Re-Examination of *Opisthorchis viverrini* in Nakhon Ratrasima Province, Northeastern Thailand, Indicates Continued Needs for Health Intervention

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**Abstract**

*Opisthorchis viverrini* infection is associated with cholangiocarcinoma particularly in the cases of chronic or re-infection. This presents a serious health problem in northeastern and northern Thailand. A community base approach is required for surveillance. Therefore, in a pilot project, re-examination of *O. viverrini* infection was conducted in the 3 districts of Nakhon Ratchasima province, Thailand, during June and October 2015. A total of 355 participants from a 194,152 population, was selected through multi-stage sampling. *O. viverrini* infection was determined using modified Kato Katz thick smear technique. Participants were 229 males and 126 females, and aged ≥30 years old. Prevalence of *O. viverrini* infection was 2.25% (8/355 participants). *O. viverrini* infection was slightly higher in females (3.17%), and age group between 41-50 years (4.49%). Mueang Yang district had a highest of *O. viverrini* infection rate (2.82%), and followed by Bua Yai (2.48%), and Chum Phuang (1.84%), respectively. *O. viverrini* infection rate was increased from year 2012 to 2015 particularly in Bua Yai and Mueang Yang. These re-examination results indicate that opisthorchiasis is still problem in community of Nakhon Ratchasima province, therefore, the provincial-wide scale is need required. Furthermore health education is need intervened in the infected group, and screening of cholangiocarcinoma is urgently concerned.

**Keywords:** Re-examination - *Opisthorchis viverrini* - cholangiocarcinoma - Nakhon Ratchasima - Thailand

Asian Pac J Cancer Prev, 17 (1), 231-234

**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 under-estimate 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 Insommooon, 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 1 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 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
The O. viverrini infection in Thailand was the first reported in 1955 (Sadhan) and many strategies have been implemented to reduce 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., 2013). The high mortality rate of CCA was reported in the northeast areas where found sites of Nakhon Ratchasima province, and investigated were infected with O. viverrini (Kaewpitoon et al., 2012). The 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., 2013). The high mortality rate of CCA was reported in the northeast areas where found sites of Nakhon Ratchasima province, and investigated were infected with O. viverrini (Kaewpitoon et al., 2012).

### Materials and Methods

A cross-sectional survey was a pilot project and conducted in 3 districts of Nakhon Ratchasima province, northeastern Thailand, between June and October 2015. This data is useful for further therapy, curable, and planning of prevention and control.

#### Baseline characteristics of participants in 3 districts of Nakhon Ratchasima province, Thailand.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No. (%)</th>
<th>No. of infection (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>229(65.51%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>126(34.49%)</td>
</tr>
<tr>
<td>Age</td>
<td>30-40</td>
<td>29(8.17%)</td>
</tr>
<tr>
<td></td>
<td>41-50</td>
<td>89(25.07%)</td>
</tr>
<tr>
<td></td>
<td>51-60</td>
<td>130(36.62%)</td>
</tr>
<tr>
<td></td>
<td>61-70</td>
<td>98(27.61%)</td>
</tr>
<tr>
<td></td>
<td>&gt;70</td>
<td>92(25.04%)</td>
</tr>
<tr>
<td>District</td>
<td>Bua Yai</td>
<td>121(34.08%)</td>
</tr>
<tr>
<td></td>
<td>Chum Phuang</td>
<td>165(45.92%)</td>
</tr>
<tr>
<td></td>
<td>Mueang Yang</td>
<td>71(20%)</td>
</tr>
<tr>
<td>Total</td>
<td>355(100%)</td>
<td>8(2.25%)</td>
</tr>
</tbody>
</table>

#### Discussion

Opisthorchis viverrini is still a serious health problem in Nakhon Ratchasima province. In this study, we investigated 3 districts, included in this study. The prevalence of O. viverrini infection was 2.25%, O. viverrini infection was slightly in female (3.17%) more than male (1.75%). The majority of O. viverrini infection was found in age 50 years old (4.49%), and followed by 61-70 years old (2.04%), 51-60 years old (1.54%), respectively. O. viverrini infection was the highest in Mueang Yang district (2.82%), and followed by Bua Yai (2.48%), and Chum Phuang (1.84%), respectively. Baseline characteristics and infection are shown in Table 1. Other known parasitic infections were examined and found that two samples were infected Blastocystis hominis, and one sample was infected with Strongyloides stercoralis. Patients who infected with O. viverrini and other known intestinal parasitic were completed therapeutic treatment. O. viverrini infection in 3 districts between the surveyed data in year 2012 (Kaewpitoon et al., 2012c) and 2015, was considered. Infection rate was increased in Bua Yai (0.36%) and Mueang Yang (2.78%) district in year 2012 to 2.48%, and 2.82% in year 2015. In the opposite, O. viverrini infection was slightly decreased rate in 2015 (Table 2 and Figure 3).
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(Sitthithaworn et al., 2012). Meanwhile, a provincial-wide surveyed in 2012 by Kaewpitoon et al (2012c) and found that a total of 1,168 stool samples were obtained from 516 males and 652 females, aged 5-90 years. Stool examination showed that 2.48% were infected with O. viverrini. However, identification of O. viverrini in the district scale and found that the infection rate was 2.78%, 2.78%, and 0% in Mueang Yang, Chum Phuang, and Bua Yai district. In addition, recent re-examined results were slightly increased in Mueang Yang (2.82%) and Bua Yai (2.48%) district in year 2015. Infection rate of O. viverrini in 3 districts in 2012 was 1.85%, while in 2015 was 2.25% of prevalence or morbidity rate = 2,250 per 100,000 population. This result indicates that O. viverrini infection is still a health problem in rural communities, and they are a risk group of cholangiocarcinoma. Recently we have known that 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). In addition, O. viverrini has been classified as Type 1 carcinogens by the International Agency for Research on Cancer, World Health Organization (WHO) (IARC, 1994). Previously, the mortality rate of cholangiocarcinoma was reported and found that Nakhon Ratchasima province has 13.67-16.2 per 100,000 populations (Sripa and pairojkul, 2008). This figure indicates that Nakhon Ratchasima province should be intervened the health behavioral change particularly in these highly risk group. Furthermore, a provincial wide survey is need required, and screening of cholangiocarcinoma in infected participant and risk group is urgently concerned.

Acknowledgements

This disease surveillance screening was supported by National Health Security Office of Nakhon Ratchasima province, through health promotion and prevention fund, year 2015. Special thanks all staffs of district public health organization of Bua Yai, Meuang Yang, and Chum Phuang for their assistance.

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