than the key information. So, the interviewer may not be able to observe facial expressions or gestures of the interviewee and the interviewees may feel like there is some barrier between them and the interviewer. As a consequence, they may feel uncomfortable or not feel free to answer or raise any issue which may benefit or be related to the study. Meanwhile, the unstructured interview is the most flexible and adaptable for real situations which provide a considerable benefit in giving rich and detailed information. However, it may be more time consuming. Significantly, it requires an experienced interviewer because it does not have a set of questions for guidance while conducting the interview. So, if the interviewer has no ability to conduct this kind of the interview, it will be very difficult to develop the questions to get to the needed information. For semi-structured interviews, open-ended questions will be set up by using the keywords and used as a guideline for interview. These arranged questions will be flexible during the interview. Therefore, the semi-structured can fill the weakness or gaps of both techniques. By the semi-

structured interview, the new ideas or any issues which may not be previously concerned are allowed to be brought up during the interview and the framework of the questions set up before would be also explored.

Key informants

Apart from the interview technique, the interviewees or key informants are the most crucial in the interview process. Spradley (1979) proposed five desirable qualifications of key informants for the researcher to look for when they are going to conduct a qualitative interview as follows:

- Excellent knowledge and high experience in that field.
- Still working in the field.
- Work in different field with the data collector.
- Have adequate time for interview.
- Good narrator.

These qualifications, however, are merely broad concepts and can be adjusted as deemed necessary, because it is difficult to pre-identify well-qualified key informants. Rubin and Rubin (1995) have suggested that the first thing that we have to be concerned with is whether the potential interviewees fit with the criteria for sampling which we have set up in our research design or not. If the people being

considered are determined to be well-qualified, Rubin and Rubin recommended considering the key informants based on 3 things including;

- Knowledge and experience regarding the study.
- Willing to provide information.
- In case that the study is about many perspectives, the key informants should be selected from various groups of viewpoints.

Patton (1990) also emphasized the importance of the information-rich cases. So, the key information should not be anyone who just has the knowledge or experience but should be the people who the researcher can learn from them rather from the others. Thus, the researcher has to specifically select by considering the goal or purpose of the research (Podhisita 2013).

The most important concern is the knowledge and experience of the respondents as well as the need for a depth of data. Therefore, I have decided to select the key informants based on the concept of the information-rich-case. That means it is necessary to choose the kind of specialist in the field of the Clonorchiasis and Opisthorchiasis as well as the health policy and control implementation because they have both specialized knowledge and high levels of experience. Hence, they can greatly provide an insight and reflect the fact of the situation and government control measures. And it also can help to guarantee that the data is correct and cover the field of the study. However, it's quite difficult to find the appropriate

respondents. So in this case, I have collected the information from the literature review and have listed the names of the organizations which have continuously and actively handled the research regarding Clonorchiasis and Opisthorchiasis. Based on this list, I have chosen the organizations which have many years of direct experience or which are knowledgeable in Clonorchiasis and Opisthorchiasis as well as the control implementation based on their scope of the study. Therefore, two scholars/parasitologists (one from Thailand and one from South Korea) and 2 governmental officials responsible for or who have taken part in the control programs of the two countries (one from Thailand and one from South Korea) would be interviewed. In the case of Thailand, I selected participants from the Faculty of Medicine or Liver Fluke and Cholangiocarcinoma Research Center of Khon Kaen University and the Ministry of Public Health. Meanwhile, key informants from South Korea would be selected from a reputable university and from South Korea's Ministry of Health and Welfare. So, I will interview four key informants in total. Nevertheless, the interview of the South Korean respondents might be difficult to complete. Therefore, the Korean documentary search will also be emphasized in addition to the English literature.

Interview question

I will use the keywords regarding the objective, research questions and hypothesis of the study to arrange the open-ended questions for interviews following

the concept of the semi-structured interview technique. So, the pre-arranged questions will be used as a guideline and it will be modified both in terms of wording, order of questions, and as the possibility of some extra questions will be added in order to get deeper information or interesting points depending on the situation during the interview. The pre-arranged questions will mainly focus on the effectiveness of the policy, the factors which contributed to its outcome as well as its development since the policy was implemented and the opinion of the key informants regarding the policy which may be used for recommendations or suggestions of effective policy and strategy.

Data recording

Gathering interview information is necessary to ensure the data collection efficiency, quality, and consistency across interviews. To make sure all the information is captured. There are two methods use to record the interview responses. The method for data collection used in this part will be either on paper or voice recording in order to fill in any information gaps or details. Therefore, the permission from the respondents for the voice record will be made before the process.

4.2.2 Secondary data

Secondary data is data that have already been collected and analyzed by someone else. It is available both as published and unpublished data. Published data are usually available in many forms, such as publications, journals, books, newspapers and reports which all could be accessed from various sources. Using secondary data, however, is risky if the characteristics of reliability, suitability and adequacy are not taken into proper consideration. Thus, I would carefully take the data by considering the various sources and ensuring all characteristics mentioned earlier when the secondary data will be utilized.

In addition, the data analysis of health policy needs three levels of data including facts, values and actions. Facts are the verity or information based on substantiation of the phenomenon such as problems, necessity or distress of the people. Values mean data on perception, belief and attitude in each society. Actions are about the intervention or implementation toward the phenomenon such as the solution of the problem, policy and strategy (Sukhontha Kongsin and Jiamton 2007).

As this study would mainly emphasize documentary research and content analysis, the various forms and sources of data such as articles, journals, previous reports and studies as well as the electronic database would be assessed and reviewed. The data on Clonorchiasis and Opisthorchiasis concerning health policy and strategies would be surveyed either past or present. Also, the information about the factors relates to the outcome and trend of health policy would be obtained the

great attention. Nonetheless, the documentary utilization might have some limitations due to its access and language barrier. The interview, therefore, must be applied to work together to complete information for the analysis.

4.3 Data Analysis

In qualitative study, data analysis often begins while gathering data, but such analysis tends to be tentative and incomplete (Neuman 2014). This step is very important in the process of qualitative studies, especially the method applied in analysis that is used to make the conclusion of the study.

- *Coding and concept*

In qualitative research, the organization of the data is also necessary. Therefore, the step will start with an organization of raw data into conceptual categories based on themes, concepts or similar features as guided by research questions. Codes are tags or labels for assigning units of meaning to the descriptive or inferential information which usually is words, phases, sentences or whole paragraphs. This step will help to develop new concepts, formulate conceptual definitions and examine the relationships among concepts. So, I will be able to link concepts to each other in terms of sequence, oppositional set, or similar categories (Neuman 2014).

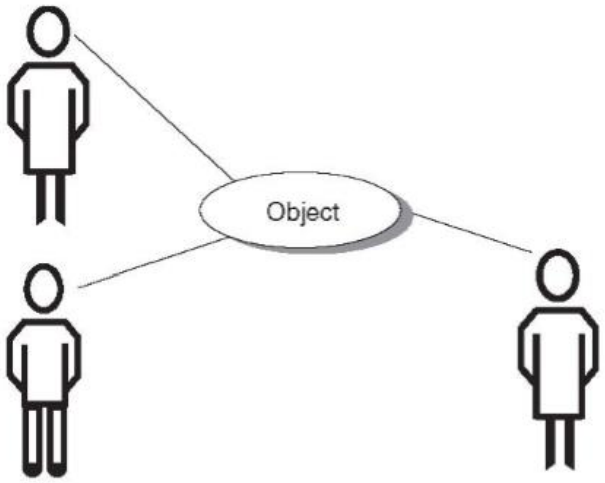
- *Content analysis*

To analyze the data, I would like to use the conceptual frameworks presented in chapter III as the guideline. A conceptual framework of liver flukes control is used to analyze the consequences of health policy. The policy analysis framework is to find out the mechanisms or factors that support or prohibit the effectiveness of health policy. Finally, a comparison framework is used for comparing Thailand and South Korea. However, I would adopt the analytic strategy for qualitative data as well. The strategy I have chosen is the ideal type proposed by Max Weber (Neuman 2014). This strategy is one of the most common strategies used in a qualitative approach. The concept is to create a mental model or abstraction which will be used to make comparisons with the reality or data we obtain to see how well each case measures up to the ideal. Therefore, I would develop my ideal model of the effective health policy and strategy so that the data from the study can be compared within the scope of the conceptual frameworks. To construct the mental model, I may utilize some theories in order to get the better concept such as the institutional theory introduced by Thomas R. Dye to describe and evaluate the government institutional structure and its function with regard to liver fluke infection control implementation since it has an impact on policy in terms of the crucial actors.

- *Trustworthiness*

In addition, the errors of the data and its prevention should be considered. In order to improve the validity of the research, the triangulation, thus, should be introduced and applied in the study.

Figure 12: Triangulation



Resource : (Neuman 2014)

Basically, observing the objective from several different angles or viewpoints can obtain a good fix on an objective's true location. By this perspective, the researcher can learn more by observing from multiple perspectives rather than looking from only a single perspective. The idea of looking at something from multiple points of view for the same phenomenon will improve the accuracy and differences which may be seen among the measures will also help to create new

ideas, as well as the questions which may contribute to the complete dimension of the study.

There are several types of this method such as triangulation of measure, triangulation of observers, triangulation of theory, and triangulation of method (Neuman 2014). In this study, however, only the triangulation of measure will be utilized. The method of taking multiple measures of the same phenomena will be used by comparing the results of at least 2 methods of data collection or data sources to judge the data between different accounts. Therefore, I would use the data from documents analysis compared with the information obtained from the interviews. This technique would be applied since it could help to promote either the validity or the comprehensiveness of the data analysis.

- *Data presentation*

The data or findings would be systemically presented in details in textual form composed of the summary of the findings, citing and implications of the study. Furthermore, tables may be another form of data presentation which may be utilized to show the qualitative data in order to provide the summary of the content in some parts. This table will also help in terms of a clearer comparison of the information on some topics.

- *Interpretation and Conclusion*

This final step is scoped within 3 areas comprised of

- Summary: summarize the result of data analysis and findings, review the stated problem and link with the result from data analysis.
- Conclusion: focus on the answer of the problem and hypothesis whether it is accepted or rejected.
- Recommendation: suggest some improvement or development based on the result of the conclusion.

CHAPTER V
ANALYSIS

This section aims to present the data of the study obtained by the documentary review or interviews with the key informants and the comparison of South Korea and Thailand based on the analysis of collected data.

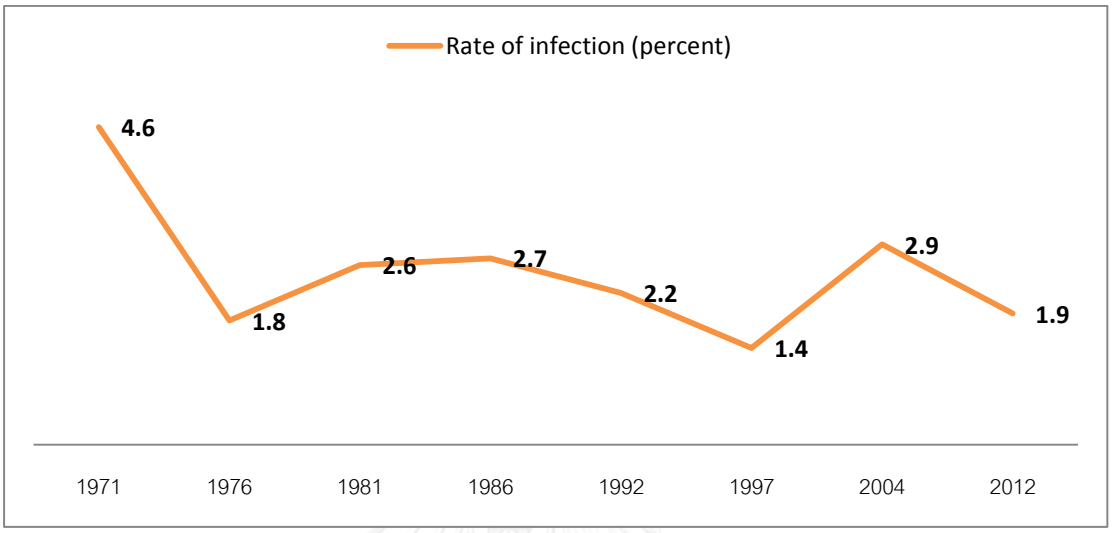
5.1 South Korea

In the evaluation of the control program of South Korea, it is difficult to measure progress in terms of quality since available information was limited. The results therefore have been mainly measured and focused in terms of the prevalent rates over time.

After the mass treatment project began in 1984 in the endemic areas in South Korea, the status of liver fluke infection was significantly decreased (Rim 1997). Based on Cho Shin Hyeong et al (2008), the decreased overall infection during past decades can be attributed to the continuous efforts for nationwide control program undertaken by the government to reduce prevalence and to increase the hygiene and sanitary conditions of Koreans. The government-supported control program, including continuous anthelmintic intervention and health education, could really lower the rate of egg per gram counts and made the decreased of the infectious rate of Clonorchiasis like in case of areas in Geum river basin (Gye-Sung LEE 2002);(Hyun-Kyung Kim, Hyeng-Il Cheun et al. 2010). So, it evidently recognized that not only was

the infectious rate reduced in the endemic areas but also the proportion of the degree of heavy infection has been lowered in infected people.

Figure 13: Rate of infection presented by the national survey between 1971-2012

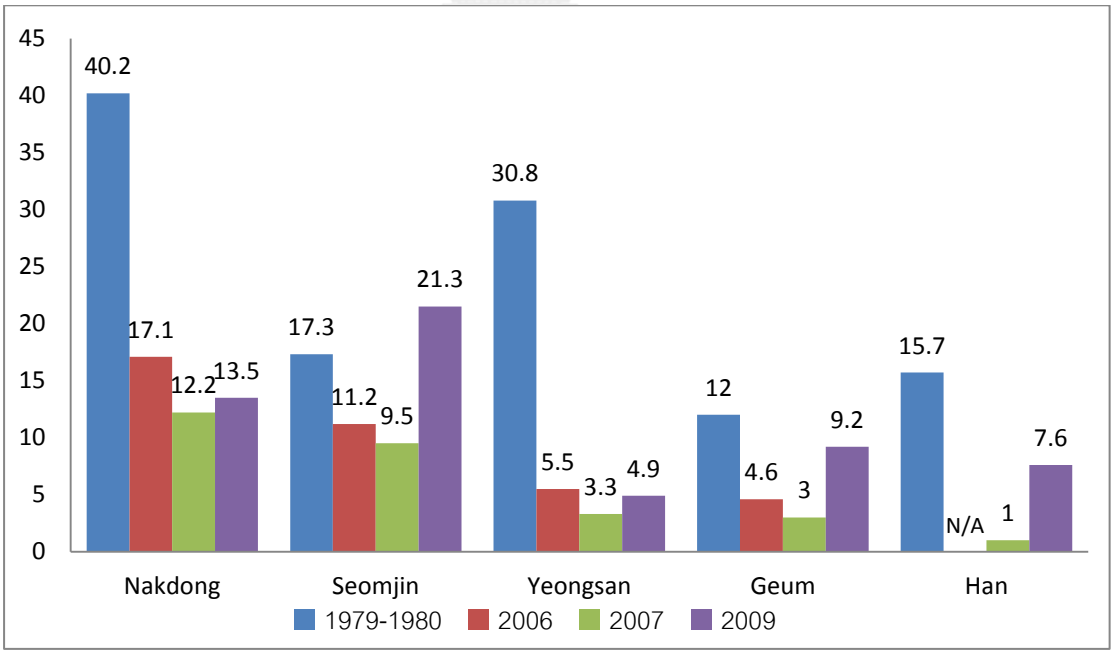


Resources: (Sung-Tae Hong, Kisung Yoon et al. 1998); (Shin-Hyeong Cho 2008);(Do-Soon Park 2014)

The figure above shows the infectious rate based on the information from the national survey of South Korea (Sung-Tae Hong, Kisung Yoon et al. 1998); (Shin-Hyeong Cho 2008);(Do-Soon Park 2014). It shows a pattern of decline of Clonorchiasis rates from 4.6 percent in 1971 to 1.9 percent in 2012. From this figure, it can be concluded that the control project run by the government was efficiently carried out. However, the result of the survey actually did not reveal the steady and impressive decline of the prevalence since the infectious rate fluctuated substantially since 1976, particularly after 1984, even though the control program was implemented. Especially in 2004, it increased to more than half of the rate in 1971 which was before the medication and control program had been implemented.

Furthermore, the national monitoring data of Clonorchiasis has shown little change over 25 years in overall prevalence since 1971 (Jin-Kyoung Oh, Min Kyung Lim et al. 2014) and the infection rate in 2012 was also higher than in 1976 and 1997, although the medical technology and the economics of the country are far more advanced. Moreover, this reduction of the infectious rate might also be the result of industrialization and economic development since it changed the traditional ways of living in terms of the mechanization of farms and the use of chemical fertilizers, as well as the pesticides which have affected the parasites or its intermediate hosts (Rim 1990). So, this information might suggest other conclusions. Nevertheless, this might not be enough, and might not be able to present a clear picture. Therefore, the prevalent rate of the endemic areas should be presented as well.

Figure 14: Prevalence of Clonorchiasis in the five major rivers of South Korea



**N/A = No assessment of prevalent rate in Han River area in year 2006.*

Resources: (Seo 1981); (Cho 2008); (Hyun-Kyung Kim, Hyeng-Il Cheun et al. 2010); (Kyung Ja June, Shin Hyeong Cho et al. 2013)

According to Cho Shin Hyeong et al (2008), Do-Soon Park et al (2014), and JK Oh et al (2014), Clonorchiasis is still common in South Korea since the infection was still being actively transmitted and relatively high in endemic areas scattered along the river basins of South Korea. From the graph of the prevalence of Clonorchiasis in five major rivers presented above, we can see that the decrease of the infection matches the trend presented in the previous graph of the National survey if we look superficially. The infection rate of every river area continued to decrease in 2006 and 2007. In particular, the Nakdong and Yeongsan rivers were where the most endemic areas showeda lot of change of the prevalence rates by decreasing more than 50% since 1979-1980. However, this graph has manifested a clear difference inthe unstable infectious rates of the endemic areas. The infection rate in 2009 was again higher in every river area. The Nakdong and Yeongsan rivers might show only a small increase of the infectious rate compared to other areas by rising from 12.2 percent in 2007 to 13.5 percent in 2009 and from 3.3 percent in 2007 to 4.9 percent in 2009 respectively. Meanwhile, Seomjin, Geum and Han rivers have obviously shown an increase in the infectious rate, especially the Seomjin river where the rate was 11.8 percent higher in 2009(21.3 percent) than 2007 (9.5 percent), and even worse than the rate in 1979-1980 (17.3 percent). This increase can be assumed to be the result of the consumption of raw freshwater fish among the residents since it was confirmed as a risk factor based on the analysis of the study in 2009 (Kyung Ja June, Shin Hyeong Cho et al. 2013).

So based on this data, we can clearly see that although the overall prevalence among the population of South Korea seems to have decreased, the endemic areas were quite converse since the prevalence rate in major river areas

was higher. The national survey, nevertheless, showed much fluctuation, which might have resulted from the increasing prevalence among the endemic areas. So, this information can help to point out that the efforts of the government have not yet succeed and the policy was not effective even though Clonorchiasis control has been conducted. To easily analyze the implementation of the liver fluke infection control, the conceptual framework of the liver fluke control presented in chapter three will be used in this part.

First approach: elimination of the human host reservoir.

In terms of the elimination of the human host reservoir through screening by stool examination and treatment, the South Korean government seems to pay much attention to this implementation. The nationwide control efforts in order to control and reduce the prevalence of helminthic infections have been carried out since the1960s. Between1969-1995, the governmental organization for parasitic eradication under the support of the Ministry of Health and Affairs implemented their control activities against various parasitic infections which were endemic among Korean people, including clonorchiasis. In the first period, the activities mainly targeted the schoolchildren. So, the students, who totaled more than 8 million or about one-fifth of the whole population in the country, received twice yearly stool examinations and treatment by anthelminthics from the government. The control program revealed a remarkable reduction of various parasitic infections and it became even more effective thereafter during 1970s(Rim 2003).

The nationwide control program of the government, particularly the control of clonorchiasis, was later implemented in 1984 since clonorchiasis became one of

the important species of trematodiases among Korean population and the effective dose of the medication was discovered. Between1984-1990, millions of people living in endemic areas were examined and offered treatment at local health centers under the supervision of physicians. Medication was also available for all infectious cases in addition to the mass treatment of the risk groups. However, the control program still did not significantly reduce the prevalence of clonorchiasis since it was substantially unchanged over decades despite the continuity of nationwide control program and development of anthelminthic drug and the nationwide control program (Rim 2003).

Up to the 2000s, the control program was still implemented in endemic areas (Hyun-Kyung Kim, Hyeng-Il Cheun et al. 2010). But it was conducted only in some localities. The examination, medication and any campaigns would be run by public health centers at the county level (Kyung Ja June, Shin Hyeong Cho et al. 2013). Although the situation of clonorchiasis in endemic areas was improved in terms of egg positive rate and intensity of the infection, it decreased only slightly(Hyun-Kyung Kim, Hyeng-Il Cheun et al. 2010). The presence of light to moderate endemicity of the infection was still detected (Cho 2008). Cases of re-infection and treatment failure as well as newly infectious cases have been reported (Gye-Sung LEE 2002); (Kyung Ja June, Shin Hyeong Cho et al. 2013). From the above information, we can see that the South Korean government has quite concentrated and tried to continue their effort for really long time. However, the continuous screening and treatment still could not effectively decrease the rate of infection (Kyung Ja June, Shin Hyeong Cho et al. 2013) which are mainly consequent from unsuccessful in persuading the

people in endemic areas to change their habit of eating raw freshwater fish consumption (Kyung Ja June, Shin Hyeong Cho et al. 2013).

Second approach: interruption of the infection.

Because infection is closely related to the eating behavior or habit of consuming raw freshwater fish, it will be much more effective to adopt an approach in terms of health education regarding the importance of well-cooked fish consumption. The South Korean government itself also seems to focus on this approach as equally important as screening and treatment. Through mass media, the South Korean government provided health education to their people. In addition, they also made several other forms of educational material including posters, leaflets, slides and even film strips to provide at the health agencies and schools. The appropriate health knowledge regard to the trematodes infection was provided by focusing on the infection route and promotion to avoid eating raw or inadequately cooked freshwater fish, crabs and crayfish as well as the importance of anthelminthic drug treatment (Rim 2003).

However, the educational effort has not yet succeeded since the government still could not motivate and persuade the people to change their eating habits. This might be because of eating habits of people in endemic areas was deeply settled particularly among the older people. Nevertheless, this might have happened because of the content and intervention of the health education itself.

According to the study of J-K Oh et al (2014), the intensive health education provided to community leaders and individuals was more effective especially when it was based on the community's awareness, understanding and behaviorsas well as

when the complication of the disease was also emphasized. However, health education was usually provided to the masses and mainly aimed at changing risky eating behavior. So, it might not be powerful enough to motivate the people. As a consequence, there are still treatment failure cases where some individuals continue to eat raw freshwater fish after treatment (Gye-Sung LEE 2002). Therefore, this might allow one to assume that the health education provided by the government is still not efficient enough to make changes in the infectious people although the government has already put their effort in this approach.

Third approach: interruption of transmission.

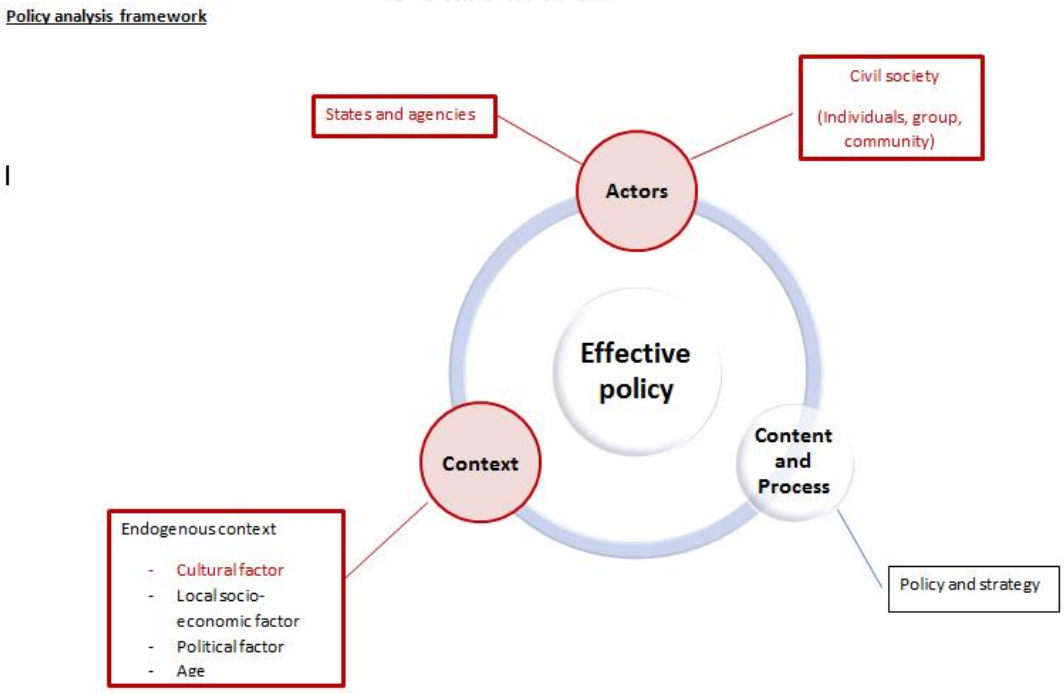
Other than the control program and health education, the South Korean government has also improved the sanitation of the country. In South Korea, action was taken on sanitation and hygiene since the 1960s, and the government has played a significant role in the improvement of sanitation (Ryu 2014). The sanitation was set as the national-level drive in order to improve the quality of the population's lives(Henry Northover 2016). The government not only made improvements on sanitation through constructing sanitation and sewerage infrastructure but also developed in terms of policy or political drive through the adoption of laws and provisions to push and guide the function of various related sectors and officers (Ryu 2014).Based on my review, the South Korean government seems to give the importance to this aspect since it also affects the public heath particularly when it's directly related to the parasitic infections. This might be the reason why South Korea has achieved universal sanitation improvement. Since South Korea has reached the sanitary coverage as well as the system of waste and sewage

management provided to their people, incidences of unhygienic sanitation have not been found. This makes it possible to assume that the South Korean government has done well in the implementation ofthis aspect, particularly when compared with the two approaches mentioned before.

If comparing all three aspects, we can see that the South Korean government has concentrated on implementation. Particularly through the control program by screening, treatment and health education, we can clearly see that the South Korean government has implemented their programs since a long time ago, especially for the control of clonorchiasis. Meanwhile, the sanitation improvement might be emphasized due to the situation of the parasitic infection, but on the other hand, it's also the result from one of the country's infrastructure development. The implementation of screening and treatment as well as heath education, it should give a good result. Nevertheless, it seems opposite. So, the reason of its ineffectiveness is still in question. This ineffectiveness of the policy and control program might have happened mainly due to the inability to persuade the people in endemic areas to change their habit of raw fish consumption and consequently they have not been successful in decreasing the infection continuously and sustainably (Kyung Ja June, Shin Hyeong Cho et al. 2013). Hence, the factors influencing the policy implementation especially in terms of the factors affecting the eating habits of the people should be examined since this habit is the greatest reason for the policy's ineffectiveness.

Factors influencing the policy outcome

Due to some limitations of the data collection, it was quite difficult to describe all of the factors influencing the outcome of South Korea's policy implementation in regards to clonorchiasis, especially in terms of the government and its agencies. However, from my documentary search, I have found several factors. Hence, I would evaluate and analyze in the big picture so that we could see the problems overall. Regarding the conceptual framework presented in Chapter 3, the ineffectiveness of the policy might have stemmed from mainly two factors which are actors and cultural factors.



Actors: State and its agencies

As mentioned earlier that the state and its agencies will be analyzed in the big picture, I would focus on some elements found out in the health care system which resulted from gaps in the South Korean government's management and it

possibly affects the implementation of the Clonorchiasis control policy and strategy. These include the small numbers of public health care facilities provided by the government and the distribution of both medical facilities and healthcare personnel. These factors can contribute to the limitation and imparity in approaching the health care facilities and higher medical expenditure the people have to use as well as the attention of the health care workers in regards to clonorchiasis.

Public health in many countries is usually provided by the government, either the central government itself or local government. The South Korean government also provided the public health to their people via public hospitals and public health centers under the governed of the local government in that area. However, these public health facilities like the primary health care were only 10 percent of total providers. This number is relatively small especially when compared to the other 90 percent which are the private health providers (Lee 2003); (Kwon 2009);(Chang Bae Chun 2009). Hence, the size of the public medical sectors is problematic. The public health centers of the government which should be the major medical provider of good quality of care services to the people, therefore, could not operate a major role because their numbers were insufficient(Chang Bae Chun 2009). So, the people have to seek the services of private medical facilities. However, seeking private medical service might not be a big problem if those private providers would not attempt to make profit.

Privately owned medical facilities should be the not-for-profit health care providers as it was understood. But in fact, they tended to maximize their revenues since this kind of facility is more prevalent and dominated the number of all health care facilities provided to the people. Since profit is the biggest concern, they

focused on attracting patients to use their services. So, strong competition among private providers happened and they competed even with secondary and tertiary hospitals instead of cooperating to provide better service. Also, primary health care providers have a tendency to focus on curative care rather than preventive care which actually is more important and should be emphasized. This might happen from the system of the fee schedule for primary health care providers that is based on the fee for service rather than capitation which resulted in a lack of incentive on health prevention and promotion (Chang Bae Chun 2009).

The situation could be worse. In the 1990s, public hospitals of the local governments contracted out their services to private providers. The management of these facilities then changed to profit-seeking which resulted in reducing the number of staff and using market-oriented management in order to maximize their profits and reduce expenditures. This induced the hospitals to focus on profitable departments such as cosmetic surgery (Chang Bae Chun 2009). So since 1990s, the government had tried to keep down the impact of private medical providers by building more public facilities (Chang Bae Chun 2009) and transform private hospitals into public ones but it failed because of the private owners' resistance and inadequate funds to buy these facilities. Also, the South Korean government itself paid less attention to expanding the public health sector (Lee 2003).

Barriers in accessing health care services are not only limited number of the public medical facilities. The problem of an inequity in the distribution of the medical facilities such as the primary care and health care personnel between rural and urban areas should also be in concern since all of them are usually concentrated in Seoul and major cities including Busan, Daegu, Daejeon, Gwangju,

Incheon and Ulsan. In particular, the distribution of the medical workers like doctors or nurses was mainly concentrated in those large cities. In rural areas, the number of the doctors was relatively small. This was a result of the higher income and better living conditions gained from working in the urban areas (Chang Bae Chun 2009). And this means the patients like elderly and farmers who live in remote areas will get some difficulties since there is along distance to seek for the health services.

Up to this point, there might be a question how these factors or problems related to the ineffective clonorchiasis policy and its implementation. Firstly, those private health sectors were for profit. As I have mentioned earlier, they will emphasize profitable departments. By this situation, the clonorchiasis might be out of the concern since it seems unprofitable for their business, unlike cosmetic surgery, and it's usually the disease of the people in rural areas which are farmers or common villagers who are not rich. So, they surely cannot get a lot of money from them. Second, the fee schedule for health care providers is based on the fee for service and they tended to focus on the curative care rather than the preventive care. The clonorchiasis seems to be far away from their objective since it rather needs the preventive care in terms of the screening and health education. Third, the people in the endemic areas might need to travel a long distance if the health care facilities are located out of their areas which requires time and money for transportation. Therefore, they might not be willing to take this difficulty, especially in the people who are not concerned with their health condition particularly if they have to go for only screening or health education. And the service cost might be higher than public one so that the people might not want to take this burden. All of these can be a great barrier. Since the limitation in accessing health care service

happen, the people in endemic areas will feel difficult. And the government's implementation will be harder to achieve especially if combined with challenging factors like culture.

Actors: civil society in the areas of endemic

Although, many people knew that the transmission route of Clonorchiasis is the ingestion of the raw freshwater fish contaminated with the parasites and the eating of fully cooked freshwater fish dish can help to prevent the infection (Ho Gak Kim, Jin Bong Kim et al. 2009), a lot of people would not change their habits and still enjoy raw freshwater fish dishes(Ho Gak Kim, Jin Bong Kim et al. 2009); (Kyung Ja June, Shin Hyeong Cho et al. 2013). This was also the result from the culture that made the people addicted to the taste and reinforced the consumption of raw freshwater fish. As a consequence, changing habits to abolish the raw freshwater fish has not been a concern even though awareness of Clonorchiasis and its prevention is quite high (Jin-Kyoung Oh, Min Kyung Lim et al. 2014). Also, due to these habits, most of the people who have been treated were re-infected and this is why the control program in South Korea is inefficient (Sung-Tae Hong, Kisung Yoon et al. 1998). Although the government could reduce the positive rate, the reduction may not be sustainable and can be increased since the people still maintain and repeat eating raw freshwater fish.

Other than preference of raw fish consumption, the residents of the endemic areas seem to have overconfidence in the medication. They also ignore the risks of infection since it is usually an asymptomatic infection. These might be because the people incorrectly believe that the infection can be easily treated by the medication

and it will not lead to serious complications(Jin-Kyoung Oh, Min Kyung Lim et al. 2014); (Ho Gak Kim, Jin Bong Kim et al. 2009). However, this may be the result of national intervention programs including the mass health campaigns and the health education program since the severe complications of Clonorchiasis such as cholangiocarcinoma were not communicated well to the people in endemic areas. In other words, an intensive health education based on the understanding, awareness, and behavior of community should be provided and strongly emphasized (Jin-Kyoung Oh, Min Kyung Lim et al. 2014). This is also another reason which should be considered since the national intervention program and its intensiveness is very significant in motivating people to change their eating habits and build up concern which directly affects the permanent reduction of prevalence.

Context: cultural factor

The major problem of the ineffective policy and control program implementation in South Korea is an inability to motivate or persuade the people in endemic areas to change their eating habit of raw freshwater fish consumption. This risky eating habit has formed among the people by the long-held dietary traditions of Korean culture passed down from ancestors. And it was considered or confirmed by many studies to be a major factor of the infection and prevalence such as the study of Kim HG et al (2009), KJ June et al (2013) and Park et al (2014). According to JK Oh et al (2014), this eating culture formed in people since childhood has made up a craving for raw freshwater fish, or a taste addiction. And this was indeed the hidden barrier in changing the eating habit. Furthermore, the Korean culture in terms of custom of drinking and social participation which often carried by males also

reinforced the eating habit among the people since the raw fish is usually consumed with drinking during this social gathering.

5.2 Thailand

Figure 15: Prevalence of Opisthorchis in all regions of Thailand

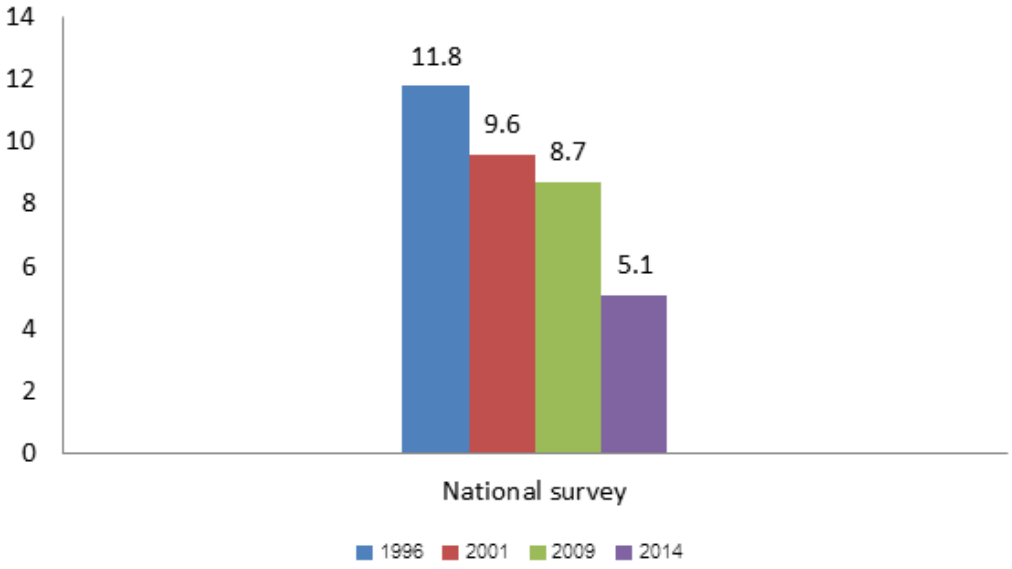
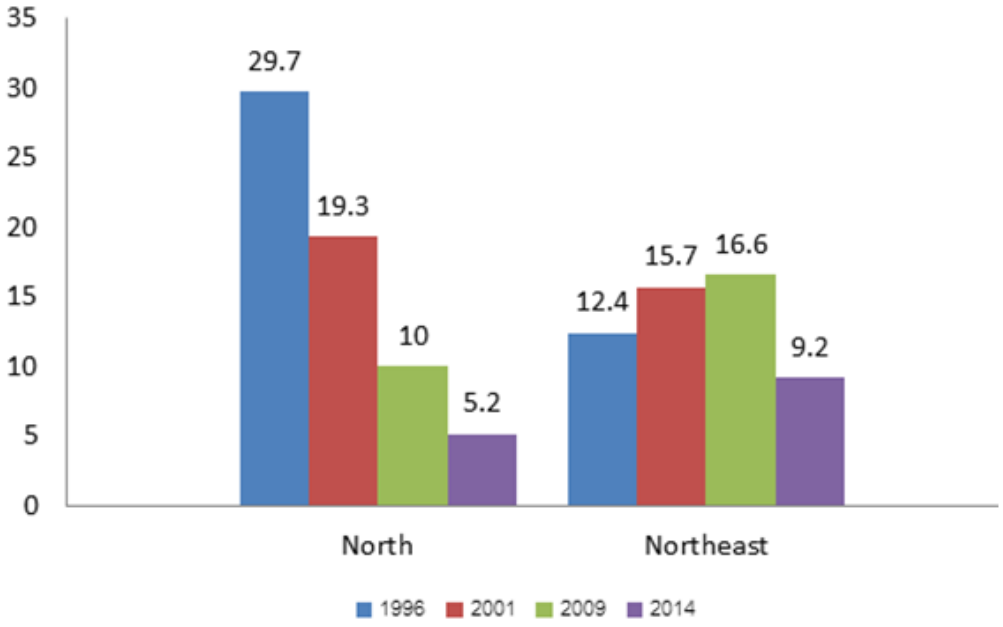


Figure 16: Prevalence of Opisthorchis in the endemic areas of Thailand



If we look at the big picture of the whole country, the infectious rate of the Thai population has decreased considerably. From figure 15, we clearly see that the prevalent rate of liver fluke infection of Thai population was much declined from 11.8 percent in 1996 to 5.1 percent in 2014. Conforming to the prevalence in the endemic areas, figure 16 could present the decline of the prevalence rate, especially in Northern area, which showed a great reduction, although the prevalence in the Northeastern region was not sustainable. So, from these statistical data, the effectiveness of Thai liver fluke policy and its strategy was affirmed since the prevalence both nationwide and region-wide has decreased.

According to the information gained from an interview on January 25, 2016 with a public health scholar of the Bureau of General Communicable Diseases at the Department of Disease Control, the infection rate of the population was below the measurement set up by the WHO. And it was also lower than 10 percent which is the rate established in the Eighth National Health Plan (1997-2001). So, if we focus only on the rate of prevalence, it is clear that the situation of the infection is now in control which generally means the policy and control program of the government that was carried out is effective.

Nevertheless, the statistic of the infectious rate was just the random result of some sampling villages, not the whole picture of the endemic areas. Normally, the National survey which usually carried out every 5 years by the random method called 30 clusters. Only some areas of some provinces were picked up based on the areas of Department of Disease Control and did the survey to represent the situation in that period. Consequently, the villages with high endemicity might be failed from

the survey in that time. So, if the data is obtained from every endemic area, the result of the prevalence might be somewhat different. Also, based on the data from the Department of Disease Control, infection rates as high as 85 percent were still detected in some villages in 2009. However, since the study has been using the result of the national survey as the main indicator, the policy and strategy of the Thai government was still effective in decreasing the prevalence of the liver fluke infection.

Although the policy and strategy were effective in reducing the prevalence of the infection, the control program of the liver fluke infection implemented by the government still had some room for improvement.

First approach: elimination of the human host reservoir.

Originally, the stool examination and treatment provided for the people was the active service. The government had organized the mobile stool examination in villages. But after the situation came under control, the active service was then gradually transformed into a passive service in which the passive case detection and treatment were provided in the hospital (P Jongsuksuntigul and Imsomboon 1997). At that time, the policy seemed to mainly focus on decreasing the prevalence in order to prevent liver fluke infection. But since the number of patients with cholangiocarcinoma (CCA) in the northeastern region is still at high levels even though the prevalence of the liver fluke infection has been decreased, the government's attempt is to reduce the occurrence of CCA.

In Thailand, cancer has had a higher mortality rate than all other diseases for more than ten consecutive years, particularly CCA. CCA is the most severe

complication of chronic or multiple re-infections of the liver fluke. And it is frequently found among northeasterners at a rate of approximately 30-40 persons/ 100,000 populations. It is the most critical health problem recently. So, the policy is to eradicate the liver fluke infection in order to decrease the rate of CCA. To do so, the government has promoted community health volunteers to take part in screening for the risk groups and send them to receive the further investigation and treatment in the hospital for early detection (Office of the Permanent Secretary, MOPH 2012).

This method of screening is still in the process of the implementation. So, it might be somewhat difficult to conclude the result. But from my review on the previous implementation, this aspect have been implemented and tended to have a prominent result by reducing the infectious rate. (P Jongsuksuntigul and Imsomboon 1997). However, from talking with the Community Public Health Officer and Public Health technical officer, even at the professional level in Chaiyaphum province on June 4, 2016, some problems still arise.

From talking with the Public Health and Public Health technical officers about the professional level in one province, the liver fluke infection still gained somewhat less attention from the government. And the local government as well as the local public health services have not been active in handling their duty since they have to collect and examine the stool and did not set liver fluke infection as their main priority. So, the people have to go to the hospital themselves if they want to receive the service. Also, the problem of the lack of continuity of implementation which resulted in the insufficient budget and medical support was raised.

In addition, the surveillance and screening system for cases also had some weakness due to its coverage, the working system, knowledge and skills of the staff. Importantly, most of the screening is to find patients or infected cases instead of finding risk cases and implementing the prevention since the beginning. Furthermore, the management of risk group is to provide the suggestion for follow up or repeated stool examination but the suggestion for self-prevention is not emphasized. And the medication was rarely available in some areas (Picha Suwannahitatorn, Saranapoom Klomjit et al. 2013).

Second approach: interruption of the infection.

According to P. Jongsuksuntigul, T. Imsomboon (2003), health education was long-term used by Thai government as a one of the main control activities by emphasizing on the cooked fish consumption. If we consider the national control program or activities since it was first implemented, we will see that health education was always included in those activities. So based on the documentary review, there is no doubt that the government has seen its importance and given their attention to providing it to the people.

Previously, the health education and promotion of the government consisted of having officials announce information and provide brochures. The promotion and provision of health education of the government usually happened through the public health media either the printed matter or the radio and television broadcasting as well as the mobile units. But the important point is that educational materials made by the government were not scary. Instead, it looked funny because, for instance, sometimes it featured fun songs. So, it could not present the severity of

the disease and the people were not afraid when they watched or saw it (ชาลีพรม). As well, the issue of low levels of focus from the government was noted in the course of the interview.

Until recently, the health education focused on cooked fish consumption is still being promoted. Since community health volunteers are crucial actors who help to drive the health policy in the community level, they were trained to give the knowledge to the people other than function in the screening process. In addition, it will be included in the curriculum of the secondary student and higher educational level in the future. However, emphasizing on cooked fish consumption might also seem to be another weakness because the habit of eating raw fish is still high. Regarding the interviews with Public Health Officers, the people still ignore this information even though they knew the safety eating. This can point out that emphasizing only the importance ofcooking fish before consumption is not enough to make the people feel the threat that is going to kill them. And information of severe complication should be communicated in parallel.

Third approach: interruption of transmission.

Based on the documentary review, Thailand has already achieved the goal of the sanitation coverage especially the excretion disposal in the rural areas (T.V. Luong 2000); (Albuquerque 2013). The household coverage of the sanitary latrines has remarkably increased from 8.1 percent during the First National Socioeconomic Plan to 98.2 percent during the Eight National Socioeconomic Plan (Ms. Theechat Boonyakarnku 2003). In rural areas, 98.11 percent of families have used sanitary latrines by 1990 (T.V. Luong 2000). Over 40 years, the coverage of sanitation has

increased with 28 percent of average annual growth (Binder 2013). And it resulted in the decreasing of helminthic infections since the rate of the latrine use increased (Ms. Theechat Boonyakarnku 2003). This successful sanitation can be claimed as the outcome of the strong policy and enforcement with great support undertaken by the government since the 19th century. During the period of the sanitary improvement, the government and its concerned agencies cooperated well and functioned even though they often have overlapping responsibilities resulting in a duplication of effort (T.V. Luong 2000); (Ms. Theechat Boonyakarnku 2003). Not only was the sanitary construction built, but the social mobilization and health education in communities by the mobile unit and the village volunteers were also provided to the people (T.V. Luong 2000). Many projects' approaches had been developed as the national strategy on improved sanitation. The village leaders and officials concerned were trained to build up the capacities in government in all levels and at the grassroots. The budget was also allocated to more than the latrine construction but also research and development (T.V. Luong 2000).

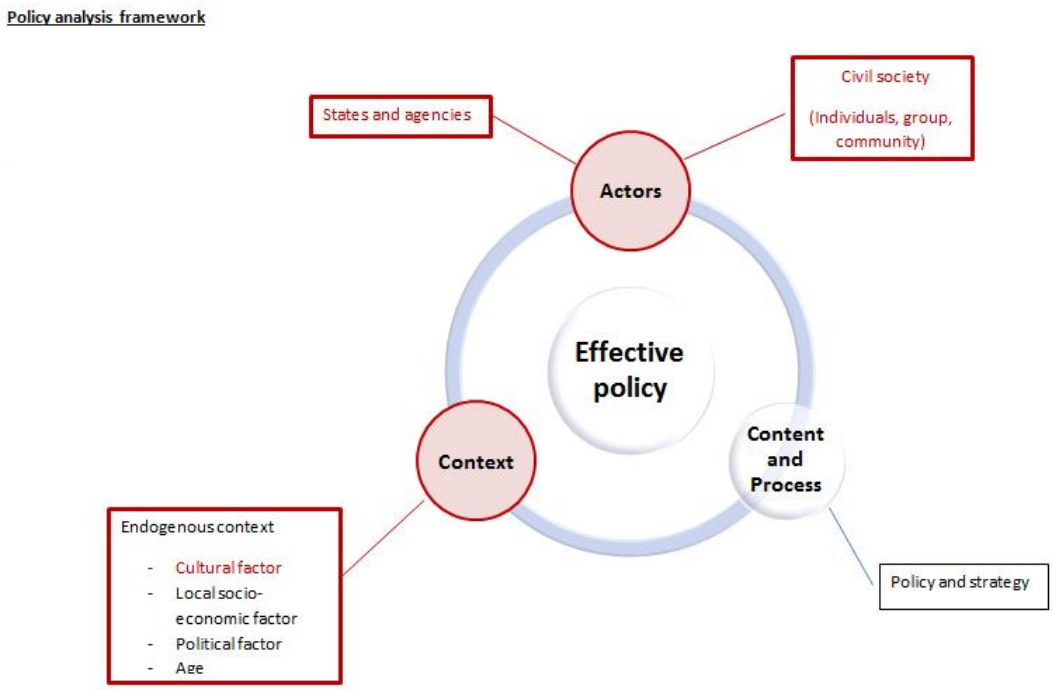
According to the information from the interview, the sanitary latrine seems to be the approach to which the government gave great concern. The used policy regarding sanitation is to promote the coverage of the latrine by every house that wants to be registered needs to have a latrine. Otherwise, they will not receive a house number. This was the memorandum of understanding or MoU made between the Ministry of Public Health and the Ministry of interior. However, unhygienic defecation still happens in some areas of the endemic areas in some cases like in the case of agricultural workers. Unhygienic defecation usually occurred during working in the areas without proper toilets like in the rice paddies as well as in

case of migrants working in the areas, especially unregistered migrant workers who lacked access to hygienic sanitation and received inadequate health care services. Unlike Thai villagers, these migrants usually live in temporary shelters or camps with no proper latrines (Picha Suwannahitatorn, Saranapoom Klomjit et al. 2013); (Albuquerque 2013).

Moreover, the problem particular to poor management of disposal of human waste still remains despite the sanitary coverage achievement (Albuquerque 2013). The used treatment systems could not handle all the waste released from communities and the untreated or the fecal matter was usually disposed into public water systems or spread on nearby fields in the rural areas (Mansour 2013); (Ms. Theechat Boonyakarnku 2003); (Albuquerque 2013). This might have happened due to lower levels of involvement of the government especially in the rural sanitation sectors and no provisions for the management of accumulated waste in latrines (Mansour 2013). Therefore, the operation of the government in its approach to sanitation still has some gaps and needs improvement, otherwise the health of the population will continue to be affected by Opisthorchis viverrini.

Factors influencing the policy outcome

Since the policy and strategies of Thailand still has some gaps, some factors are particularly influential. Based on my review, the main factors are actors such as the state and its agencies, or the people residing in endemic areas. Moreover, some other context like the cultural factor also seems to take part.



Actors: state and its agencies

The most significant factor is the government itself since the government is what determines the direction of policy. If the government does not give the significance, the governmental agencies surely will not active and rather focus on only policy under the government's attention. According to the interview, the problem of any fluke infection usually is low levels of concern in terms of the policy because it is seen as a poor country's disease, and as a representation of poverty, can complicate issues when a government is concerned with showing a healthy economy. Hence, the policy towards liver fluke infection was not clear and lacked governmental support. This directly gives a huge impact to the attention and inactive operation of the governmental agencies who respond to the government policy. As a consequence, the management of the disease was not that effective.

Another reason is changes towards decentralization in the bureaucracy system, which seems to promote the intervention of other policies in many endemic areas. In the past, the Department of Disease Control under the direction of the Ministry of Public Health had the duty to both issue and implement policy on health issues. However, after decentralization, the Department of Disease Control was changed to function only as the policy maker. Meanwhile, the provincial Public Health office of each province received the policy and responded with the implementation. Nevertheless, the policy on any health issue released by the Department of Disease Control might not be implemented, depending on the priorities of the provincial Public Health office in each province which was adjusted by the attention of the central government because the attention of the government is also important in terms of the governmental support, especially the budget and any facilities. So, if the government has focused on other diseases, the provincial Public Health office will rather respond to that disease even if it is not the most critical problem in their areas.

Lastly, changing the government also is another important factor which has a huge impact on the continuity of the policy and its implementation because when the government changes, various policies released by that government may also experience a decrease in importance, or might perhaps even be abandoned. In 2012, the problem of liver fluke infection drew attention. So, the strategy and implementation was formulated, and a campaign was kicked off in the endemic areas. This helped to motivate the people and could gain their attention towards the liver fluke infection. However, the liver fluke policy and strategy implemented in that period declined since the government has changed.

The data presented earlier, we might not see the intention of the government. However, from the literature review, we could see the efforts of the government in reducing the liver fluke infection and CCA. The Ministry of Public Health (MOPH), as the main governmental department responsible for the health of the population, has pushed forward the issue of the liver fluke infection and CCA to be the important agenda particularly when it was greatly motivated by the group of health assembly. So, the issue was finally become the national agenda and gained the attention from the governmental settings. Since the problems were gained the attention, the control strategy and various promoting campaigns or activities were operated by the MOPH. And the cooperation came from all social sectors including governmental sector, private sector, educational institutions and hospital networks. The control activities were not limited to screening and health education. Exhibitions, public dialogue, and mini concerts were created, as well as other promotions via various media. One of the important campaigns is to provide free surgery for the CCA patient (โรงพยาบาลจุฬาภรณ์ 2013),(กรมคร. 2013),(2012).

The data obtained from interviews might mainly point out the defects of the government, but the information from the documentary review has conversely told. So up to this point, it appears that the government and its agencies did attempt to reduce the infection although there are still problems and issues to be solved.

Actors: civil society in the areas of endemic

The people in the endemic areas usually lack proper understanding of the mechanisms of infection. Many people do not know the adverse effects of eating raw freshwater fish. The fact that infection is usually asymptomatic or causes only mild

symptom also compounds the difficulty of communicating the seriousness of this health issue. So, the people were not concerned about the infection and importantly, they do not realize the relationship between CCA and raw fish consumption (Picha Suwannahitatorn, Saranapoom Klomjit et al. 2013); (Ram Rangsin, Mathirut Mungthin et al. 2009). And they became less concerned, and did not give the importance in self-prevention since they have overconfidence in the effectiveness of medication and treatment against parasites (Ram Rangsin, Mathirut Mungthin et al. 2009). So, they ignore dangerous complications of the disease and the necessity of lifestyle modification, preferring instead to maintain their unhealthy eating habits while also not seeking proper diagnosis and treatment (Picha Suwannahitatorn, Saranapoom Klomjit et al. 2013). So, they need to be motivated. When the local health agencies worked in the villages and told them to do, the residents would comply as long as the staff was still in the village. Naturally, this would present problems, since governmental agencies have lots of work to handle. So, after the local health agencies moved on from villages or if they did not motivate the local residents, those residents would gradually forget and neglect the health education that had been imparted to them (ชาลีพรม)

Context: cultural factor, age and environmental factors

Cultural factors seem to play an important role since they have a strong influence on the people's daily life in the sense of eating habits and social customs. According to the interviews, it was much more endemic in northern and northeastern Thailand due to the eating culture of those regions. In endemic areas, the local food with raw freshwater fish as a main ingredient is the main dish of the local people.

The preparations of the raw fresh water fish are common, 60-90 percent of people eat raw fish dishes such as koi-pla (Natthawut Kaewpitoon, Soraya J Kaewpitoon et al. 2008) every week (Picha Suwannahitatorn, Saranapoom Klomjit et al. 2013) and it is the food for the party, family reunion (Wongba N, Thaewnongiew K et al. 2011) and any social gathering, which are usually held by males (Picha Suwannahitatorn, Saranapoom Klomjit et al. 2013). This culture therefore increases the risk of exposure to the infection as well as makes people feel less concern habit since it was been their culture's way of life since the time of their ancestors (Wongba N, Thaewnongiew K et al. 2011). Additionally, raw fish dishes are not only a traditional food but are also considered by locals, particularly the elderly, to be delicious, cheap, and easy to prepare, (Wongba N, Thaewnongiew K et al. 2011). In the study of Mrs. Pariyakorn (2015), all of the villagers were willing to change their eating habits except the elderly aged older than 70, who insisted on maintaining their eating habits, as they claimed that they are too old and addicted to the taste of the fish. So, this eating habit is considered by many studies as well as the interviewees as the major factor which prohibits a sustainable decline of the liver fluke infection and is very difficult to be changed (Ram Rangsin, Mathirut Mungthin et al. 2009).

These cultural factors did not contribute to only the risky habits of eating, but also entrenched erroneous beliefs and misconceptions about infections among the people in the endemic areas, such as the belief that mixing rice whisky or lime juice with raw fish dish will kill the liver flukes (Picha Suwannahitatorn, Saranapoom Klomjit et al. 2013), that eating raw fish dishes will present leadership and braveness, or that it will help to improve sexual ability in males. So, the cultural factors

surrounding the entire pattern of eating and preparing food is the significant cause and has a strong impact on people with related infections..

Other than local culinary culture, the environment is also a great factor in increasing the exposure to the infection. Villages located closer to water resources, such as marsh or rivers, are at higher risk because the freshwater fish is much more easily found. This kind of environment has contributed substantially to the raw freshwater fish consumption habits among the villagers. (ชาลีพรม).

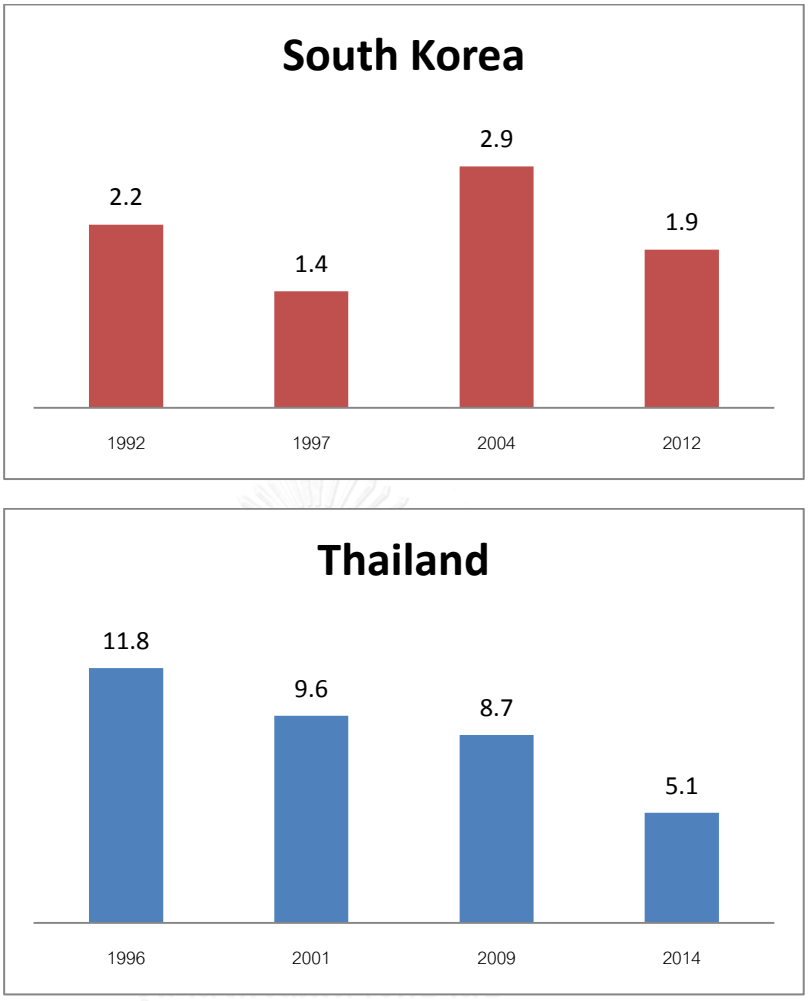
5.3 Comparison

After the details of effectiveness and the factors of both countries have been presented, this part will generally compare these two countries in terms of the situation, effectiveness of policy, and other influential factors.

5.3.1 Situation of infection

For the situation, the prevalence of the liver fluke infection of both South Korea and Thailand seems to have impressively declined in the overall population or in terms of the national survey, with decreases of more than half since the national survey and the implementation of the control program have been operated in both countries. However, since the data of the prevalence in these two countries presented earlier in the topic of the effectiveness are different in terms of the years presented in the graphs, it might be difficult to compare. So in order to compare the situation, I would like to focus on comparisons of the prevalence rate from the 1990s to 2000s.

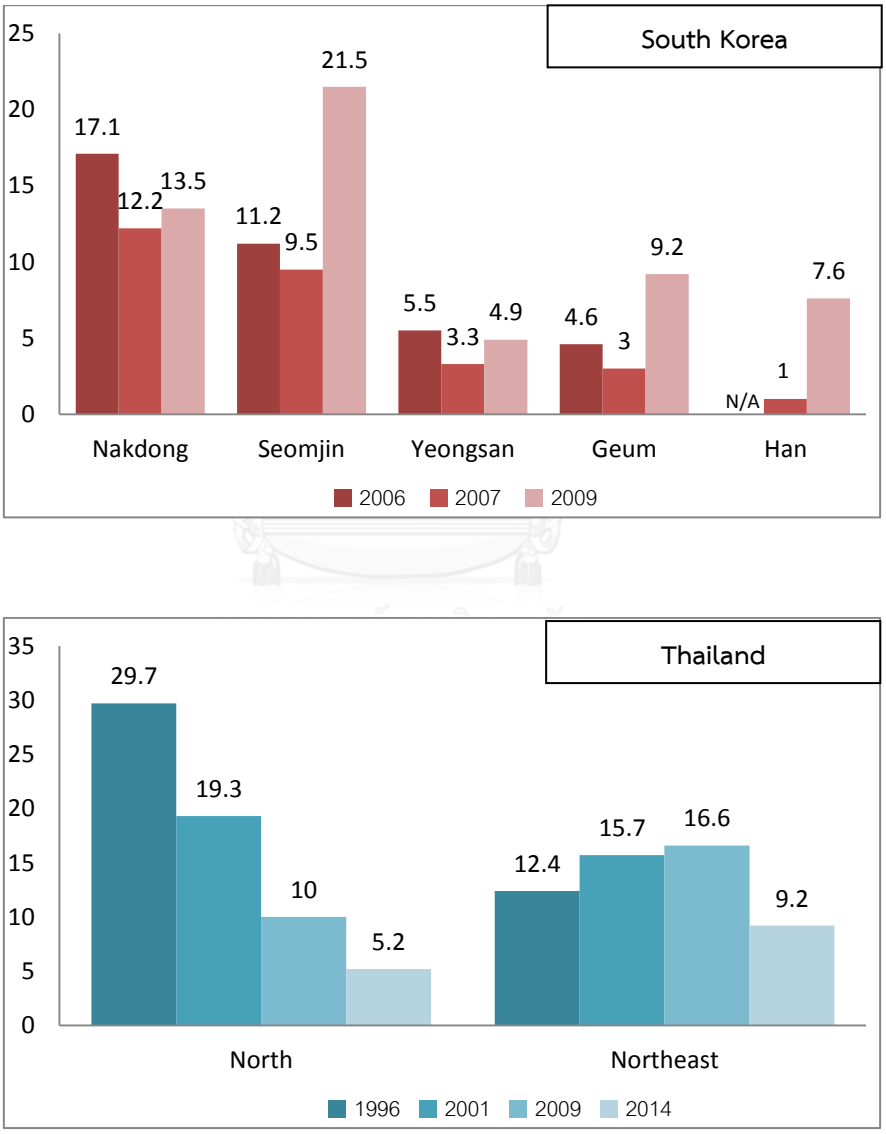
Figure 17: Prevalence based on the national survey of South Korea and Thailand



From the graph showing the prevalence in South Korea and Thailand obtained from the national survey, we can see that the prevalence in the Thai population was sustainably decreased to only half of year 1996 in 2014 although the changes between 2001 and 2009 seem to be small. Meanwhile, the overall prevalence in the South Korean population has shown only small changes if compared with the decline of the Thai prevalence rate because the prevalence rate in 2012 was decreased only 0.3 percent from rate obtained in 1992. Fluctuations in this period also make it more difficult to assess the data for South Korea's success. So, if comparing the overall situation of the two countries based on this information,

Thailand seems to have made better progress in reducing the prevalence rate than South Korea and it might be possible to imply that the policy and strategy of the Thai government is more effective than that of the South Korean government's policy.

Figure 18: The prevalence in the endemic areas of South Korea and Thailand



In case of the endemic areas, these two countries might be a bit different in terms of geographical distribution since the liver fluke infection in South Korea is being transmitted along the riverside areas all over the country but in Thailand, the prevalence of the liver fluke infection is scattered in mostly just some regions including northern region and northeastern region. The situation in the endemic areas of the two countries was also seen to be different. For South Korea, the prevalence rate in the endemic areas did not decreased as can be seen clearly from the graph. Although the situation has become better in year 2007, the prevalence rate of every area was again higher in year 2009, especially in the Seomjin, Han and Geum river areas. On the other hand, the prevalence in endemic areas of Thailand showed better reduction, particularly in the northern regions where the rate continuously decreased even though the rates of the northeastern region in year 2001 and year 2009 increased. The overall trend of prevalence rate in the endemic areas of Thailand is decreased while that of South Korea is still in flux.

5.3.2 Policy and effectiveness

If comparing the two countries, the scope of the policy in Thailand seems to look forward to the steps of reducing the complications of the liver fluke infection instead of focusing on reducing infections of liver fluke. This is because the incidence of cholangiocarcinoma (CCA) still remains at high levels despite the decrease of the liver fluke infection among Thais. However, to lower the rate of CCA, it still needs to continuously reduce the liver fluke infection together with the early detection of the patients and health education. On the other hand, based on the previous review, it seems that South Korean policy still focuses on liver fluke infections. This might be

due to the dissimilarities between the outcome of the policy and its control strategy. Thai policy and control program was more effective and Thai government seemed to be successful in decreasing the prevalence rate of the liver fluke infection among the target population. Meanwhile, the South Korean government still could achieve a successful reduction of the prevalence rate, which could imply that the implemented policy and control programs have not been effective. Consequently, the prevalence rate, particularly in the endemic areas, was higher.

- *First approach: elimination of the human host reservoir.*

Both Thailand and South Korea have paid much attention to screening and treatment since the 19th century, although the control program of South Korea in the very first period was set up for various parasitic infections, while Thailand seems to have specifically attempted to control the endemicity of Opisthorchiasis. Policy implementation in both countries seems to have resulted in a remarkable decrease of the infectious rate of liver flukes during 1970 and 1990 particularly when compared to other aspects of the implementation.

However, the two countries have some dissimilarities. South Korea seems to have a problem in terms of the intensity of the implementation. After the decline of the prevalent rate, South Korea has reduced the intensity of the control program implementation by limiting it to only some localities of the endemic areas. And based on the review, the information of active implementation was not presented. So, there is no data to suggest that the South Korean government has increased the intensity of the implementation provided to the people. Meanwhile, in the case of Thailand, the implementation has become more active recently even though the

problem of passive service in the hospital, less government and its agencies' attention, lack of continuity of implementation and weak working system had ever reported.

- *Second approach: interruption of the infection.*

This approach is also one of the important aspects for Thailand and South Korea. It was the main strategy provided to people besides the control program of screening and treatment since the control activities has started in the past. In South Korea, the health education seems to be given as much concern as the control program of screening and treatment. Although the information of the less concern of Thai government in providing health education to the people and the less effective educational material was brought up in interviews, the Thai government and responsible units seem to be quite active in providing health education lately, especially in terms of creating effective communication channels for more intensive knowledge which is able to reach the public. However, health education in South Korea seems to be provided extensively to the masses, and there was no information that suggested the improvement of health education in terms of its intensity.

Overall, there are some commonalities between the two countries in providing health education to the people. The health education provided in both countries emphasized the importance of properly cooking fish prior to consumption. Although the South Koreas government also provided other information such as the infectious route and importance of the anthihelminthic treatment, the content of the cooked fish consumption was always the main priority when providing health

education. But the most common thing is that both countries still haven't been able to completely successfully change the eating habits among the people since their residents in the endemic areas still maintain their raw freshwater fish consumption habits, leading to re-infection.

- *Third approach: interruption of transmission.*

This approach is also very similar in both countries, both in terms of the priority and governmental support. From the data presented in previous topics, the strongest similarity between the two countries is that sanitation and hygiene is very important especially when it reflects the health of the people. The sanitary improvement, thus, was ranked at the national level drive. So, it's unquestionable how much both governments have put their efforts in this approach. The governments have taken a crucial and major role in development and achieved the goal of the sanitation coverage since the period of the 1990s, resulting in improved hygiene provided for the people in both countries as well as helping to lower the rate of infection. The support given by the South Korean and Thai governments were also similar since it's mainly the sanitary construction and the political drive with strong enforcement. Nevertheless, Thai sanitation seems to have problems of poor management of treatment of the human waste due to the ineffective treatment system and lack of the provision for dealing with the waste, and also still has issues with unhygienic defecation in some rural areas. Meanwhile, the management of sewage in South Korea has been legally enforced and guaranteed by the government since the 1990s.

5.3.3 Influential factors

The ineffectiveness of policy and strategy implementation can be attributed to various factors in these countries. In the cases of Thailand and South Korea, the most common factors discovered from my study are related to the people, either states and agencies or civil society, as well as cultural factors, presented in the form of the eating habits and activity of social participation.

- *Actors*
    - *States and its agencies*

Thailand and South Korea might be facing the similar problem in terms of the health care service system but the situations of these two countries were somewhat different in some points. For South Korea, the problem occurred from the structure of the health care system where the weakest point seems to be the limitation of the public health facilities that contributed to the raising of the for-profit private-owned health facilities with competition and the consequent distribution of medical workers. This problem was not only due to the management system of the government but it also reflected the fade in concern of the government in finding the solution and increasing the number of the public health sectors.

On the other hand, the problem in Thailand that was raised during interviews was also attributed to fading concern of the government, which directly affects the activeness and priority of the responsible agencies as well as resulted in lack of support. The limitation of public health facilities is not an issue since public hospitals account for approximately three fourths of all health facilities (Catapult 2014).

However, the problem of disparities between health facilities across the regions also exists. The same problem with South Korea in terms of the distribution of medical personal also appeared in Thailand because the health facilities and the medical workers are usually concentrated in Bangkok and the central region (Catapult 2014).

Apart from the health care system, the organizational structure of the Thai and South Korean governments is also similar since they have both been decentralized. However, the decentralized administration was claimed by the Public Health technical officer to be a great barrier of the Thai government since opisthorchiasis control program was replaced in priority by other health problems. In contrast, the decentralized administration in South Korea was praised as it has further helped to support the local governance and cooperation between central and local government in terms of health care (Chang Bae Chun 2009).

- *Civil society*

The people in the endemic areas are one of the main factors found in both Thailand and South Korea to have greatly affected the implementation of liver fluke infection policy. From the study, there was a great similarity between these two countries when we talk about this factor. The commonality is that the people in the endemic areas of South Korea and Thailand lack concern about the infection. So, they still enjoy consuming raw fish even though they knew that eating raw freshwater fish will cause the infection and eating properly cooked fish dish can help to prevent the disease. Additionally, overconfidence in the effectiveness of medication was also found in the people of both countries. This also lowers the concern of the people towards the infection since they thought it can be easily cured by medication.

Other than the main actors, the groups of the people who play an intermediary role, such as NGOs, the health assembly or health volunteers, are also very important. Their function regarding liver fluke policy might not have been mentioned in the previous part. However, they have played a crucial role in pushing or driving effective and successful health policy in both South Korea and Thailand.

South Korean NGOs seem to have played a role in the determination of the policy direction as part of the civil participation. But the role of NGOs in South Korea regarding the liver fluke might not be seen clearly. Meanwhile, the function of health assemblies, particularly community health volunteer, is strongly presented in Thailand. Thai health assemblies take a crucial part in building healthy public policies and the role in pushing the liver fluke infection policy to be on the national agenda was their big success. Community health volunteers have also played an important role in their community's health and knowledge. They also seem to have increased in importance recently since they were trained and promoted to function in providing health education, screening and referral systems of the at-risk people according to the policy of reducing the CCA.

- *Cultural factor*

Although Thailand and South Korea may have different cultures or traditions, they share the same habits of eating raw freshwater fish and gathering socially in the endemic areas. This has been a very important barrier in both countries and can be called as the most significant factor that impacts liver fluke infection policy, and is difficult to counteract. In Thailand, it has become harder since some contextual elements such as the local socioeconomic or the geographical factors which affected

people's daily lives are also involved. However, the eating culture was contributed to the eating habit and formed the taste addiction. So, it's not surprising that the people in the endemic areas of both countries enjoy this eating habit.

To sum up, we can see from all the data presented in this chapter that the policy implementation of the Thai government has been effective in reducing the prevalence of liver fluke infections. However, the South Korean government still has not been able to sustainably reduce the infection in the endemic areas of their countries, which could reflect weaknesses of the government. Meanwhile, the policy and control program of Thailand still has some gaps. Consideration of all main factors, including the actors and internal context of the countries which still need to be dealt with by the government, is important in understanding current gaps in policy. Also, we can see both the similarities and differences between these two countries. However, this might not be enough since the study has not been concluded and some useful points or suggestions obtained during data collection have not been mentioned yet. Therefore, the conclusion and some recommendations will be presented after this.

.

CHAPTER VI
CONCLUSION AND POLICY RECOMMENDATION

6.1 Conclusion of the study

Foodborne Trematodiases is still prevalent in many poor or developing countries globally. In South Korea, although the overall parasitic infection rate has been decreased significantly, the South Korean government's effort of controlling Clonorchiasis do not seem to have been successful, since Clonorchiasis still remains very prevalent in riverside areas. In Thailand also, the Opisthorchiasis is still being actively transmitted in northern and northeastern regions and is considered a major health problem, since it contributes to the high mortality among northerners and northeasterners. Both of the countries governments have implemented national control measures, which usually include treatment and health education. But since the prevalence is still not sustainably decreasing, and cases of reinfection are commonplace, the effectiveness of the policy and implementation strategies by these two countries is still questionable. Thus, this study has assessed the health policy and strategies by focusing on the effectiveness, and determining the factors influencing the outcome for each country, then comparing findings.

Based on documentary reviews and interviews, South Korea's policy and control program of Clonorchiasis is still somewhat ineffective, different from

Thailand. The prevalence in South Korea has not decreased sustainably, it fluctuates and it tends to be increased among the endemic areas. This has resulted from inactivity and lack of continuity of screening implementation and providing treatment, and also ineffective and restricted health knowledge dissemination. Nevertheless, sanitation seems to be a great success since either universal sanitation or well management was achieved. In Thailand, the prevalence rate seems to be sustainably decreased and shows better reduction progress, although the decreased rate of infection in northeastern regions has not stabilized. However, there are some implementation gaps, such as the management of sanitation which needs attention and improvement so that Opisthorchiasis can be eradicated and result in decreasing CCA in the near future.

Apart from the evaluation of the effectiveness of the policy and strategy, the factors found from these two countries were also very similar. First the governments and its agencies in terms of problems in the health care service system. The most common factor influencing the effectiveness of the policy was the cultural factor and this appears to be the major factor in endemic areas. The habits of eating raw freshwater fish, communal social drinking and lack of awareness, additionally peoples misunderstanding and lack of health education has to take significant responsibility for the ineffectiveness of the policy. Additionally, the environmental factor which encourages the consumption of raw freshwater fish was also proposed as important by an officer working in Thai Public Health.

Hence from all the data provided, we are able to conclude and answer the questions set up in the first chapter of this study, that the implementation of both governments was somewhat different in some aspects and the situation of two countries was also dissimilar. Importantly, the policy of South Korea was not very effective, different from Thailand where the policy and its control strategy was effective in reducing the prevalence of the infection. South Korea still has not succeeded in the prevention of liver fluke infection and sustainably decreased its prevalence in the endemic areas. Nonetheless, both countries still did not succeed in terms of trying to change the eating habit of their people in the endemic areas, since the consumption of the raw fish still remain a significant factor as well as the people's lack of health concerns and awareness.

6.2 Policy recommendation

Although the policy regarding Opisthorchiasis has gained considerable attention from within the government setting and become part of the national agenda in terms of reducing the infection rate to reduce the CCA, there is still a need for some implementations to reinforce the effectiveness of the policy and strategy. Firstly, the policy and its activity should be included in the function of various governmental departments in order to stimulate them to continuously work on this issue. Furthermore, the government should motivate the responsible governmental

units, in the various areas of endemic, to identify and set up their own problem studies based on the health issue of population in their areas, not only focusing on the problems identified by the central government. Also, the central government should provide them with set up support, even though it is a local government problem. This can be applied not only for the problem of liver fluke but other problems too.

In case of South Korea, there might be more elements to accomplish than in case of Thailand since their policy and control program has not yet been effective. There are several points that can be improved to increase the effectiveness. A strong policy is very important, and especially, the government and its serious concern are extremely essential to strengthen the policy and its enforcement. Therefore, the first thing that the South Korean government should do is to focus their attention on their liver fluke policy and stimulate all sectors to recognize and be aware of its importance as a significant problem to public health. In addition, the control program of screening with treatment and health education should be actively and mutually implemented. The active service of screening and treatment should be comprehensively provided in all endemic areas. Since the South Korean government still could not make change to people's eating habit, health education with emphasize on cooked fish consumption should also focus on the informing people of the severe complication and medication expense to provide a more powerful motivator encourage a change eating habit. The people will then be well informed

regarding the infection, and its treatment so allowing them to make an educated decision. If active screening and treatment is done with intensive health education, the control of liver fluke infection should be successful. The new infectious cases will not be found in addition to the infected patients being treated.

Nonetheless, the interesting thing that I would like to mention is reference the study of Mrs. Pariyakorn Chaleephrom (ชาลีพรม) which I believe is a good example of operating a control program based on the community and focuses on the residents' implementation, it seems to have great implication not only for Thailand but also for South Korea in improving their liver fluke policy and implementation.

If we consider the point of the governmental process, it usually happens as a top-down governance approach for any policy, this seems to be a crucial weak point in the management of a control program. From the study of Mrs. Pariyakorn, the bottom-up process has proved to work well among the residents in a village. The purpose of the study is to develop the model of prevention and control of Opisthorchiasis by participation of the community in Lahan Tumbon, Chatturat District, Chaiyaphum Province. The concept of the study is to encourage the villagers in the community to think and implement the control activities themselves. The public health officers had a function only to give their assistance, and support in terms of the tools and knowledge base the villagers needed. This study was gradually operated over many years. However, it gave a great and sustainable result

since almost of the villagers joined and the control activities are still operated by the villagers despite being time-consuming.

This method did not only help to create the motivation and awareness among the residents, but it also met the actual needs of the village which the normal governmental control program may not be able to emphasize. Furthermore, it could be incorporated into an ineffective government control program, and help public health officers learn or get new idea which can be then used to improve the control program using ideas and solutions developed by the villagers. A good example is the case of educational material, which I have mentioned in the chapter 5, or the idea of writing the name of the participants at the top of the questionnaire so that health education and control activities would be specifically and appropriately provided to each villager. Hence, the different problems of each person would be solved appropriately.

In addition, health education which normally emphasized cooked fish consumption has to be changed to focus on the severe complication of the disease, because villagers are already aware of safe eating behavior but are not concerned. For greater effectiveness, Mrs. Pariyakorn designed it to be a personal experience, villagers with family members who had suffered and died from cholangiocarcinoma were brought to tell their stories and this method worked. The people tended to have more awareness and saw the importance of infection control since they could now perceive the danger of the infection. So, this study has also proved that health

education based on community's awareness, understanding and behaviors as well as the complication of the disease was more effective than tradition government implementation.

From the study, we can see that the bottom-up management is more effective. However, Thai and South Korean used policy and strategy that was usually the top-down model, which could not resolve the problem according to its social characteristic, needs and the understanding of each area. This is because the situation or problem of each area was not really reflected in the policy. So, only sending the policy decided by the government to the endemic areas did not help to decrease the infectious rate, and especially could not make change of the people's eating behavior since the policy and its control program did not suit individual endemic areas. Hence, learning and listening to the people in the areas, as well as giving them the opportunity to design and operate it themselves will really meet their needs and fit with the characteristic of the community. The local governmental units and staffs should remain in their role as the supervisor and supporter based on the community's needs. It may be a good strategy for the Thai government to develop this model in other areas. The South Korean government may also be able to apply this in their country and develop their owned suitable model in the future. Nevertheless, the central governments of both countries should actively take the principal responsibility in providing the budget, knowledge and facilities so that the implementation can be operated smoothly and sustainably.

Additionally, health intermediaries should be paid more attention to and given a high profile since they are the important spokesperson of the people, reflecting the health issues and ineffective policies for that area. Regarding the study of Mrs. Pariyakorn, the community leader was praised as the successful factor of the study, since the community leader was the crucial factor in motivating the people in the village to recognize the importance and see it as an important health problem of the village. This happened because the community leader is one of the villagers and close to the people in the community, different from the governmental officers who may not have any local affiliations. So, the community leader will be more creditable and has greater potential to persuade the people to acknowledge the problem and raise their concerns, which brings a cooperation approach in solving the problem. In Thailand, the function of these intermediaries, apart from the community leader, have been recognized especially the health assembly and the community health volunteers. Their function seems to have been encouraged by the government recently, in parallel with cooperation from various social sectors. Although, in case of South Korea their function still could not be seen clearly. Therefore, this might be a good opportunity for South Korea to learn from Thailand and promote the cooperation of social sections and the function of health intermediaries.

When the government show great concern, the policy is strengthened and governmental agencies, either the central or local divisions, will respond, and

actively take part in the policy implementation. Together with enthusiastic cooperation from the civil society, the liver fluke policy will be effective and the liver fluke infection as well as cholangiocarcinoma will be successfully eradicated from South Korea and Thailand.

REFERENCES

. "Common Carp (Cyprinus carpio)." Retrieved 11 Novermber, 2015, from http://www2.dnr.cornell.edu/cek7/nyfish/Cyprinidae/common_carp.html.

Infectious Diseases of South Korea, GIDEON Informatics Inc.

(2012). ""สธ."จัดโครงการผ่าตัดรักษาผู้ป่วยมะเร็งตับ-ท่อน้ำดีฟรี 224 ราย เทิดพระเกียรติในหลวง-ราชินี-พระบรมโอรสาธิราชฯ." from http://www.cuhc.chula.ac.th/hospital/?q=node/84.

(2013). Adult of C. sinensis stained with carmine. Clearly visible in this image are the oral sucker (OS), pharynx (PH), ceca (CE), acetabulum, or ventral sucker (AC), uterus (UT), vitellaria (VT) and testes (TE). Centers for Disease Control and Prevention

(2015). Life cycle, Centers for Disease Control and Prevention.

Albuquerque, C. d. (2013). Thailand: Striking contrasts in access to safe drinking water and sanitation - UN expert urges establishment of independent water and sanitation regulator.

Banchob Sripa, et al. (2010). Food-Borne Trematodiases in Southeast Asia: Epidemiology, Pathology, Clinical Manifestation and Control.

Binder, S. T. a. D. (2013). Evaluating the effectiveness of public finance for household sanitation in rural Thailand.

Buri Tippanas, P. B. (2009) ผลของการใช้รูปแบบการปรับเปลี่ยนพฤติกรรมการบริโภคอาหารเสี่ยงต่อการเกิดโรคพยาธิใบไม้ตับของประชาชนในพื้นที่ลุ่มน้ำชี : กรณีศึกษา อำเภอเชียงขวัญ จังหวัดร้อยเอ็ด ปี 2551. Research and Development Health System Journal **2**, 97-105

Catapult (2014). Healthcare Landscape in Thailand
An overview.

Chang Bae Chun, S. Y. K., Jun Young Lee, Sang Yi Lee (2009). Health Systems in Transition. Republic of Korea: Health System Review. **11**.

Cho, L., Lee, Cho, Cheun, Hong, Sohn and Kim (2008) Prevalence of Clonorchiasis in Southern Endemic Areas of Korea in 2006.

Cho, S.-Y. (2009) Fifty years of the Korean Society for Parasitology. **47**, DOI: 10.3347/kjp.2009.47.S.S7.

Choi, D. W., et al. (1976) Clonorchis sinensis in Kyungpook Province, Korea. 3. Chnaging pattern of Clonorchis sinensis infection among inhabitants. Korean J. Parasit. **14**, 117-122

Collins, T. (2005). "Health Policy analysis: a simple tool for policy makers." Public Health **119**(3): 192-196.

Do-Soon Park, S.-J. N., Shin Hyeong Cho, Kyung Ja June, Young-Chae Cho, Young-Ha Lee (2014) Prevalence and Risk Factors of Clonorchiasis among Residents of Riverside Areas in Muju-gun, Jeollabuk-do, Korea. Korean J Parasitol. **52**, 391-397

E.S. Upatham, V. V., W.Y. Brockelman, S. Kurathong, P. Lee, R. Kraengraeng (1988) Rate of re-infection by Opisthorchis viverrini in an endemic Northeast Thai community after chemotherapy. **18**, 643-649

Eun-Hee Shin, S.-M. G., Hyo-Jin Kim, Soon-Hyung Lee, Jong-Yil Chai (2008) Trends in parasitic diseases in the Republic of Korea. DOI: http://dx.doi.org/10.1016/j.pt.2007.12.003

Guo-Jing Yang, et al. (2014) China's sustained drive to eliminate neglected tropical diseases. Lancet Infect Dis. **14**, 881-892 DOI: 10.1016/ S1473-3099(14)70727-3

Gye-Sung LEE, I.-S. C., Young-Ha LEE, Hyung-Jun NOH, Dae-Whan SHIN, Sok-Goo LEE and Tae-Yong LEE (2002) Epidemiological study of clonorchiasis and metagonimiasis along the Geum-gang (River) in Okcheon-gun (County), Korea. **40**, 9-16

Henry Northover, S. K. R. a. T. B. (2016) Achieving total sanitation and hygiene coverage within a generation – lessons from East Asia.

Herman F. Wunderink, et al. (2014) Foodborne Trematodiasis and Opisthorchis felineus Acquired in Italy. Emerg Infect Dis. **20(1)**, 154-155 DOI: 10.3201/eid2001.130476

Ho Gak Kim, J. H., Myung-Hwan Kim, Kyu Hyun Cho, Im Hee Shin, Gwang Ha Kim, Jae Seon Kim,, et al. (2009) Prevalence of clonorchiasis in patients with gastrointestinal disease: a Korean nationwide multicenter survey. World Journal Gastroenterology **15**, 86-94

Hyun-Kyung Kim, et al. (2010) Prevalence of Clonorchis sinensis Infections Along the Five Major Rivers in Republic of Korea, 2007 Osong Public Health and Research Perspectives **1**, 43-49 DOI: 10.1016/j.phrp.2010.12.010

Jennifer Keiser and J. Utzinger (2007). Global distribution of major food-borne trematodes.**:** Global distribution of major food-borne trematodes. The main foci are as follows: C. sinensis – much of China, Republic of Korea and Vietnam; F. hepatica and F. gigantica – Altiplano of Bolivia, Cuba, Ecuadorian and Peruvian highlands, Egypt (Nile delta), Islamic Republic of Iran, Portugal, Spain and Vietnam; O. felineus – Kazakhstan, Russian Federation, Siberia and Ukraine; O. viverrini, Cambodia, Lao People's Democratic Republic, Thailand and Vietnam; Paragonimus spp. – Cameroon,

China, Ecuador, Lao People's Democratic Republic, Nigeria, Peru, The Philippines and Republic of Korea. Figure based on data from Keiser and Utzinger.

Jennifer Keiser and J. Utzinger (2007). Global estimates of at-risk population and number of people infected with major food-borne trematodes.

Jin-Kyoung Oh, et al. (2014) Control of clonorchiasis in Korea: effectiveness of health education for community leaders and individuals in an endemic area. Tropical Medicine & International Health **19**, 1096–1104 DOI: 10.1111/tmi.12338

Kwon, S. (2009) Thirty years of national health insurance in South Korea: lessons for achieving universal health care coverage. Oxford Journals **24**, 63-71

Kyung Ja June, et al. (2013) Prevalence and Risk Factors of Clonorchiasis among the populations Served by Primary Heathcare Posts along Five Major Rivers in South Korea. Osong Public Health and Research Perspectives **4**, 21-26 DOI: 10.1016/j.phrp.2012.12.002

Lee, J.-C. (2003) http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1447690/pdf/0930048.pdf. Am J Public Health **93**, 48-51

Lee, N. (2012) SOCIAL HEALTH INSURANCE IN MALAYSIA – LESSONS FROM THAILAND AND SOUTH KOREA. Kajian Malaysia **30(1)**, 51-70

Lor, P. (2011) International and Comparative Librarianship.

Mansour, S. T. a. G. (2013). Evaluating the effectiveness of public finance for sanitation
A synthesis report**:** 20-21.

Men-Bao Qian, et al. (2012) The global epidermiology of clonorchiasis and its relation with cholangiocarcinoma.

Ms. Theechat Boonyakarnku, P. A. K. (2003). Water Supply, Sanitation, and the Children of Thailand. Regional Health Forum. **7:** 48-55.

Narong Khuntikeo, P. Y. (2012) แนวคิดด้านนโยบายและยุทธศาสตร์ในการบริหารจัดการโรคมะเร็งท่อน้ำดีอย่างเป็นระบบและมีประสิทธิภาพ
Conceptual Framework of Health Policy and Strategies to Administer and Manage Cholangiocarcinoma Systematically and Effectively Srinagarin Med J. **27**, 422-426

Natthawut Kaewpitoon and S. Kaewpitoon (2010) พยาธิใบไม้ในประเทศไทย
Liver Fluke in Thailand. วารสารวิชาการ มอบ. ปีที่ 12 ฉบับที่ 1 มกราคม - เมษายน 2553 49-63

Natthawut Kaewpitoon, et al. (2008) Opisthorchiasis in Thailand: Review and current status. World Journal Gastroenterology DOI: 10.3748/wjg.14.2297

Neuman, W. L. (2014). Social Research Methods: Qualitative and Quantitative Approaches T. O. f. D. Viewpoints, Pearson Education Limited.

Neuman, W. L. (2014). Social Research Methods: Qualitative and Quantitative Approaches, Peason Educatiob Limited.

P Jongsuksuntigul and T. Imsomboon (1997) The impact of a decade long opisthorchiasis control program in northeastern Thailand. Southeast Asian J Trop Med Public Health **28**, 551-556

P Jongsuksuntigul and T. Imsomboon (1998) Epidemiology of opisthorchiasis and national control program in Thailand. The Southeast Asian journal of of Tropical Medicine and Public Health **29**, 327-332

P. Jongsuksuntigula and T. Imsomboonb (2003). Opisthorchiasis control in Thailand. Prevalence rates of opisthorchiasis in Thailand in 1981, 1996 and 2001 classified by regions.

P. Jongsuksuntigula and T. Imsomboonb (2003) Opisthorchiasis control in Thailand. Acta Tropica **88**, 229-232 DOI: 10.1016/j.actatropica.2003.01.002

Picha Suwannahitatorn, et al. (2013) A follow-up study of Opisthorchis viverrini infection after the implementation of control program in a rural community, central Thailand. Parasites & Vectors **6**, DOI: 10.1186/1756-3305-6-188

Podhisita, C. (2013). ศาสตร์และศิลป์แห่งการวิจัยเชิงคุณภาพ.

Ram Rangsin, et al. (2009) Incidence and Risk Factors of Opisthorchis viverrini Infections in a Rural Community in Thailand The American Journal of Tropical Medicine and Hygiene **vol. 81 no. 1**, 152-155

Rim, H.-J. (1990) Clonorchiasis in Korea. The Korean Journal of Parasitology **28**, 63-78

Rim, H.-J. (1997) Epidemiology and control of clonorchiasis in Korea. The Southeast Asian Journal of Tropical Medicine and Public Health **28 Suppl 1**, 47-50

Rim, H.-J. (2005) Clonorchiasis: an update. Journal of Helminthology **79**, 269-281 DOI: http://dx.doi.org/10.1079/JOH2005300

Rim, H. J. (2003). Controlling disease due to helminth infections. A. M. D.W.T. Crompton, M.C. Nesheim, L. Savioli, Taylor&Francis Group.

Ryu, S. K. (2014). Korea's Path to Universal Sanitation: Detailed Study on the Role of Institutions and their Political Drivers.

Seo, L., Cho, Chai, Hong, Han, Sohn, Cho, Ahn, Lee, Chung, Kang, Shim and Hwang (1981) An Epidemiologic Study On Clonorchiasis And Metagonimiasis In Riverside Areas In Korea.

Shin-Hyeong Cho, K.-Y. L., Byung-Chul Lee, Pyo-Yun Cho, Hyeong-Il Cheun, Sung-Tae Hong, Woon-Mok Sohn3 and Tong-Soo Kim (2008) Prevalence of Clonorchiasis in Southern Endemic Areas of Korea in 2006. Korean J Parasitol. **46**, 133-137

Sohn, W.-M. (2009) Fish-borne zoonotic trematode metacercariae in the Republic of Korea. **47(Suppl)**, DOI: 10.3347/kjp.2009.47.S.S103

Sukhontha Kongsin and S. Jiamton (2007) การวิจัยนโยบาย คืออะไร และทำอย่างไร. วารสารบริหารงานสาธารณสุข ปีที่ **13** ฉบับที่ **2** กรกฎาคม - ธันวาคม **2550**, 56-71

Sung-Tae Hong and Y. Fang (2012). "Clonorchis sinensis and clonorchiasis, an update " Parasitology International **61**(1): 17-24.

Sung-Tae Hong, et al. (1998) Control of clonorchiasis by repeated praziquantel treatment and low diagnostic efficacy of sonography. The Korean Journal of Parasitology **36(4)**, 249–254 DOI: 10.3347/kjp.1998.36.4.249

T.V. Luong, O. C., Thira Thatsanatheb (2000). Universal Sanitation - Thailand experiences. 26th WEDC Conference
Water, sanitation and hygiene: challenges of the millennium, Dhaka, Bangladesh.

Walton, B. C. and I. Chyu (1959) Clonorchiasis and paragonimiasis in the Republic of Korea

Report on a prevalence survey using intradermal tests. Bulletin of the World Health Organization **21(6)**, 721-726

website, A. P. "Four major rivers." from http://america.pink/images/1/5/9/1/8/1/0/en/2-four-major-rivers-project.jpg.

website, C. f. D. C. a. P. (2013). "Shells of Parafossarulus manchouricus, the most common snail host of C. sinensis in endemic areas in southeast Asia. Image courtesy of the Web Atlas of Medical Parasitology and the Korean Society for Parasitology.". from http://www.cdc.gov/dpdx/clonorchiasis/gallery.html#snailhost.

website, M. C. D. I. Adult Visceral Trematodes of Humans.

WHO. "Foodborne trematode infections." 2015, from http://www.who.int/foodborne_trematode_infections/infections_more/en/.

WHO (May 2015). "Foodborne trematodiases ". 2015, from http://www.who.int/mediacentre/factsheets/fs368/en/.

WHO (1995). Control of Foodborne Trematode infections. W. s. group.

WHO (1999). Health21: the health for all policy framework for the WHO European Region.

Wongba N, et al. (2011) Liver fluke prevention and control in the northeast of Thailand through action research. Asian Pacific Journal of Cancer Prevention **12**, 1367-1370

Wongsawad, C. (2012). Parasitology.

WorldBank. "Health expenditure, total (% of GDP)." Retrieved July 12, 2016, from http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS.

Yavaprabhas, S. (2014). นโยบายสาธารณะ.

Yeo, I.-S. (2008). A history of public health in Korea. Public Health in Asia and the Pacific: Historical and Comparatives Perspectives. M. J. L. a. K. L. MacPherson: 73-86.

กรมคร., ก. ส. (2013, April 5, 2013). "สธ. รณรงค์ “กำจัดโรคพยาธิใบไม้ตับ ลดมะเร็งท่อน้ำดี” หลังพบสถิติล่าสุดปี 54 เสียชีวิตด้วยโรคมะเร็งท่อน้ำดีเกือบ 15,000 ราย มากสุดในภาคอีสานและภาคเหนือ ". from http://pr.moph.go.th/iprg/include/admin_hotnew/show_hotnew.php?idHot_new=54729.

ชาลีพรม, ป. การพัฒนารูปแบบการควบคุมป้องกันโรคพยาธิใบไม้ตับโดยการมีส่วนร่วมของชุมชน โรงพยาบาลส่งเสริมสุขภาพ ตำบลละหาน อำเภอจัตุรัส จังหวัดชัยภูมิ.

มหาวิทยาลัยขอนแก่น, et al. (2012) ยุทธศาสตร์ "ลดพยาธิใบไม้ตับ กำจัดมะเร็งท่อน้ำดี วาระคนอีสาน". 1-97

โรงพยาบาลจุฬาภรณ์, ห. (2013). "โรงพยาบาลจุฬาภรณ์ ได้รับเลือกจากกระทรวงสาธารณสุข ให้เป็น โรงพยาบาลที่ร่วมรณรงค์สัญจร “การกำจัดโรคพยาธิใบไม้ตับ ลดมะเร็งท่อน้ำดีปี 2556”." from http://www.cccthai.org/l-th/index.php/2009-06-13-08-18-36/2012-03-16-03-34-52/834--2556.html.

อังศุชวาล, ธ. (2012). "ปัญหาของการนำนโยบายสาธารณะไปปฏิบัติในประเทศไทย." 26 August 2015, from http://www.pub-law.net/publaw/view.aspx?id=1758.

APPENDIX

VITA

Ms. Sidawadi Pulsiriwit

Born: 16 April 1990

Education:

- Master of Arts in Korean Studies, Graduate School, Chulalongkorn University, Thailand
- Bachelor of Nursing Science, Faculty of Nursing Science, Assumption University, Thailand