Primary Care Intervention to Prevent and Control Cholangiocarcinoma: Lesson from Nakhon Ratchasima, Thailand

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Background: Cholangiocarcinoma (CCA) is a bile duct cancer. It includes intra-and extra-hepatic bile duct. It is most commonly found in Thailand particularly in the northeast and north region. Those regions have been reported as the highest of incident of the world.

Objective: Primary car interven in the risk areas of CCA among population in Nakhon Ratchasima province,Thailand.

Material and Method: A community-based study was conducted among three districts of Nakhon Ratchasima province, Thailand including Bua Yai, Chum Phuang, and Mueang Yang district between July and December 2015. Mix method was used in this study that included cross-sectional survey, action research, and application of Geographic Information System. The study was composed of five steps, develop Korat CCA network, CCA screening by using Korat CCA verbal screening test, detection of liver fluke and CCA in the population at risk by using Kato Katz thick smear technique and ultrasonography, health behavior modification, and development of Geographic Information System for CCA database.

Results: Three hundred fifty five participants were tested for liver fluke infection and the infection rate was found to be 2.25%. Eight cases from 88 participants at risk had a dilated bile duct. Populations at risk in each district were selected for health modification briefing that used the social engagement model. Seven community rules were agreed, cooked fish consumption, stop under-cooked fish, hygienic defecation, CCA campaign, food safety club, annual health check, an ongoing monitoring by village health volunteer and local public health officer.

Conclusion: Infection in Nakhon Ratchasima is high. A community briefing and rules were agreed. A geovisual display of the population at risk for CCA is now available.

Keywords: Primary care intervention, Cholangiocarcinoma, Nakhon Ratchasima, Thailand

Cholangiocarcinoma (CCA) is a bile duct cancer that includes intra-and extra-hepatic bile duct.

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It is most commonly found in Thailand particularly in the northeast and north region where it is reported to be the highest of incidence of the world[1-3]. In the Western world, it has an annual incidence rate of one to two cases per 100,000[4,5]. A study from Thailand has described the northeast and north region as a high incidence of this cancer. Mortality rate of CCA in Thailand was approximately 36.48%. In Nakhon

Ratchasima province, it was ranked between 13.67 and 16.2[6]. Kaewpitoon et al[7,8] reported the infection of *Opisthorchis viverrini,* the carcinogenic human liver fluke in human, at 2.48%. It is the second intermediate host at 12.3% in Nakhon Ratchasima.

Therefore, primary healthcare intervention is required in this area, particularly the areas where liver fluke infection have been reported. This study aimed to make recommendation of the required healthcare toward CCA in the risk areas of Nakhon Ratchasima province, Thailand. These results may be useful for further work on eradication of CCA in Nakhon Ratchasima province.

Material and Method

A community-based study was conducted in three districts of Nakhon Ratchasima province, Thailand between July and December 2015. They included Bua Yai, Chum Phuang, and Mueang Yang district. Mix method was used in this study including cross-sectional survey, action research, and application of geographic information system. The study was approved by the human research ethics committees of Suranaree University of Technology, 2015 (EC58-48). The study was composed of five steps, (1) developing Korat CCA network, (2) CCA screening by using Korat CCA verbal screening test, (3) detection of liver fluke and CCA in the population at risk by using Kato Katz thick smear technique and ultrasonography, (4) health behavior modification, and (5) development of Geographic Information System for CCA database. The questionnaire comprised of five domains including (1) demographic data; gender, age, education, agriculture, and income, (2) knowledge; 15 questions, (3) attitude; 20 questions, and (5) practice; 15 questions. Reliability and validity of questionnaire was analyzed, knowledge (Kruder-Richardon-20) = 0.80, attitude and practice (Cronbach's alpha coefficient) = 0.82 and 0.79, respectively. Descriptive and analytical statistics were used in this study mainly mean, standard deviation, t-test, pair t-test.

Results

This study was a developmental research for CCA eradication in Nakhon Ratchasima. All results are shown in Fig. 1-8.
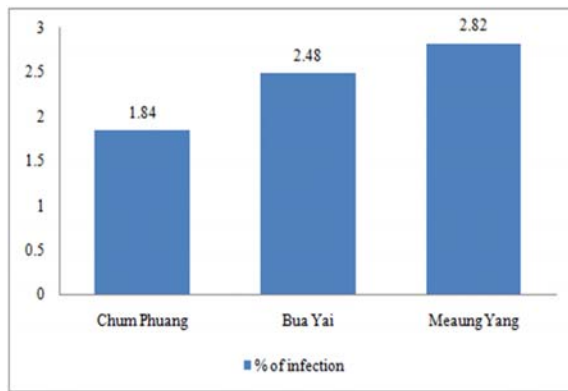
Development of Korat CCA network

This project was supported a grant from Suranaree University of Technology (SUT) and by Office of the Higher Education Commission under NRU Project of Thailand, and the National Health Security

Fig. 1   Development of Korat CCA network.
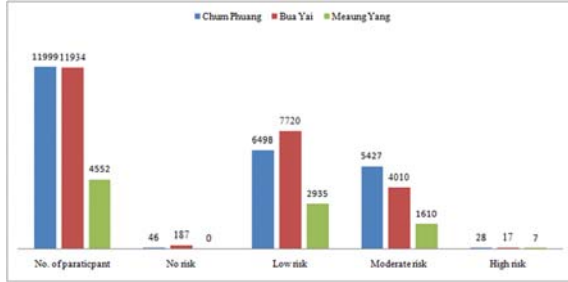
Fig. 2 Screening of population at risk for CCA by using Korat CCA verbal screening test.

Fig. 3 Liver fluke infection in the population at risk who had CCA screened and high risk scores.

Fig. 4 Dilated bile duct in the population at risk who had CCA screened and high risk scores.

Office of Nakhon Ratchasima province, through health promotion and prevention fund, year 2015. We have set up CCA team in Nakhon Ratchasima province name Korat CCA Network that has the Suranaree University of Technology Hospital as the host of the project. We cooperated with (1) School of Family Medicine and Community Medicine, (2) School of Surgery, (3) Parasitic Disease Research Unit, Suranaree University of Technology, (4) Faculty of Public Health,

Vongchavalitkul University, (5) Faculty of Public Health, Nakhon Ratchasima Rajabhat University, and (6) Provincial Public Health Office of Nakhon Ratchasima. Furthermore, we received good collaboration from the District Public Health of Chum Phuang, Bua Yai, and Meaung Yang. This network worked together to eradicate CCA in Nakhon Ratchasima (Fig. 1).

Screening of population at risk for CCA by using Korat CCA verbal screening test

Populations were screened for CCA by using Korat CCA verbal screening test composed of the history with (1) opisthorchiasis; definitive diagnosed by medical doctor or related officers, (2) under-cooked fish consumption, (3) Praziquantel used; given by medical doctor or related officers, (4) cholecystitis; definitive diagnosed by medical doctor or related officers, (5) relative family with cholangiocarcinoma, (6) naive northeastern people, (7) agriculture, and (8) alcohol consumption. The 28,485 participants were screened and identified as no risk, low, moderate, and high-risk. Details are shown in Fig. 2.

Detection of liver fluke and CCA by using Kato Katz Thick Smear and Ultrasonography

Three hundred fifty five participants were tested for liver fluke infection and found that infection rate was 2.25%. Mueang Yang district was found to be higher than Bua Yai and Chum Phuang district (Fig. 3). Meanwhile, CCA screening found eight cases, from 88 populations at risk, with a dilated bile duct (Fig. 4). All cases received further CT-scan.

Health behavior modification in the population at risk for CCA

Populations at risk in each district were selected for health modification briefing. Mueang Yang district was provided with a health education program that used the social engagement model. Chum Phuang district was provided with a health education program that applied the self-efficacy and social support theory. Finally, Bua Yai district was an action research that used social mobilization. All activities are shown in Fig. 5-7. Participants gained knowledge (mean difference = -7.48, t = -51.241, *p*-value = 0.001), attitude (mean difference = -9.07, t = -9.818, *p*-value = 0.001), and practice (mean difference = -2.04, t = -2.688, *p*-value = 0.008), were difference between before and after participating in the health intervention was statistically significant. The following community rules were agreed, (1) cooked fish consumption, (2) stop

Fig. 5   Behavioral modification in Mueang Yang district, Nakhon Ratchasima province.

Fig. 6   Behavior modification in Chum Phuang district, Nakhon Ratchasima province.

under-cooked fish by household cooker, (3) hygienic defecation, (4) create a village CCA campaign, (5) have a village food safety club, (6) annual health check, (7) monitoring by village health volunteer and local public health officer.

Geographic information system for CCA database

Geovisual display of the population at risk for CCA on the google map included 11 layers, 1) district, 2) local administrative organization: Town Municipality, Sub-district Municipality, and Sub-district

Fig. 7   Behavior modification in Mueang Yang district, Nakhon Ratchasima province.
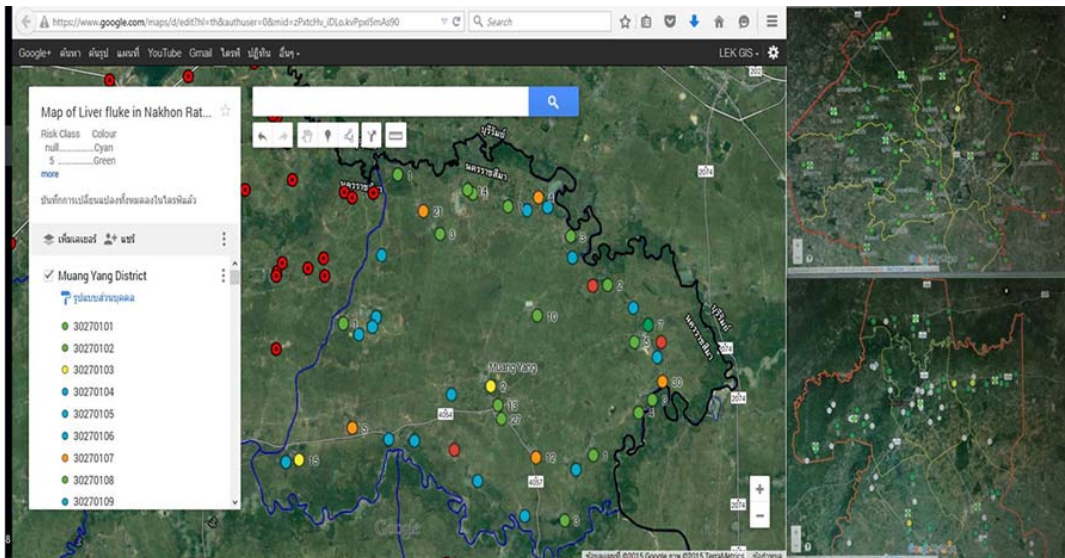

Fig. 8   Dilated bile duct in the population at risk who had CCA screened and high risk scores.

Administrative Organization, 3) hospital, 4) opisthorchiasis, 5) praziquantel used, 6) cholelithiasis, 7) raw fish consumption, 8) alcohol consumption, 9) pesticide used, 10) relative family with CCA, and 11) naive northeastern people (Fig. 8). The geovisual display is now available in google map

Discussion

We set-up Korat CCA Network including academic institution, provincial public health office,

and local public health office that will work together for the eradication of CCA in Nakhon Ratchasima. Populations were screened for CCA by using Korat CCA verbal screening test and found that the majorities of them were in moderate and low risk for CCA. Three hundred fifty five participants were tested for liver fluke infection and the infection rate was found to be 2.25%. This result was similar to a 2012 study, which was 2.48% in Nakhon Ratchasima[8]. However, Bua Yai district was increased of infection from 0 in 2012 to 2.48% in this year. Therefore, examination of stool is needed in other areas. Recently, we detected eight cases from 88 participants at risk that had a dilated bile duct. This is a high incidence of an abnormal bile duct. The primary care investigation indicated that active surveillance is required in rural areas of province.

Participants received a health intervention seminar and the knowledge, attitude, and practice were improved after participation. This result is similar to Becker and Maiman[9], Janz and Becker[10], and House and Kahn[11]. During the health intervention, discussion and sharing of the perceived susceptibility and severity of opisthorchiasis, perceived benefits, and perceived barriers to prevention was done. These discussions improved their perception. The continuous good practice is depended on social support, which influences behavior modification.

A geovisual display of the population at risk for CCA is now available on the google map. We will use for monitoring, surveillance, and further home visit. A previous study indicates that GIS and Google map production process is very simple and easy to learn. It is suitable for the use in further development of CCA management strategies[12].

Conclusion

This is the first report regarding Korat CCA Network that uses comprehensive cooperation for the eradication of CCA in their area. We have work for primary care in rural community and get a success team and provide better health care to community people.

What is already known on this topic?

A 2012 study found that the liver fluke infection rate was high at 2.48% in Nakhon Ratchasima.

What this study adds?

We tested 355 participants and found that the current liver fluke infection is 2.25%. Furthermore, Bua Yai district infection rate increased from 0 in 2012 to 2.48% this year. Additionally, a geovisual display of

the population at risk for CCA is now available on the google map. It can be used for monitoring, surveillance, and further home visit.

Potential conflicts of interest

None.

References

1. Green A, Uttaravichien T, Bhudhisawasdi V, Chartbanchachai W, Elkins DB, Marieng EO, et al. Cholangiocarcinoma in north east Thailand. A hospital-based study. Trop Geogr Med 1991; 43: 193-8.
2. Sripa B, Kaewkes S, Sithithaworn P, Mairiang E, Laha T, Smout M, et al. Liver fluke induces cholangiocarcinoma. PLoS Med 2007; 4: e201.
3. Shin HR, Oh JK, Masuyer E, Curado MP, Bouvard V, Fang YY, et al. Epidemiology of cholangiocarcinoma: an update focusing on risk factors. Cancer Sci 2010; 101: 579-85.
4. Landis SH, Murray T, Bolden S, Wingo PA. Cancer statistics, 1998. CA Cancer J Clin 1998; 48: 6-29.
5. Patel T. Worldwide trends in mortality from biliary tract malignancies. BMC Cancer 2002; 2: 10.
6. Sripa B, Kaewkes S, Intapan PM, Maleewong W, Brindley PJ. Food-borne trematodiases in Southeast Asia epidemiology, pathology, clinical manifestation and control. Adv Parasitol 2010; 72: 305-50.
7. Kaewpitoon SJ, Rujirakul R, Kaewpitoon N. Prevalence of *Opisthorchis viverrini* infection in Nakhon Ratchasima province, Northeast Thailand. Asian Pac J Cancer Prev 2012; 13: 5245-9.
8. Kaewpitoon N, Kaewpitoon SJ, Ueng-arporn N, Rujirakul R, Churproong S, Matrakool L, et al. Carcinogenic human liver fluke: current status of *Opisthorchis viverrini* metacercariae in Nakhon Ratchasima, Thailand. Asian Pac J Cancer Prev 2012; 13: 1235-40.
9. Becker MH, Drachman RH, Kirscht JP. A new approach to explaining sick-role behavior in low-income populations. Am J Public Health 1974; 64:

205-16.

10. Janz NK, Becker MH. The health belief model: a decade later. Health Educ Q 1984; 11: 1-47.

11. House JS, Kahn RL. Measures and concepts of social support. In Cohen S, Syme SL, editors. Social support and health. New York: Academic Press; 1985: 83-108.

12. Rattanasing W, Kaewpitoon SJ, Loyd RA, Rujirakul R, Yodkaw E, Kaewpitoon N. Utilization of google earth for distribution mapping of cholangiocarcinoma: a case study in Satuek District, Buriram, Thailand. Asian Pac J Cancer Prev 2015; 16: 5903-6.

การพัฒนากระบวนการป้องกันและควบคุมโรคพยาธิใบไม้ตับในชุมชน: กรณีศึกษาจังหวัดนครราชสีมา ประเทศไทย

สรญา แก้วพิทูลย์, ไรอัน เอ ลอยด์, รัตนา รุจิรกุล, ปาริชาติ วัคคุวัทพงษ์, ทวีศักดิ์ ทองทวี, ลิขิต มาตระกูล, สุกิจ พันธุพิมานมาศ, พรทิพย์ คำพอ, จุน หน่อแก้ว, จิระวุฒิ กุจพันธ์, วาสุกรี เชวงกูล, สุกัญญา ผลพิมาย, มะลิ โพธิ์พิมพ์, ธนิดา ผาติเสนะ, ธวัชชัย เอกสันติ, ภูวลด พลศรีประดิษฐ์, นาฎนภา ปัดชาสุวรรณ, เฟื่องฟ้า เบญจโอพาร, นิวัฒน์ชัย นามวิชัยศิริกุล, พัฒนพงษ์ คืบขุนทด, ณัฏฐวุฒิ แก้วพิทูลย์

ภูมิหลัง: มะเร็งท่อน้ำดีเป็นมะเร็งที่พบทั้งในท่อทางเดินน้ำดีภายในและนอกตับพบได้บ่อยในประเทศไทย โดยเฉพาะภาคตะวันออกเฉียงเหนือและภาคเหนือและพบสูงที่สุดในโลก

วัตถุประสงค์: เพื่อดำเนินกิจกรรมสุขภาพระดับปฐมภูมิในพื้นที่เสี่ยงของจังหวัดนครราชสีมาของประเทศไทย

วัสดุและวิธีการ: การศึกษาโดยใช้ชุมชนเป็นฐานได้จัดทำใน 3 อำเภอ ประกอบด้วย อำเภอบัวใหญ่ ชุมพวง และเมืองยาง ระหว่างช่วงเดือนกรกฎาคมถึง เดือนธันวาคม พ.ศ. 2558 การศึกษาในครั้งนี้เป็นการศึกษาแบบผสมผสานหลายวิธีดังนี้ การสำรวจแบบภาคตัดขวาง การวิจัยเชิงปฏิบัติการ การวิจัยประยุกต์ใช้ระบบ สารสนเทศภูมิศาสตร์ การดำเนินการวิจัยประกอบด้วย 5 กิจกรรมหลักดังนี้ (1) การพัฒนาเครือข่ายมะเร็งท่อน้ำดีในโคราช (2) การคัดกรองกลุ่มเสี่ยงมะเร็งท่อน้ำดีด้วยแบบคัดกรองด้วยวาจาฉบับของโคราช (3) การตรวจหาไข่พยาธิใบไม้ตับด้วยวิธีคาโตคาทซ์ทิคเสมียร์ และตรวจคัดกรองมะเร็งท่อน้ำดีด้วยวิธีอัลตราซาวด์ (4) การปรับเปลี่ยนพฤติกรรมกลุ่มเสี่ยง (5) การพัฒนาฐานข้อมูลสารสนเทศภูมิศาสตร์

ผลการศึกษา: การศึกษาวิจัยในครั้งนี้นับเป็นครั้งแรกในการทำงานเชิงเครือข่ายมะเร็งท่อน้ำดีโคราช เกิดความร่วมมือเป็นอย่างดี และตกลงร่วมกันในการดำเนินงานเพื่อกำจัดมะเร็งท่อน้ำดีให้หมดไปจากพื้นที่นี้

สรุป: การทำงานเพื่อระดับปฐมภูมิและชุมชนชนบทจึงนำมาซึ่งความสำเร็จของทีมและสุขภาพที่ดีของชุมชน