

## MINI-REVIEW

# Modifying Health Behavior for Liver Fluke and Cholangiocarcinoma Prevention with the Health Belief Model and Social Support Theory

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### Abstract

The liver fluke *Opisthorchis viverrini* is a serious health problem in Thailand. Infection is associated with cholangiocarcinoma (CCA), endemic among human populations in northeast and north Thailand where raw fish containing fluke metacercariae are frequently consumed. Recently, Thailand public health authorities have been organized to reduce morbidity and mortality particularly in the northeast through *O. viverrini* and CCA screening projects. Health modification is one of activities included in this campaign, but systemic guidelines of modifying and developing health behavior among liver fluke and CCA prevention in communities towards health belief and social support theory are still various and unclear. Here we review the guidelines for modifying and developing health behavior among populations in rural communities to strengthen understanding regarding perceived susceptibility, severity, benefits, and barriers to liver fluke and CCA prevention. This model may be useful for public health officers and related organizations to further health behavior change in endemic areas.

**Keywords:** Modifying and developing health behavior - liver fluke - cholangiocarcinoma - health belief model

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### Introduction

Liver fluke, *Opisthorchis viverrini* is a caused of cholangiocarcinoma (CCA) that remain a major public health problem in Thailand (Kaewpitoon et al., 2008; Sripa et al., 2010; Sitthithaworn et al., 2012; Kaewpitoon et al., 2015). *O. viverrini* is endemic among human populations in northeast and north Thailand, where the most common raw fish is frequently consumed (Sadun 1955; Harinasuta and Vajrasthira 1960; Wykoff et al., 1965; Preuksaraj et al., 1982). A nationwide survey in Thailand was reported and found that the prevalent was 5.1%. The highest of prevalent was found in the northeast (9.2%) and followed by the north region (5.2%). Meanwhile, CCA has been reported that Thailand is the highest incident of the world. Morbidity rate of CCA was 85% in Thailand, followed by Korea (8.75%), and Japan (3.40%), respectively (Shin et al., 2010).

Behavior on prevention and control of liver fluke infection are essential for decreasing the disease. Previously studied indicated that knowledge, attitude, and practice related to liver fluke infection in rural

communities (Kaewpitoon et al., 2007). Raw attitudes, wetland cultures, life-cycles: socio-cultural dynamics relating to *O. viverrini* in the Mekong Basin (Grundy-Warr et al., 2012). Inadequate knowledge, misbeliefs, and social and cultural mores were important factors leading to the maintenance of risk behaviors. Moreover, unhygienic defecation and insufficient diagnosis and treatment were found to facilitate *O. viverrini* transmission. Precise and regular health education and promotion targeting the main risk factor, Koi pla consumption, improving diagnosis and treatment, and promoting hygienic defecation should be used in the prevention and control program (Suwannahitatorn et al., 2013). Viriyavipart et al (2015) reveals that knowledge, perception, and behavior about food consumption related to the prevention *O. viverrini* among people in upper northeastern Thailand, this study indicates that people did not know the appropriated cooking to kill the causative agent. Many people are still eating raw fish and raw fermented fish dish. Lifestyle modification is needed to improve particularly risk behavior, knowledge, perception, and practice regarding liver fluke. Improvement of high knowledge, perception,

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and practice regarding diseases, depend on varieties of health education. Boom (1971), Becker and Maiman (1975), and Janz and Becker (1984) indicated that the success behavior modification should be used many methods and continuous intervention.

Health Belief Model (HBM) is a psychological model that attempts to explain and predict health behaviors. HBM was first developed in the 1950 by Hochbaum, Rosenstock, and Kegels, the social psychologists, they work in the U.S. Public Health Services (Rosenstock, 1974). HBM has done by focusing on the attitudes and beliefs of individuals. The model was developed in response to the failure of a free tuberculosis (TB) health screened program. Since then, the HBM has been adapted to explore a variety of long- and short-term health behaviors (Becker et al., 1978; Eisen et al., 1992; Conner and Norman, 1996; Glanz et al., 2002). Meanwhile, HBM has been applied to liver fluke and CCA prevention in Thailand. Thongnamuang and Duangsong (2011) adapted HBM and social support for preventive behaviour of liver fluke and CCA in Moeiwadi district, Roi-Et province, northeast Thailand. Thubthim and Duangsong (2014) reported the effected of a behavioural development program for opisthorchiasis prevention at a community in Mahachai Sub district, Plapak district, Nakhonphanom province, northeast Thailand. In addition, Phaha and Banchonhattakit (2016) study the effect of behavioral change with Esan folk tales and folk dances for prevention and control of *O. viverini* among risk group Tambon Sao-Hae, Nong-Hee district, Roi-Et province, Northeast Thailand. Presently, we applied HBM to prevent liver fluke infection in rural people of Surin province, northeast Thailand, and showed that this successfully take attempt behavior change of the population at risk for liver fluke and CCA (Kaewpitoon et al., 2016). However, a key conceptual model attempt and strengthen liver fluke and CCA prevention has been so far, therefore here we gather the guideline for modifying and developing health behavior among population in rural communities strengthen perceive susceptibility, severity, benefits, and barriers regarding attempt the liver fluke and CCA prevention. This model may useful for public health officer and related organization to further health behavior change in endemic areas.

### Health Belief Model and Self-efficacy

The HBM was spelled out in terms of four constructs representing PPPPCS. The perceived threat and net benefits: perceived susceptibility (one's opinion of chances of getting a condition), perceived severity (one's opinion of how serious a condition and its consequences are), perceived benefits (one's belief in the efficacy of the advised action to reduce risk or seriousness of impact), and perceived barriers (one's opinion of the tangible and psychological costs of the advised action). These concepts were proposed as accounting for people's "readiness to act" (strategies to activate "readiness"). An added concept, cues to action, would activate that readiness and stimulate overt behavior (confidence in one's ability to take action) (Glanz et al., 1997). The perceived susceptibility; define population at risk, risk

levels; personalize risk based on a person's features or behavior; heighten perceived susceptibility if too low. Perceived severity; specify consequences of the risk and the condition. Perceived benefits; define action to take; how, where, when; clarify the positive effects to be expected. Perceived barriers; identify and reduce barriers through reassurance, incentives, and assistance. (Glanz et al., 1997). HBM is the concept of self-efficacy, or one's confidence in the ability to successfully perform an action. This concept was added by Rosenstock and others in 1988 to help the HBM better fit the challenges of changing habitual unhealthy behaviors, such as being sedentary, smoking, or overeating. Cues to action; provide how-to information, promote awareness, reminders. Self-Efficacy; provide training, guidance in performing action (Rosenstock et al., 1988). Glanz et al. (2002) has been reported the conceptual model of health behavior and health education, following; *i*). Individual perception, *ii*). Modifying Factors, *iii*). Likelihood of Action

### Health Belief Model and Self-efficacy for Diseases Prevention in Thailand

The HBM has done by focusing on the attitudes and beliefs of individuals, it has been adapted to explore a variety of long- and short-term health behaviors (Becker et al., 1978; Eisen et al., 1992; Conner and Norman, 1996; Glanz and Rimer, 1997; Glanz et al., 2002). Meanwhile, HBM has been applied to liver fluke and CCA prevention in Thailand. Padchasuwan and Banchonhattakit (2014) has been adapted HBM and social support to prevent iodine deficiency in pregnant women and indicated that successful and useful of health behavior change program. To promote the attitudes and beliefs of individuals for diseases prevention mainly promoting preventive behaviors among pulmonary tuberculosis patients in Wangsaphung hospital, Loei province (Saraboon et al., 2012), cervical cancer screening in Kudsaijor subdistrict, Kantarawichai district, Mahasarakham province (Worawai et al., 2014), and eating behavior and hematocrit of older adults having iron deficiency anemia (Wongjamnong et al., 2014).

In addition, Boonchai and Sota (2010) have been adapted HBM and social support on health behavior development among HIV-AIDS patients who have TWEATED EITH anti-retroviral drug in Buntharik Hospital, Ubonratchathanee province. This study showed an effectiveness of HBM to increase the consistency of anti-retroviral drug used of patients. Furthermore, Yaemmen and Duangsong (2012) reported the effects of health promotion program by application of HBM and social support on behavioral modification for weight control among overweight students at level 5 of primary school, Muang district, Phitsanulok province. Meanwhile, Phaha and Banchonhattakit (2016) reported the effect of behavioral change with Esan folk tales and folk dances for prevention and control of *O. viverini* among risk group Tambon Sao-Hae, Nong-Hee district, Roi-Et province, Thailand. Health education program emphasized health education, lecture, group discussion, pamphlet, Esan

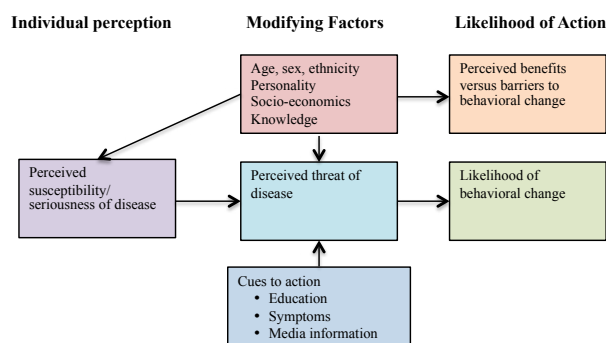
folk tales and folk dances. The result indicated that participants had a high level of knowledge, perceived, and practice regarding liver fluke and CCA, with a statistically significant.

## Effectiveness of Health Belief Model and Self-efficacy for Liver Fluke and CCA Prevention

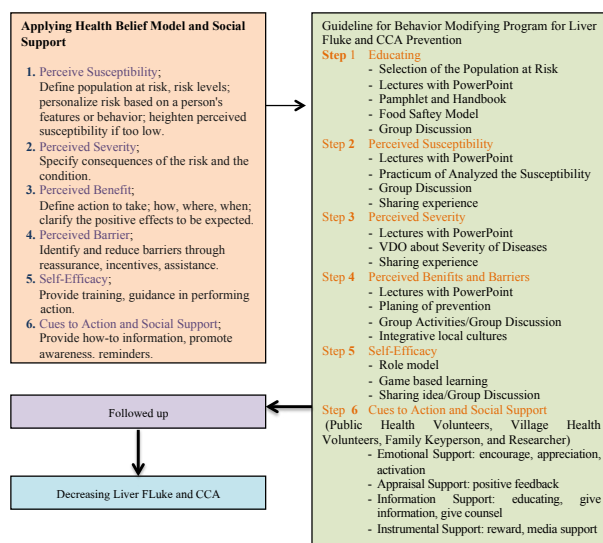
Recently, health education program has been reported. Various studies were adapted to behavior change for liver fluke and CCA prevention. Thongnamuang and Duangsong (2011) adapted HBM and social support for preventive behaviour liver fluke and CCA in Moei district, Roi-Et province, northeast Thailand where has been reported endemic of diseases. Health education program was emphasized lecture, demonstration, practicum, sharing idea, group discussion, media information, motivating support by local members, and followed up through home visit. The result indicated that participants had a high level of knowledge, perceived, and practice regarding liver fluke and CCA, with a statistically significant. Development of a community-based approach to liver fluke control has been recommended Duangsong et al. (2013), include; Phase 1: Situation Analysis; in all three villages the initial action was an analysis of the environment and culture, as well

as risk behavior for liver fluke infection. Phase 2: Action - First Loop; This first involved selection of the community leaders. The facilitator in each case was a staff member of the Department of Education at Khon Kaen University, Faculty of Public Health. The essential members were professionals from the health promotion hospital, and in addition volunteers, cooks, and a teacher to provided input from education services, as well as local NGO. Then using media such as video power point, flipchart, posters, group discussions were held and these 20+20+20 persons start to develop the plan by Appreciation Influence Control. In all three villages teaching of those responsible for cooking was a high priority, as well as screening for liver fluke infection and suggesting behavioral change projects. In addition separate plans were adopted at the village level. Approximately four months later, the project members from all three villages gathered for discussion of the results. This generated new plans for the three communities and was followed by further reflection and generation of new plans.

Thubthim and Duangsong (2014) reported the effects of a behavioural development program for liver fluke prevention at a community in Mahachai subdistrict, Plapak district, Nakhonphanom province, northeast Thailand. Health education program was emphasized lectures with PowerPoint, museum, VDO, role model, group discussion, group activity, exhibition board design, and social support from village health volunteer, family cooker, public health officers, neighbour, and researcher. The result indicated that participants had a high level of knowledge, perceived, and practice regarding liver fluke and CCA, with a statistically significant. Toward integrated liver fluke control in northeast Thailand: the Lawa project was showed to be the best model (Sripa et al., 2015). The controlling the liver fluke infection using the EcoHealth/One Health approach was introduced into the Lawa Lake area in Khon Kaen province where the liver fluke is endemic. A program has been carried using anthelmintic treatment, novel intensive health education methods both in the communities and in schools, ecosystem monitoring and active community participation. As a result, the infection rate in the more than 10 villages surrounding the Lake has declined to approximate one third of the average of 50% as estimated by a baseline survey. Strikingly, the Cyprinoid fish species in the Lake, which are the intermediate host, now showed less than 1% prevalence compared to a maximum of 70% at baseline. This liver fluke control program, named "Lawa model," is now recognized nationally and internationally, and being expanding to other parts of Thailand and neighboring Mekong countries. Meanwhile, community-based health education and communication model development for liver fluke prevention has been also implemented in a high-risk area, Khon Kaen Province, Thailand (Promthet et al., 2015). The study consisted of three stages. Stage 1 involved a survey of the level of opisthorchiasis. The target group consisted of 390 persons. Stage 2 covered the quasi-experimental research design, the process of implementing the community based health education and communication strategy for opisthorchiasis prevention in high-risk areas. An experimental group and a control



**Diagram 1 . Theory at a Glance: A Guide for Health Promotion Practice (Adapted from Glanz et al., 2002)**



**Diagram 2. Guideline for Behavior Modifying Program for Liver Fluke and CCA Prevention (Adapted from Glanz et al., 1997)**



group, each consisting of 90 persons, were established, and the study was conducted over the period May 2011-April 2012. Stage 3 was an evaluation of the experiment using an instrument adapted from the health behavior evaluation form in opisthorchiasis of the Department of Disease Control, Ministry of Public Health. This result indicates that health education and communication program developed as part of the study was effective in changing the consumption of uncooked fish. Therefore, this approach should be promoted in other high-risk areas in Thailand in the future.

Furthermore, Kaewpitoon et al. (2016) suggested that health educational program based on self-efficacy and social support effected to prevent liver fluke infection in rural people. Health education program included Week 1; knowledge improvement which composed of lectured with multimedia, demonstration regarding general knowledge on the epidemiology, morphology, life cycle, transmission, sign and symptoms, pathogenesis, related diseases, diagnosis, treatment, prevention and control of liver fluke, Week 2; lectured with poster, brochure, and handbook regarding general knowledge toward liver fluke similar to week 1, Week 3; lectured toward susceptibility and severity of opisthorchiasis, benefits and perceived barriers to prevention of opisthorchiasis, Week 4; group discussion with their health belief, sharing their ideas and experience toward liver fluke prevention and control, and Week 5-10; social support from village health volunteers (VHV), head village (HV), friends, their member of family, and public health officer (PHO). The followed-up by PHO/VHV/HV, and giving certificates and flag for household that did not eat raw fish. This health education program is success to health behavior modification in the rural communities therefore it may useful for further work behavior modification in the other epidemic areas.

## Conclusion

HBM has done by focusing on the attitudes and beliefs of individuals. Understanding HBM will support preventive behaviour of liver fluke and CCA. Lesson from various studies has been reported, therefore, here we gather the guidelines for modifying and developing health behavior program strengthen perceive susceptibility, severity, benefits, and barriers regarding attempt the liver fluke and CCA prevention (Diagram 2). This model may useful for public health officer and related organization to further health behavior change in endemic areas.

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