COMMUNITY PARTICIPATION FOR BEHAVIOR DEVELOPMENT TO PREVENT *OPISTHORCHIASIS* AMONG PEOPLE IN A RURAL AREAS OF LOWER NORTH THAILAND

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ABSTRACT:

Background: *Opisthorchiasis* is a chronic parasitological disease. It is one of the significant public health problems in Southeast Asia, especially Thailand. This action based research aimed to study an application of community participation for behavior development to prevent *Opisthorchiasis* among select resident in Kwae Noi Dam, Phitsanulok province.

Methods: A total of 70 participants were selected. The process was divided into two phases. The first group was educated about situation analysis in the community, channels for health information, stakeholders, and food training. The second group was trained about prevention planning which composed of demonstration, modeling, group discussion, campaigning for prevention and rewards. In each implementation stage qualitative and quantitative methods were used for data collection. Data collection included information regarding socio-demographics, knowledge, perception of protection motivation, and preventive behavior. For the qualitative data, the content analysis was made according to framework and key themes that reflected the meanings and values of the learning management process. The quantitative data was analyzed by descriptive statistics including percentage, mean, standard deviation, Chi-square, and Fisher's exact test.

Results: More than 70% of participants' scores had improved significantly with marked increases in knowledge and perception toward preventive behavior for *Opisthorchiasis.* The learning processes were developed based on the real problems and the direct experience of the samples.

Conclusion: Processes and models are important instruments that affect the prevention of *Opisthorchiasis* among people (by using appropriate strategies and methodologies). The lessons learned will be useful for educational institutions, in addition to which, this innovative model can be applied to anyone. Moreover, this model not only provides a new academic experience but also suggests a new policy for community participant learning.

Keywords: Community participant; Behavior development; Prevention *Opisthorchiasis*

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INTRODUCTION

Opisthorchiasis is a parasitic infection caused by helminths of the genus *Opisthorchis (Digenea, Opisthorchiidae)*. Two species cause serious health problems in humans: *Opisthorchis felineus* in Asiatic countries of the former Soviet Union and in Central-Eastern Europe *and Opisthorchis viverrini* in Southeast Asia. About 10 million people worldwide suffer from *Opisthorchiasis*; and their

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numbers are increasing in some areas [1, 2]. In Thailand, approximately six million people harboring *Opisthorchis viverrini (O. viverrini)* infection live in the northern and northeastern regions [3], *O. viverrini* infection was recently reported in central Thailand. The prevalence is high in the North (19.3%), Northeast (15.7%), and Central (11.0%) areas of Thailand [3]. Chronic infection of *O. viverrini* may lead to Cholangiocarcinoma (CCA) [4]. The concentrated distribution of *O. viverrini* in the north, northeast and central regions correspond with local natural intermediate hosts and traditional eating habits [3]. Persons in these areas consume undercooked or raw animal products, in particular freshwater fish. Although the life cycle of *O. viverrini* is complex, involving two intermediate hosts, the consumption of uncooked foods containing the parasite at the infective stage leads to infection. Although many campaigns to educate the people to abstain from eating raw fish have been undertaken, the decrease in incidences in the endemic areas has proven unsatisfactory [4]. There is evidence indicating that the major factors affecting unsuccessful eradication are not only the difficulty in changing the eating culture of the risk group but also other problem issues [1,4]. Since *Opisthorchiasis* is a serious underlying risk for the development of CCA, the control of *Opisthorchiasis* has become an important local public health issue. The challenge to control the disease has become a national policy. Several campaigns have been launched [3-5]. However, the problem still persists. Attempts to get rid of the parasites by universal usage of antihelminthic drugs were successful [4, 5]. In the case of a parasitic infestation, sanitation becomes an importance underlying factor leading infection. The poverty and low education of the local people has also become an important concern [3].

In Thailand, it found that the reported number of CCA cases in people in *Opisthorchiasis* endemic area was 20 times higher than in non- endemic areas. Phitsanulok Province reported the incidence of *Opisthorchiasis* (17.0%) [3, 6]. The rate of infection was highest among people aged 25-58 years [3, 6, 7]. In relation to infection prevalence in endemic areas, this can vary from 24.5 to 60.0%. In the central regions part of Thailand, the rooted eating practice is eating raw fish. The local dishes, namely, "Koi-pla (Chopped raw fish salad or uncooked fish)" and "Pla-ra (Extensively fermented fish)" are widely consumed by local people; and that was the starting point of the infection cycle. Pla-som (Brief fermented fish) is traditional Thai from fermentation of either whole fish or fish fillets with salt, steamed rice or sticky rice, and garlic until its taste becomes sour. Fermented fish has a complicated role in Thai cuisine. It is fresh water fish that has been fermented with toasted rice and salt. Also, because of the poverty the local people cannot earn sufficient to choose nutritious foods and facilities for cooking and results in the populace finding local food and eating it uncooked [3, 6]. It has proven difficult to dissuade at risk populations from the risky behavior of consuming these dishes, including modifying preparation of the dishes by heating the constituent fish flesh sufficiently to kill the metacercariae [3]. In addition, raw fish dishes in Phitsanulok province are locally prepared based on community culture. A review of literature found that a lack of knowledge regarding *O. viverrini* infection in Phitsanulok province which may hinder the prevention and control program of this fluke [3]. In addition, further methods to influence the behavior of people should be tried and implementation. Our study was designed to examine participatory action research aimed to study an application of community participation for behavior development to prevent *Opisthorchiasis* in Kwae Noi Dam, Phitsanulok province.

MATERIAL AND MEDTHODS

This study was conducted in Wat Bot district, Phitsanulok province, Thailand from June to December 2015. The district is situated in lower northern Thailand, borders on the north, and the south with northeast Laos. The main ethnic groups were northeastern and local people. The majority of the population is comprised of farmers who mostly retained their traditional northeastern culture, dialect, folk customs and life style including eating habits. This study was approved by the Ethical Review Committee for Research Involving Human Research Subject, University of Phayao (2/046/58). Participants live in six selected villages. These villages were purposely selected because of their small population sizes, and the relatively homogeneous population structure. All inhabitants of the villages were targeted as study. Those six villages were selected due to the high prevalence of *Opisthorchis* infection. This participatory action research was viewed as the first step in a holistic project aimed at providing village people with the knowledge and skills they require for protecting

themselves from *O. viverrini* infection. It was followed by communities building health volunteer centers and the training of volunteer leaders to run the health volunteer centers. The volunteered participants derived from four groups of people. Each group comprised of ten to twelve members. However, the conversation during focus group of two times, each time for duration of two hours. Study participants were informed about the purpose, procedures, potential risk, and benefit of the research and were also given a chance to question the researchers. Participants who are willing to participate to the study were requested to sign an informed consent form. The research consisted of operation plans as follows.

First stage: The study of the problem conditions and community behavior including: health status, eating habits. The research team surveyed the participants from the area for their level of knowledge, intention, and the practices of people for preventing *O. viverrini*. The team organized group discussions [8] and conducted in-depth interviews in order to ensure that the participants fully understood the activities; this mitigated any information concerns.

Second stage: The research team organized training in order to provide knowledge about *O. viverrini* to people in community. Participants were randomly recruited. The training participants consisted of 30 household cooks, 20 village leaders, 7 staff from the Tambon Health Promoting Hospital, 3 teachers, and 10 staff from district administration, a total of 70 people. The media used in the training were movies, pictures, and samples viewed through a microscope. There were health awareness campaigns, with reference to *O. viverrini*, promoted in the villages and schools, a safety food competition, and a logan competition. Furthermore, the research team invited families, whose family members had passed away due to *O. viverrini*, to share their experiences with the training participants. Community's leaders were assigned to share the knowledge with people in their villages. For those who had *O. viverrini*, the research team invited families whose family members passed away due to *O. viverrini* to share their experiences in order to plan solutions. Moreover, community leaders call on patients at their homes and provide them with care and instructions. In addition, the research team organized an activity to seek a role model regarding behavior changing. Regarding school activities, the research team in the cooperation with teachers provided training about *O. viverrini* for leading students; and also assigned them to randomly check meals cooked at their homes; and if any household did not eat raw fish they got a green flag in order to create motivation within the community.

Third stage: Results evaluation. This stage was to evaluate the advancement and to conclude the results. The profiles of participants were created based on data from questionnaires. The conversations during focus group discussion (FGD) [8] were recorded using a voice recorder. The data were collected continuously until no new information was identified, i.e., data saturation. The qualitative study used the FGD technique to assess; 1) situation of uncooked fish consumption in the community, 2) knowledge, 3) self-efficacy, 4) uncooked fish consumption and preventive behavior, and 5) diagnosis and treatment of *O. viverrini* infections. The recorded conversations from each session were transcribed into text. Then the text based data were manually sorted and coded in order. Data were revised, organized and summarized for analysis. The methods used included content analysis, direct quotations and selected word to give consideration to actual local words used by local participants [8, 9].

Quantitative data: Information was collected by using a structured questionnaire. The questionnaire was divided into four parts. The first part was related to socio-demographic variables of the participants. The second part was the section relating to their knowledge of *O. viverrini*. It was both a positive and negative. If the answer was correct, then received 1 point and if the answer was wrong, then received 0 points. The third part was based on the protection motivation theory [10] of *O. viverrini* which includes four major subscales; perceived severity, perceived probability, self-efficacy, and perceived benefit. The last part was the section of practice to preventive behavior *O. viverrini*. The answer were rated using a scale from 1 - 3, which represent agree, not sure, and disagree. The participants can choose only one answer for each question; and the questions were both positive and negative (rating scaled). From the rating scale of the above state criteria were used to evaluation perceived toward preventive *O. viverrini* are rank three levels [11]. Content validity of the questionnaire was evaluated by two experts. The overall item objective congruence (IOC) for content validity was 0.80. The reliability test indicated that overall subscales had a good level of internal consistency [12] (Cronbach's alpha coefficient, $\alpha \geq$ 0.78, 0.72, 0.80, and 0.71).

Table 1 Percent categorized by level of all variables in the participants group between pre-test and post-test (N=70)

General	Males (n=23) (%)	Females (n=47) (%)	Chi-square test
Age group (years)			0.016*
0-20	0 (0.0)	3 (100.0)	
21-30	2 (10.5)	17 (89.5)	
31-40	5 (55.6)	4 (44.4)	
41-50	5 (26.3)	14 (73.7)	
51-60	10 (55.6)	8 (44.4)	
≥ 61	1 (50.0)	1 (50.0)	
Mean ± SD 44.51 ± 18.32			
Median (min : max) 45 (18 : 65)			
Occupation			0.291
Government	5 (55.6)	4 (44.4)	
Agriculture	13 (34.2)	25 (65.8)	
Laborer	5 (25.0)	15 (75.0)	
Trading	0 (0.0)	3 (100.0)	
Education level			0.753
Primary school	0 (0.0)	3 (100.0)	
Secondary school	4 (25.0)	12 (75.0)	
Vocational school	14 (38.9)	22 (61.1)	
Bachelor	3 (33.3)	6 (66.7)	
More than bachelor	2 (33.3)	4 (66.7)	
Household income per year (Baht)			0.360
< 5,000	0 (0.0)	3 (100.0)	
5,001 – 8000	7 (53.8)	6 (46.2)	
8001 – 10,000	10 (33.3)	20 (66.7)	
10,001 – 15,000	3 (21.4)	11 (78.6)	
> 15,001	3 (30.0)	7 (70.0)	

Table 2 Percent categorized by level of all variables in the participants group between pre-test and post-test (N=70)

Characteristics	Males (n=23) (%)	Females (n=47) (%)	Chi-square test
Experience of stool examination			0.422
Never	7 (29.2)	17 (70.8)	
Ever	16 (34.8)	30 (65.2)	
Fish menu			
Koi-pla (Chopped raw fish salad or uncooked fish			0.077
No	3 (17.6)	14 (82.4)	
Yes	20 (37.7)	33 (62.3)	
Pla-ra (Extensively fermented fish)			0.361
No	7 (38.9)	11 (61.1)	
Yes	16 (30.8)	36 (69.2)	
Pla-som (Brief fermented fish)			0.244
No	8 (26.7)	22 (73.3)	
Yes	15 (37.5)	25 (62.5)	

Statistical analyzes were performed by using IBM, SPSS Statistics version 20 (University of Phayao). Descriptive statistics for continuous variable and frequency (percentages) for categorical variables were used to describe the characteristics of the study population. Chi-square and Fisher`s exact test were used to determine the association. The results were considered significant when the *p*-value less than 0.05.

RESULTS

Quantitative study: The general characteristics of the 70 participants are show in Table 1. 32.9 % were males; and 67.1 % were females. The mean age was 44.51 ± 18.32 years, ranging from 18 to 65; and it was statistically significant (p<0.001). More than

Table 3 Percent categorized by level of all variables in the participants group between pre-test and post-test (N=70).

Characteristics	Pre-test n (%)	Post-test n (%)
Knowledge on *Opisthorchiasis*		
Low (8-10 scores)	3 (4.3)	2 (2.9)
Moderate (6-7 scores)	25 (35.7)	18 (25.7)
High (< 5 scores)	42 (60.0)	50 (71.4)
Perceived severity		
Low (24-30 scores)	6 (8.6)	2 (2.9)
Moderate (19-23 scores)	43 (61.4)	7 (10.0)
High (< 18 scores)	21 (30.0)	61 (87.1)
Perceived probability		
Low (24-30 scores)	12 (17.1)	5 (7.1)
Moderate (19-23 scores)	38 (54.3)	21 (30.0)
High (< 18 scores)	20 (28.6)	44 (62.9)
Self-efficacy		
Low (24-30 scores)	4 (5.8)	9 (12.9)
Moderate (19-23 scores)	54 (77.1)	7 (10.0)
High (< 18 scores)	12 (17.1)	54 (77.1)
Perceived benefit		
Low (24-30 scores)	16 (22.9)	13 (18.6)
Moderate (19-23 scores)	51 (72.8)	8 (11.4)
High (< 18 scores)	3 (4.3)	49 (70.0)
Preventive behavior for *Opisthorchiasis*		
Low (24-30 scores)	21 (30.0)	13 (18.6)
Moderate (19-23 scores)	21 (30.0)	8 (11.4)
High (< 18 scores)	28 (40.0)	49 (70.0)

50.0 % of the participants were working in agriculture and went to vocational schools. Table 2 shows the results of experience of stool samples examined for helminthes. More than half (65.7 %) of the samples had parasites. Both males and females (54.3 %) had a history of helminths. Moreover, during the past of three months detection of helminthes in the participants was 37.5 %. In addition, most of the participant's habit of eating chopped raw fish salad (Koi-pla) was 75.7 %; extensively fermented fish (Pla-ra) was 74.3 %; and briefly pickled Fish (Pla-som) was 57.1 %. There were no statistically significant differences ($p>0.05$) in both males and females of all the variables used in Table 2.

Table 3 shows the percentage level of all variables in the participant groups between pre-test and post-test. Before implementation, almost all the variables indicated poor and moderate score levels including; moderate and low knowledge on *Opisthorchiasis* (35.7%, 4.3%), moderate perceived severity (61.4%), low and moderate perceived probability (17.1%, 54.3%). Almost all of them showed moderate self-efficacy (77.1%), and low and moderate for perceived benefit (22.9%, 72.8%). Moreover, most of all them were both low and moderate for preventive behavior of *Opisthorchiasis* (30%), respectively. After implementation, more than half of the participants scores had changed to the high level, the increases were as follows; knowledge on *Opisthorchiasis* (71.4%), perceived severity (87.1%), perceived probability (62.9%), self-efficacy (77.1%), perceived benefit (70%) and preventive behavior for *Opisthorchiasis* (70%).

Qualitative study

Most of the consumer behavior involved three uncooked fish dishes; the most widely consumed was fermented fish (Pra-ra) because it is used as a main ingredient in dishes in the area of Phitsanulok. Most of the sample groups liked to eat spicy minced raw fish and Koi-pla (uncooked fish), a representative of health volunteer (52 years old) says,

> *"I like eating spicy minced Koi-pla and Pra-ra, especially minced raw fish it is very delectable, I have been eating it for a long time and if you drink rice whiskey with the meal the whiskey will kill all the germs.*"

Information that supports this behavior of the sample groups who are at risk of developing Helminths is that most of the housewives (wives) used ingredients bought from the village market. Some were from self-catching such as fish from the river near Kaew Noi reservoir and most of them believed that half-cooked food tasted good.

Knowledge of *Opisthorchiasis*

More than half of the sample group did not have accurate knowledge of *Opisthorchiasis* before joining the training; and most of them believed that soil-transmitted helminthes did not cause any serious health problems and can be treated by taking some medicine. As one of the participant (48 year old) says,

> *"Opisthorchiasis are not dangerous; take medicine to kill them and you will be fine. I had it once 15 years ago and if I have it again I will just buy medicine from a community shop."*

After implementation the training, the sample group analyzed the problems in the community regarding the impacts caused from CCA. They understood the severity of having *Opisthorchiasis* that it can related to CCA, (55 years old) says,

> *"I saw some of my neighbors die because of CCA. I was scared and I do not want anyone in my family to be like that. I know that the cause was because our eating behavior that we like eating half-cooked food."*

Behaviors toward *Opisthorchiasis*

Most people in the community migrated from the northeastern region of Thailand (I-san). According to group discussions and in-depth interviews regarding behaviors toward *Opisthorchiasis*, it was revealed that most people claimed that this kind of eating behavior, eating raw fish, has been their way of life since their ancestors. They considered it as normal by giving reasons that it is delicious; and there is a medicine for it. People can purchase anthelmintics from any mobile drug store or community shop or from the health leader of the village. Furthermore, they believed that eating raw food leads to healthy. Young people can eat raw fish because they have a good immune system; but children and elders should not eat raw fish because their immune system is less effective.

Some people believed that if everyone seriously and constantly promoted the campaign for preventing *Opisthorchiasis* the numbers of helminthes patients would decrease. One of the villagers (52 years old male) says,

> *"If we can do it, quit eating raw fish, then children, or anyone in the family will do the same, every family can do this if we are serious about it."* *"Promoting the behavior of eating cooked foods such as cooked spicy minced fish, fired fish, boiled fish, and cleaning vegetables by rinsing them thoroughly and soak them in potassium permanganate or rinsing them using intense steam." (This maybe "or rinsing them under a strong steam of water"*

DISCUSSION AND CONCLUSION

A participatory action research is increasingly in health research. A qualitative technique from real life intervention is very scarce; and it needs health assessment. In fact, the technique is very important to improve intervention programs along with quantitative study. In this study, community participation to prevent *Opisthorchiasis* among the participants in was applied. The study showed that *Opisthorchiasis* remains an important problem in the area of Kaew Noi, Pitsanulok province. The study revealed [13, 14] that contracting helminthes was mostly caused from having incorrect knowledge and behavior of eating half-cooked food such as raw salty and uncooked fish (Koi-pla) or spicy minced raw beef. According to the analysis completed before the training, it found that most of the participants had low to moderate level of knowledge regarding to soil-transmitted helminthes, and its severity, perceived probability, and eating behavior. After implementation, it found that every variable increased to a higher score, for instance, low changed to moderate, and moderate changed to higher level. This was relevant to the study. After the program to prevent helminthes, the sample group gained higher scores. This aspect reflects the efficacy of community participation in order to solve problems using learning process of self-reflection [14, 15] though a continuous process. Each implementation was conducted in order to motivate the participants in the area in order to study the priority of the problem, such as health status, practice, evaluation and reflection of their own thoughts; so that they learnt about the problems and acknowledged people in the community toward

Opisthorchiasis. Furthermore, the participants were aware of the severity and perceived probability of the decease as well as methods to prevent and control *Opisthorchiasis* effectively.

After sharing and exchanging knowledge in the area, people were able to recognize problems and solve them together. In addition, working together in each step allowed the people to feel that they are a part of the work; therefore, they helped and supported each other at solving the problem. This is consistent with previous studies [14, 16, 17], that the action research process helped the community to understand their problem, become more confident, able to solve problems, and raised their quality of life. After participating in activities, the score level of the sample group was higher as they listened to lectures, watched videos, group discussions, participated in a fair and campaigns for the prevention of *Opisthorchiasis* through the radio, and organized parades in the community and schools. They became more aware of the risky behaviors.This shows that a life learning plan is one of the means that can create changes regarding correct perception of knowledge. It was revealed that a good strategy to prevent *Opisthorchiasis* was the team invited the families whose family members had died due to *Opisthorchiasis* and CCA to share experiences, cost, and treatment. In addition, the team allowed those who had *Opisthorchiasis* to plan solutions which is relevant to the study of [9, 14] using group discussion method and visiting each family at their house. It was found that the average score regarding behavior toward the prevention of *Opisthorchiasis* has been increased. It is relevant to the idea that doing or not doing a behavior oneself, that the influenced person becomes important for such behavior [9, 10, 17]. By bringing housewives, who cook meals for their family, to participate in the planning for preventing *Opisthorchiasis* is one of the best ways to solve the problem at a personal and later family level.

Suggestions from this research are that the idea of social support should be used to solve the problem by cooperating with local agencies including both government and private companies; so that the activities will be operated continuously. Furthermore, there should be a stool test periodically to check for helminthes to confirm levels and to improve solution. The participation action research is an advantage for the implementation of the community for solving problems. It can be applied to solve health care problems in other areas as well, especially local diseases or chronic diseases. Moreover, there should be the emphasis on community behavior, especially, belief, culture and consumption behavior. The limitation of this study is time. The period of activities was only six months; but behavioral changes require a longer period of time and non-generalizability of results. Monitoring process in order to provide knowledge continuously should be conducted. However, a team and health care leaders should be selected from people in the community; and maintaining the work on health promotion activities within the community should be prepared.

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