**7th National Health Assembly**
**Agenda 2.4** **7 November 2014**

# Elimination of liver fluke (opisthorchiasis) and bile duct cancer (cholangiocarcinoma) in people

## 1. Definition

**Liver fluke** refers to a parasitic disease caused by worm species in the genus Opisthorchis (specifically,) found in the bile ducts of the liver as well as extrahepatic ducts. The parasite enters the body by way of raw/undercooked food of white-scaled fresh-water cyprinid fishes (of Barbonymus gonionotus family), such as Parachela oxygastroides, Brachydanio albolineata, Labiobarbus leptocheilu, Puntioplites proctozystron, Barbonymus gonionotus, and Hampala dispar.

**Bile duct cancer** is a form of cancer that is composed of mutated epithelial cells in the bile ducts of the liver as well as extrahepatic ducts. An infected person has 16 times greater risks of developing cancer than a non-infected counterpart. In Thailand, bile duct cancer is caused by many different factors related to the use of agricultural chemicals and carcinogens found in pickled preserved food.

**Recommendations to control and eliminate liver fluke and bile duct cancer** refer to attempts to mobilize technical power, social force and management with a view to reduce or eliminate liver fluke and bile duct cancer in people until the diseases are rare occurrences over the next decade. Prevention of bile duct cancer needs to go side by side with reduced risks of carcinogens. Action will focus on sustainable environmental management and reduced use of agricultural chemicals. Social contracts need to be agreed upon to minimize and end chemical use, such as chemical fertilizers, herbicides, and growth hormones, and strictly enforce relevant laws such as Hazardous Substance Act, B.E. 2535 (1992).

## 2. Significance of problem, situation and trend

2.1 With regard to the prevalence of cancer in Thailand, it is found that men have the highest rank of developing liver cancer and cancer of the bile ducts (an incidence rate of 40.3 cases per 100,000, compared to women with the third highest rank with an incidence rate of 16.6 cases per 100,000). The northeastern region shows the highest rate of incidence in both men and women.(1) In addition, Thailand records 14,469 deaths from both diseases, representing 22.5 cases per 100,000 (36 deaths per day), broken down into 10,380 men and 4,089 women.(2) Across the country there are 27 provinces with a death rate higher than 20 cases per 100,000: 17 provinces in the northeast, 9 in the north, and 1 in the eastern region, while the southern region records 5 provinces with a death rate higher than 10 cases per 100,000. However, the recording of information about the patients receiving treatment at the hospital was not comprehensive enough. A number of patients were not reported in the system of the

Ministry of Public Health. It is estimated that 70% of cancer reports were bile duct cancer (cholangiocarcinoma). So, each year at least 20,000 deaths would be caused by bile duct cancer.[3] Although the bile duct cancer incidences in the northeastern and northern regions were higher than those in the central and southern regions, there is likelihood that greater incidence will be found in other regions because of a greater trend in demographic migration.

2.2 People are infected with liver fluke from eating raw or undercooked white-scaled fresh-water fishes (of Barbonymus gonionotus family) or food contaminated by the eggs or larvae of the worms. They are at risk of developing bile duct cancer and losing their lives. At present there are about 6 million people with liver fluke in Thailand. They will likely develop bile duct cancer in about 20-30 years' time.**(4)** There were 18.6% of liver fluke cases found in the northeastern region (in some areas as high as 85%) and 10.0% in the northern region (in some areas as high as 46%), while the central and southern regions saw less than 5%.**(5)** The study[6] finds that the average rate of liver fluke infection in the northeastern region was 22.5%, the highest rate being 80%. Broken down into age groups it was found that every age group had an infection rate higher than 20%. A study of raw fish consumption behavior of local people reveals that 49.7% of the people consumed papaya salad mixed with raw fermented fish, 43.6% consumed raw preserved fish, 29.2% consumed raw spicy minced fish, and 28.2% consumed raw fish tail salad. The consumers said that the dishes are delicious and have been their regular diets. Some believed that having liver fluke is not a serious affliction. It would go away after they took anthelmintic medication, and they could eat again. These behaviors are risk factors of developing liver fluke and bile duct cancer.

2.3 As no specific indicator is currently found for bile duct cancer (research is still ongoing), blood screening test cannot be used as a diagnostic tool. However, there is another accurate, easy-to-use, safe and inexpensive tool, the use of abdominal ultrasound.**(7)** This is a good examination of screening for bile duct cancer in and outside the liver, being highly sensitive and disease-specific.**(8)** Other diagnostic tools include computer X-ray machine, a standard tool able to verify and classify the case and very important for treatment plan. At present, these tools have been made more advanced, maximizing the efficiency of the diagnosis and treatment plan, while new ones are under study.

2.4 Bile duct cancer can be treated and in some instances cured just like any other cancer case. The best method of treatment is surgery to remove the cancerous tissues during the early phase only.**(9, 10)** When cancer has spread, surgery can only be palliative. Studies conducted during 1982-2012 find that treatment has evolved considerably at all stages from diagnosis, pre-surgery preparations, surgery, and post-surgery care. Operation must be performed by experienced oncologists to ensure the

patient's safety. Teamwork is essential here. In fact, treatment of bile duct cancer patients can be further developed to be more effective.

2.5 The surveys on the prevalence of liver fluke in Thailand undertaken in 1957, 1981, 1991, 1996, 2001, 2009, and 2014 reveal that the prevalence rate slowly came down from 62.9%, 54.7%, 41.7%, 35.0%, 22.5%, 18.1% and 8.9% respectively. The rate, however, still remained higher than the expected target.[5] The survey conducted on the prevalence of liver fluke in 2014 shows that in Thailand there were 12 provinces with a prevalence rate higher than 10%. They were: Nakhon Phanom (23.2%), Buri Ram (17.6%), Roi Et (15.5%), Nan (14.9%), Si Sa Ket (14.3%), Surin (14.3%), Maha Sarakham (13.1%), Sa Kaeo (12.7%), Mukdahan (11.9%), Kalasin (11.5%), Chiang Mai (10.8%), and Lampang (10.5%) respectively. The findings are in line with another study[11] in 2013 on the prevalence and factors related to liver fluke infection in the upper northeastern region. The latter study shows that 4 out of 7 princes with a prevalence rate higher than 20% were Nakhon Phanom (40.9%), Sakon Nakhon (27.9%), Nong Khai (22.5%), and Nong Bua Lam Phu (22.1%). The average rate of infection was 22.5%, the highest rate being 80%. Every age group has an infection rate higher than 20%, the highest rate found in the 40-49 year-old age group. This is in line with other studies that find that the liver fluke infection rate was between 10% and 80%the infection[12, 13] In addition, it was found that factors related to the occurrence of liver fluke were sex, age, and consumption of risk dishes of raw fish tail salad (Koi Pla), raw pickled fish (Pla Som), and Somtam (papaya salad) mixed with raw fermented fish (Pla Ra).[11,14,15] It can be seen that eating uncooked/undercooked white-scaled fresh-water fishes with eggs of *Opisthorchis viverrini* is the main cause of liver fluke. Such eating behavior is quite common among the local people. It takes time to get the problem solved, while taking into consideration social and cultural factors, as well as understanding of the local way of life, including food production, preparation, cooking, and networks of operators and local vendors (hawkers, stalls, shops, groceries, restaurants, etc.)[16,17,18,19] A review of literature shows that there are very few studies on the subject. Of the limited number, several works were just studies of other documents/materials, thus shedding little light on the points which are begging answers.

2.6 The quality of life of cancer patients is of paramount importance, especially at the terminal stage in which they and family need several kinds of assistance, e.g. how to deal with pain and chronic wounds. Care will cover all the four dimensions – physical health, mental health, social health and intellectual health. The Ministry of Public Health needs to put in place as soon as possible a service system designed to develop the quality of life of terminally ill patients and acts as the coordination center for various organizations and volunteers.

## 3. Related policy, measures and laws

3.1 At present, vacuum waste collection trucks tend to illegally dump their loads onto such places as wasteland and farmland without prior proper waste treatment, causing the spread of *Opisthorchis viverrini* into the environment. This is in defiance of the following Thai laws related to waste management.

3.1.1 Public Health Act B.E. 2535 (1992) and the Amended Public Health Act B.E. 2550 (2007): Section 18 states that disposal of sewage is the power and duty of local government, while under Section 19 a person who wants to operate the business of collecting, transporting, or disposing of sewage as a business or for payment of service charges must obtain a license from the local official. However, many local governments do not attach importance to putting in place a correct sewage treatment system and overseeing the work of licensees operating the sewage collection and treatment business.

3.1.2 Act on Maintenance of Public Cleanliness and Orderliness B.E. 2535 (1992)**(20)** entrusts the power of local government organizations or provincial administrative organizations to manage public cleanliness and orderliness. Under Chapter 1 on Maintaining Cleanliness in Public and Public Places, Section 14 forbids any person to allow animals to defecate on the street without getting rid of the offended matter, Section 29 forbids any person to defecate or urinate in public or in public places which the local authorities do not arrange for the purpose, Section 30 forbids any person to pour, release or discharge excrement or urine from the building or vehicle into a waterway, and Section 31 forbids any person to dispose of sewage or solid waste in public and public places. However, in practice, the enforcement is far from satisfactory.

3.2 The Ministry of Public Health issued Ministerial Notification No. 281 setting the amount of sodium nitrate/nitrite used in fermented products, limiting the use of sodium nitrite to not more than 125 mg/kg and sodium nitrate to not more than 500 mg/kg. However, when looking for nitrate and nitrite contamination in fruit and vegetable and processed meat, the amount of nitrate contamination is higher [(21)] than in any other food. In addition, dried fermented fish (Pla Ra) is found to have nitrosamine contamination as high as 66.5 microgram/km **(22)** and, if it is found with *Opisthorchis viverrini*, there is a greater risk of bile duct cancer. At present, in Thailand, a matter of great concern is that manufacturers of local food products do not have proper knowledge and understanding about the matter or use them in excessive amount. Besides, there is no labeling informing the consumer of the composition of the material used.

3.3 In the current policy announced by Minister of Public Health Prof. Dr. Ratchata Ratchatanawin and Deputy Minister Dr. Somsak Chunharas, under Item 7 on management of communicable diseases and health threats, Item 7.1 states that efforts have been promptly implemented to ensure sustainable action to eliminate, clear up and control communicable diseases that can be prevented by vaccination, especially

poliomyelitis, measles, diphtheria, tetanus, and whooping cough as well as to enhance efficient control of such significant communicable diseases as tuberculosis, AIDS, insect-borne diseases, hepatitis, and liver fluke.

**4. Roles of organizations and people concerned**

4.1 Several provinces have taken action to implement the curriculum on liver fluke and bile duct cancer. For instance, Sakon Nakhon Province designed the curriculum to suit students in different classes. For pre-primary classes, teaching material is bout fish;, for primary classes, the lesson is given in a module; and for lower secondary students a more advanced module is provided. As a consequence, schoolchildren became more aware of the dangers of liver fluke and bile duct cancer and would not eat raw fish dishes. Khon Kaen Province, working with Khon Kaen University, has implemented the curriculum on liver fluke and bile duct cancer for students Grade 3-6 for more than three years in 35 schools under the pilot program.

4.2 To change behaviors of local people and persuade them to reduce and stop eating raw fish, activities are undertaken in many provinces. For instance, Sakon Nakhon has launched a number of programs that allow interested partner networks to participate in them.

4.3 Department of Disease Control, Ministry of Public Health, Khon Kaen University, National Health Security Office, and partner organizations concerned have joined forces to launch "Strategy to eliminate liver fluke and reduce bile duct cancer", considered an agenda for Isan (Northeastern) people, initiated in 2012 by Bureau of General Communicable Disease and Disease and Offices of Disease Prevention and Control, Region 5, 6 and 7. These agencies have promoted activities to solve liver fluke and bile duct cancer problems by developing relevant indicators and monitored the work through the supervisory role of regional health inspectors-general. In addition, Khon Kaen Office of Disease Prevention and Control Region 6 has set up a coordination center for liver fluke and bile duct cancer in the northeastern region.

4.4 The local offices of the National Health Security Office have been given budgetary support for the efforts to solve local liver fluke and bile duct cancer problems. Some provinces are even able to allocate budgets for services given in health promotion and disease prevention of their own.

4.5 Khon Kaen University, Liver Fluke and Cholangiocarcinoma Research Center, and local agencies have launched the following activities:

4.5.1 Developing a Tambon model called "Lawa Model" to serve as a case study of integrated liver fluke control in health lifestyle/one-health style at Kaeng Lawa, Amphoe Banphai, Khon Kaen Province, using a multidisciplinary approach (involving such professionals as physicians, veterinarians, public health officers, and scientists) and involving all sectors concerned including villagers, community leaders, village sages, teachers, monks, village volunteers, health workers, Tambon Administrative Organizations, Amphoe (district) health officers, and acadeics. The program covers

every possible dimension (i.e. adults, children, and elderly people in every education and economic category). The work over the past five years shows that more than half of the local people contracted liver fluke and fewer fishes in Kaeng Lawa area developed *Opisthorchis viverrini* from 70% to less than 1% at present.

4.5.2 Developing a healthcare system for risk groups and patients with bile duct cancer using a computer software system for Tambon health promotion hospitals to register risk groups. The software system can also record information of those were diagnosed and treated for bile duct cancer. This is a proactive monitoring approach involving the use of the main 13 digits. When a patient went for ultrasound testing at any Tambon health promotion hospital and permitted the doctor to access the information, the treatment can be continued from the previous visit straight away. Under this program, training was provided for Tambon health promotion hospital workers, physicians at community hospitals, surgeons, and medical orderlies so that they can screen, monitor and treat the cases in an effective manner. This system will support the strategy to combat this problem in the future.

4.5.3 Organizing campaigns for health education and publicizing the work as widely as possible, for example, the campaign promoting "Food Safety: Plara Tom, Somtam Saep" (boiled fermented fish and delicious papaya salad).

4.6 Local hospital centers, e.g. Udon Thani Cancer Hospital, Roi Et Hospital, and Khon Kaen Hospital, have undertaken cancer registration programs to collect information on risk groups, patients and those who died of any kind of cancer in the locality.

4.7 Foundation of Cholangiocarcinoma has joined forces with the public and private sectors to solve the problem and signed a cooperation agreement with Ministry of Public Health, Khon Kaen University, and CP All Public Co. Ltd. to approach the issues in a participatory and integrated manner. Such approach augurs a new dimension of problem solving by both the civil and public sectors in a concrete manner.

## 5. Constraints of work and problem-solving efforts

Efforts to eliminate liver fluke and bile duct cancer are beset with the following constraints:

5.1 The general public, risk groups and patients lack understanding and awareness about the danger of bile duct cancer and tend to ignore it. Nor do they know how to change their lifestyle and adopt a more appropriate and correct behavior. Problems are found with regard to public communication in all forms. Channels of communication are not really effective. Communication networks at every level are not well concerted enough to promote the work in this area, thus making it difficult to get to the specific target groups that are different from the general category. Their operation is not suitable to the context and intellectual setting of the Thai society. All this has made it to create public awareness about possible risks, good health and consumption behavioral change in their cultural and social lifestyle. Besides, many

medical professionals still entertain a misconception that bile duct cancer is incurable. "Surgery or no surgery, the patient will die." Some think that treatment with anthelmintic medication will solve the problem.

5.2 Policies at national and local levels are not unified with regard to promoting a change of cultural value and environment against eating raw fish and meat. Public policy targeting specific groups and areas is limited in its capacity to reach the wide public. Clarity is essential, therefore, in the direction of policy, plans and their implementation regarding reducing risk factors and opportunities. This can be done through effective and efficient primary preventive measures regarding the environment, social demography and, in particular, information dissemination.

5.3 The monitoring, screening and identifying possible risk groups and patients are not inclusive or systematic enough. The work is done in a fragmented manner. There is no integration or planning of the work system. There is no monitoring and utilization of information on disease prevention making use of the existing networks at national level. There is lack of qualified personnel with necessary skills and equipment in the screening process. The screening is not effective enough, as it is designed mainly to identify patients rather than risk groups. It is not geared toward preventive measures at the root case. Work on the risk or normal groups tends to focus on giving advice for repeated examination. The advice on prevention, however, is not always clear.

5.4 The health service system does not have enough capacity. For bile duct cancer it is found that a large number of patients are on the waiting list for surgery. Their number surpasses the surgical and nursing teams. Besides, patient care needs to be holistic, including social and economic dimensions, especially during the illness and treatment.

5.4 Knowledge management is still inefficient, as the knowledge is scattered in each local agency, lacks specific clarity and cannot be collectively utilized. There is a need, therefore, to develop the process regarding the collection, synthesis, research and development, and utilization of the knowledge. Such information should form the basis for formulating public policy, developing strategies, managing plans and projects, controlling the work system, supervising resource management, developing information and health systems, monitoring disease prevention, providing healthcare and rehabilitation, and conducting assessment. All this is designed to reduce work duplication, is interconnected in an integrated manner in line with the local context, and is aimed at achieving efficiency in the short and long term.

## 6. Issue to be submitted for consideration to the National Health Assembly

Requesting the Health Assembly to consider Document Health Assembly 7/ Draft Resolution 4 on Elimination of liver fluke (opisthorchiasis) and bile duct cancer (cholangiocarcinoma) in people.

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