

RESEARCH ARTICLE

People Participation Towards *Opisthorchis viverrini* Prevention and Control in Chaiyaphum Province, Northeastern ThailandRutjirapat Phongsiripapat¹, Kanokporn Chimplee¹, Ratana Rujirakul², Soraya Kaewpitoon^{2,3,4}, Natthawut Keawpitoon^{2,3,5*}**Abstract**

This cross-sectional descriptive and qualitative study was aimed to study the people participation and their approaches toward the human carcinogenic liver fluke, *Opisthorchis viverrini*, prevention and control in Ban Chaun sub-district administrative organization (BCSAO) and Bamnet Narong sub-district municipality (BNSM), Bamnet Narong district, Chaiyaphum Province, Thailand between June 2013 and February 2014. Participants were purposive selected, included chiefs of sub-district administrative organizations, sub-district municipalities, sub-district health promotion hospitals (SHPHs), heads of village, and a further sample was selected with a multi-stage random sampling for public health volunteers, and villagers. The pre-designed questionnaire contained items for individualized status and the participatory steps of sharing ideas, decision-making, and planning, procession, evaluation, and mutual benefit, for the project *O. viverrini* prevention and control (POPC). In-depth interviews were used for collection of need approaches to POPC. With 375 participants who completed the questionnaire, it was found that people had a high level regarding to participate in the POPC, particularly in the process stage (\bar{X} =3.78, S.D. = 0.56), but the lowest level was found in sharing ideas, decision making, and planning step (\bar{X} =3.65, S.D. = 0.63). By comparison, participant status and organization did not significantly differ with people participation. In each step, Ban Chaun sub-district had a high level of participation in the step of sharing ideas, decision making, and planning toward POPC, more than Bamnet Narong sub-district municipality ($t=2.20$, $p=0.028$). Approaches for POPC in Ban Chaun sub-district and Bamnet Narong sub-district municipality included requirements for budget support, annual campaigns for liver fluke prevention and control, campaign promotion, risk group observation, home visiting, community rules regarding reducing raw fish consumption in their communities, and a professional public health officer for working in their communities, BCSAO, BNSM, and SHPH, for *O. viverrini* prevention and control. This study indicates that people realize that eradication of the liver fluke needs a continuous people participation for *O. viverrini* prevention and control in their communities.

Keywords: People participation - *Opisthorchis viverrini* - prevention and control - Thailand

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Introduction

The *Opisthorchis viverrini*; carcinogenic liver fluke, is an endemic in the Lower Mekong Basin, including Thailand, Lao People's Democratic Republic, Cambodia and central Vietnam (Sripa et al., 2010). The underestimate of infections are considered, more than 10 million people are infected with *O. viverrini* in Thailand and Lao PDR (Sithithaworn et al., 2012). In Thailand, it is estimated that 6 million people are infected with the *O. viverrini* (Jongsuksuntikul and Imsomboon, 2003). This figure indicated that it is a serious public health problem in Thailand, particularly in northeastern and northern region (Kaewpitoon et al., 2008; Sripa et al., 2010). The *O. viverrini* infection is associated

with hepatobiliary diseases including hepatomegaly, cholangitis, cholecystitis, and gallstones (Harinasuta and Vajrasthira 1960; Thamavit et al., 1978; Harinasuta et al., 1984). Recently, *O. viverrini* has been classified as Type I carcinogens by the International Agency for Research on Cancer, World Health Organization (WHO) (IARC, 1994).

A community-level health education campaign been conducted since late 1950s. *O. viverrini* control has been started as a small scale helminthiasis control program in some high risk areas. A large scale has been started, the program is operated in some provinces of the central and all provinces of the northeast and north of Thailand. The main strategies for liver fluke control comprise three interrelated approaches, namely stool examination and treatment of positive cases with praziquantel for

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eliminating human host reservoir, health education for a promotion of cooked fish consumption to prevent infection, and improvement of hygienic defecation for the interruption of disease transmission (Jongsuksantikul and Imsomboon, 2003; Sithithaworn et al., 2012). The *O. viverrini* infection in Thailand was the first reported in 1955 (Sadun) and many strategies has been operated over period 1955-2000, the national prevalence of *O. viverrini* infection had fallen from 63.6% to 9.6% but the high prevalence rate is still found in the rural communities of provinces, Northeast (Sithithaworn et al., 2012). In addition, the high mortality rate of CCA was reported in the northeast areas where found frequently of *O. viverrini* infection (Sripa et al., 2010). Mortality rate of liver cancer and *O. viverrini* infection rate in different regions of Thailand has been reported that Chaiyaphum province has 30.14-44.31 per 100,000 populations. Eradication of the fluke and identification of high-risk populations are urgently needed (Sripa and pairojkul, 2008). In addition, *O. viverrini* infection has been reported that 17.6% prevalence of infection in Chaiyaphum province (Sithithaworn et al., 2012). The national control program seems to have had little impact in many of these areas, and it has been difficult to make precise assessments of the overall effectiveness of the program. Therefore there is a need for a community-based approach to prevent infection with the parasite, ideally involving as many players as possible (Duangsong et al., 2013). Therefore, people participation and their needs toward *O. viverrini* prevention and control in Ban Chaun sub-district and Bamnet Narong sub-district municipality, Bamnet Narong district, Chaiyaphum Province, Thailand, is performed between June 2013 and February 2014. This basic knowledge is able useful for further planning of prevention and control in that areas including similarly communities.

Materials and Methods

A cross-sectional survey was conducted in Ban Chuan sub-district and Bamnet Narong sub-district municipality, of Bamnet Narong district. Bamnet Narong is a district in the southwestern part of Chaiyaphum province, northeastern Thailand. The district is covered area 560.3 km² (216.3 sq mi), 54,750 populations, and density 97.7/km² (253/sq mi). Neighboring districts are (from the west clockwise) Thep Sathit, Sap Yai, Chatturat of Chaiyaphum province, Dan Khun Thot and Thepharak of Nakhon Ratchasima province. The district is subdivided into 7 sub-districts, which are further subdivided into 88 villages. There are two townships (municipality) within the district - Bamnet Narong covers parts of Ban Chuan

sub-district, and Ban Phet Phu Khiao parts of Ban Phet sub-district. There are further 7 sub-district administrative organizations (SAO), included Ban Chuan, Ban Phet, Ban Tan, Hua Thale, Khok Roeng Rom, Ko Manao, Khok Phet Phatthana (Royal Gazette, 1939). Ban Chuan sub-district administrative organization (BCSAO), and Bamnet Narong sub-district municipality (BNSM), are located in Ban Chuan sub-district where is approximately 5 kilometer from Bamnet Narong district, 60 kilometer from Chaiyaphum province, and 260 kilometer from Bangkok. BCSAO and BNSM are further 17 and 8 villages, respectively. Both of organizations, has 10,754 populations. Participant who had over 15 years old included head of community (BCSAO, BNSM, villages), represents from sub-district health promotion hospital (SHPH), and villagers, were calculated by sample size determination using Krejcie and Morgan table (1970). Of 375 participants, is purposive selected (head of villages, members of BCSAO and BNSM), and multi-stage random sampling (village health volunteer and villagers), following Table 1.

Pre-designed questionnaire contained part 1; participant status, part 2; participatory question regarding to participate the project of *O. viverrini* prevention and control: 30 questions with sharing idea, decision making, and planing, procession, evaluation, and mutual benefit. The questionnaire was 5 rating scale; highest, high, moderate, low, and lowest. Reliability of questionnaire was analyzed, Cronbach alpha coefficient = 0.847, sharing idea, decision making, and planing = 0.835, procession = 0.784, evaluation = 0.818, and mutual benefit = 0.788. For interpret result; 4.51-5.00; highest level, 3.51-4.50; high level, 2.51-3.50; moderate level, 1.51-2.50; low level, and 1.00-1.50; lowest level of participation. Independent T-test and One-way ANOVA were used for comparison of participation and pattern of organization, and status, respectively. For study the approach to develop the people participation toward *O. viverrini* prevention and control by using in-depth interview in 8 participants who were purposive selected from 2 SHPH, 1 head of village, 1 BCSAO, 1 BNSM, and 3 village health volunteers. The questions containing the step of people participation particularly sharing idea, decision making, and planing, procession, evaluation, and mutual benefit step. Quality data analysis using content analysis

Results

Of 375 participants was completed the questionnaire and found that the majorities of participant were villagers (67.46%) and followed by the head of BCSAO, BNSM,

Table 1. Sample Size Determination for Study

Status	BNSM		BCSAO		Total	
	Population	Sample size	Population	Sample size	Population	Sample size
Head/member	20	20	51	51	71	71
Village health volunteer	227	24	177	27	404	51
Villagers	5,676	121	4,603	132	10,279	253
Total	5,923	165	4,831	210	10,754	375

and SHPH, and village health volunteers, respectively. The majority of participant was habitat in Ban Chaun sub-district (56%) (Table 2). Level of people participation in POCP, was analyzed and found that people had a high level of all stage of participation (\bar{X} =3.71, S.D.=0.52). The high level was found in the activity of procession (\bar{X} =3.78, S.D.=0.6), followed by evaluation and mutual

benefit (Table 3). A comparison between participation and status regarding *O. viverrini* prevention and control was measured and found that there was not statistical significant different in all status of participant ($F=1.26$, $p=0.285$) (Table 4). Meanwhile, a comparison of people participation in different place, was measured and found that there was not statistical significant different in both of local administrative organization ($t=1.89$, $p=0.06$). However, people participation was statistical significant different regarding sharing idea, decision making, and planning of POCP. Participant from BCSAO had a higher participated than BNSM, ($t=2.20$, $p=0.028$) (Table 5).

The approaches to develop the people participation of *O. viverrini* prevention and control, was interviewed and included sharing idea, decision making, and planning step; (1) budget support by BCSAO to SHPH for *O. viverrini* screening including related activities (2) budget planning by SHPH for health education campaign (3) budget planning for annual from related organization particularly district hospital, provincial public health office, and provincial administrative organization. Procession step; (1) people participation of campaign for liver fluke prevention and control (2) annual campaign for liver fluke prevention and control by SHPH and stakeholder, and should be continuous activities. Evaluation step; (1) promotion of people participation in the activities evaluation of behavior regarding to liver fluke, (2) Observation of risk group, by health officer and represent, and (3) Evaluation and assessment of each projects regarding liver fluke prevention and control by health officer and represent. Mutual benefit step; (1) home visiting by health officer and should integrate the knowledge regarding to liver fluke for improve their perception, (2) community rule regarding to

Table 2. Participant Characteristics by Status and Pattern of Community Organization

Characteristics	No. (N=375)	%
Status		
Head of Community	71	18.94
Village Health Volunteer	51	13.6
Villagers	253	67.46
Pattern of local administrative organization		
Sub-district municipality	165	44
Sub-district administrative organization	210	56

Table 3. Level of people participation toward *O. viverrini* prevention and control in Bamnet Narong district, Chaiyaphum province, Thailand between June 2013 and February 2014

People Participation	\bar{X}	S.D.	Interpretation
Sharing idea, decision making, and planning	3.65	0.63	high
Procession	3.78	0.56	high
Evaluation	3.72	0.6	high
Mutual benefit	3.71	0.67	high
Mean	3.71	0.52	high

Table 4. Comparison between participation and status regarding *O. viverrini* prevention and control in Bamnet Narong district, Chaiyaphum porvince, Thailand

People participation	Status						F	p-value
	Head (n = 71)		Village health volunteer (n = 51)		Villagers (n = 253)			
	\bar{X}	S.D.	\bar{X}	S.D.	\bar{X}	S.D.		
Sharing idea, decision making, and planning	3.59	0.637	3.68	0.672	3.66	0.619	0.43	0.647
Procession	3.75	0.504	3.79	0.577	3.78	0.577	0.11	0.893
Evaluation	3.6	0.609	3.85	0.591	3.72	0.599	2.52	0.081
Mutual benefit	3.61	0.698	3.82	0.741	3.71	0.647	1.41	0.243
Total	3.64	0.519	3.79	0.552	3.72	0.508	1.26	0.285

statistical significant, 0.05

Table 5. Comparison between participation and pattern of local administrative organization place regarding *O. viverrini* prevention and control in Bamnet Narong district, Chaiyaphum porvince, Thailand

People participation	Pattern of local administrative organization				t	p
	Bamnet Narong SM (n = 165)		Ban Chuan SAO (n = 210)			
	\bar{X}	S.D.	\bar{X}	S.D.		
Sharing idea, decision making, and planning	3.57	0.65	3.71	0.61	2.20*	0.028
Procession	3.72	0.6	3.82	0.53	1.67	0.096
Evaluation	3.66	0.59	3.76	0.61	1.53	0.127
Mutual benefit	3.67	0.7	3.74	0.64	0.98	0.328
Total	3.66	0.54	3.76	0.5	1.89	0.06

*Statistical significant, 0.05

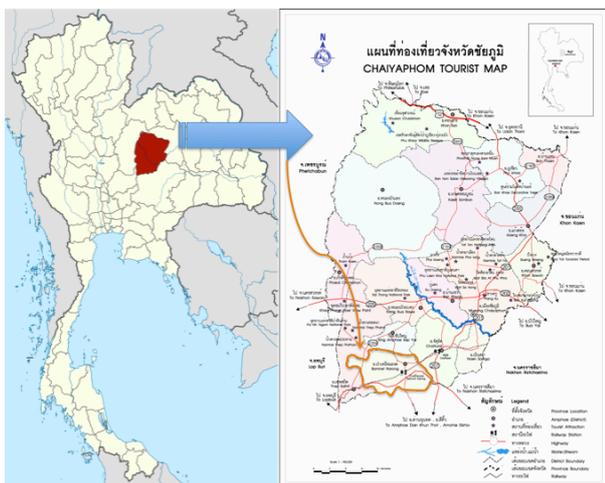


Figure 1. Map of Bamnet Narong district, Chaiyaphum province, Thailand

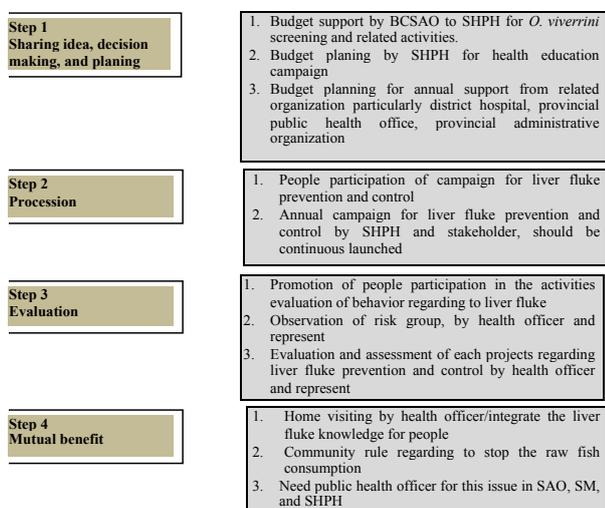


Figure 2. Approaches for development of POPC in Bamnet Narong district, Chaiyaphum province, Thailand. (These map was adapted from https://upload.wikimedia.org/wikipedia/commons/thumb/5/52/Thailand_Chaiyaphum_locator_map.svg/2000px-Thailand_Chaiyaphum_locator_map.svg.png, and <http://www.novabizz.com/Map/img/map-17-Chaiyaphum.gif>)

stop the raw fish consumption in their communities, (3) need a professional of public health officer for working in their communities, BCSAO, BNSM, and SHPH. The approaches to develop the people participation regarding *O. viverrini* prevention and control are shown in Figure 2.

Discussion

Despite a long history of control programmes in Thailand and a nationwide reduction, *O. viverrini* infection prevalence remains high in the northeastern provinces. Since then a community-level health education campaign been conducted since late 1950s. The *O. viverrini* infection in Thailand was the first reported in 1955 (Sadun) and many strategies has been operated over period 1955-2000, the national prevalence of *O. viverrini* infection had fallen from 63.6% to 9.6% but the high prevalence rate is still found in the rural communities of provinces, Northeast

(Sithithaworn et al., 2012). The main strategies for liver fluke control comprise three interrelated approaches, namely stool examination and treatment of positive cases with praziquantel for eliminating human host reservoir, health education for a promotion of cooked fish consumption to prevent infection, and improvement of hygienic defecation for the interruption of disease transmission (Jongsuksantikul and Imsomboon, 2003; Sithithaworn et al., 2012).

Recently, document an attempt to assess the best means to prevention on the basis of a community intervention in three villages in northeastern Thailand, with participation of representatives of Health Promotion Hospitals of the Ministry of Public Health with dedicated staff, but also school teachers, independent government sponsored village health volunteers, and housewives responsible for cooking and diet selection. An action plan was followed, allowing detailed discussions of practical proposals, their introduction and then repeated reflection and further proposals at the individual village level (Duangsong et al., 2013). In addition, the liver fluke control programme, named “Lawa model,” is now recognized nationally and internationally, and being expanding to other parts of Thailand and neighboring Mekong countries. Challenges to *O. viverrini* disease control, and lessons learned in developing an integrative control program using a community-based, ecosystem approach, and scaling-up regionally based on Lawa as a model are described (Sripa et al., 2015). From a lesson success model, *O. viverrini* prevention and control is approaches in the communities through a community participation, here we described the survey data about people participation in Ban Chuan sub-district administration organization (BCSAO) and Bamnet Narong sub-district municipality (BNSM) where are located in Bamnet Narong district, Chaiyaphum province.

Chaiyaphum province has reported that is a highly risk area of *O. viverrini* and cholangiocarcinoma. Mortality rate of liver cancer and *O. viverrini* infection rate in Chaiyaphum province was rank between 30.14-44.31 per 100,000 populations. Eradication of the fluke and identification of high-risk populations are urgently needed (Sripa and pairojkul, 2008). Up to date, *O. viverrini* infection has reported that 17.6% prevalence of infection in Chaiyaphum province (Sithithaworn et al., 2012). A survey of people participation and their need is concerned. People participation had a high level in all step of sharing idea, decision making, planning, proccession, evaluation, and mutual benefit, reading to the project of *O. vierrini* prevention and control in their communities. Unfortunately, *O. vierrini* infection has not been detected, therefore these could be not indicate that success or not in this communities. However, the data show a positive attitude to eradicate live fluke in both communities organization. In addition, their need is in-depth interviewed and found that budget support, annual campaign for liver fluke prevention and control, campaign promotion, risk group observation, home visiting, community rule regarding to stop the raw fish consumption in their communities, and need a professional of public health officer for working in their communities, BCSAO, BNSM, and SHPH, are their approaches to *O.*

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viverrini prevention and control.

In conclusion, these data indicates communities need to eradicate a serious problem in their communities by themselves and collaboration with public health officer, including members from SAO and SM, may advantage and get a new success model. Furthermore, screening of *O. viverrini* and cholangiocarcinoma are required, and follow up regarding to their activities and participation is measured.

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