EVALUATION OF DENGUE HAEMORRHAGIC FEVER PREVENTION AND CONTROL PROGRAM IN NAKHONNAYOK PROVINCE

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EVALUATION OF DENGUE HAEMORRHAGIC FEVER PREVENTION AND CONTROL PROGRAM IN NAKHONNAYOK PROVINCE

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ABSTRACT

The purpose of this research was to evaluate the DHF (Dengue Haemorrhagic Fever) prevention and control program in Nakhonnayok Province. It involved evaluation of the knowledge and perception of DHF, participation in community activities on DHF prevention and control and the preventive behavior of 640 household heads and 37 tambon health officers who were responsible for DHF prevention and control tasks. The associations between knowledge, perception, participation in community activities on DHF and preventive behavior were also determined. The data collection took place from 1st – 30th June 2003 using a structured questionnaire.

The results showed that the majority of household heads were female (61.3%) mean age of 47.4 years. Educationally, 62.7% were at a primary school level, 32.7% were farmers, and the average number of family members was 4 people. Amongst those questioned, 6 people (0.9%) were DHF patients who had been treated and recovered. Household heads had a moderate level of overall knowledge and perception of DHF. However, their perception of susceptibility to DHF needed improvement. Their level of participation in DHF related community activities could be improved while their preventive behavior was surprisingly good and was higher than the value indicated in the program. Inspections for mosquito larvae showed that the CI (Container Index) value was at a good level (67.5%). The analysis revealed that knowledge of DHF, perception of DHF and participation in community activities were significantly associated to the preventive behavior ($p<0.05$). The participation in community activities and susceptibility perception were able to explain the variation of preventive behavior for DHF by 6.7%. Performance in preventing and controlling DHF by tambon health officers was at a good level. It is recommended that participatory health education should be introduced to increase awareness of susceptibility and severity of DHF, to encourage people to participate in community activities and to prevent and control DHF, and that tambon health officers should also work on DHF prevention and control throughout the year.

KEY WORDS : EVALUATION / DENGUE HAEMORRHAGIC FEVER/ PROGRAM / NAKHONNAYOK.

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การประเมินผลแผนงานควบคุมป้องกันโรคไข้เลือดออก จังหวัดนครนายก
(EVALUATION OF DENGUE HAEMORRHAGIC FEVER PREVENTION AND CONTROL PROGRAM IN NAKHONNAYOK PROVINCE)

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บทคัดย่อ

การวิจัยครั้งนี้ เป็นการประเมินผลแผนงานควบคุมป้องกันโรคไข้เลือดออก จังหวัดนครนายก โดยการประเมินความรู้ การรับรู้ การมีส่วนร่วมกับชุมชน ในกิจกรรมการป้องกันโรคไข้เลือดออก และพฤติกรรมการป้องกันโรคไข้เลือดออก หาความสัมพันธ์ระหว่างความรู้ การรับรู้และการมีส่วนร่วมกับชุมชน ในกิจกรรมการป้องกันโรคไข้เลือดออกกับพฤติกรรมการป้องกันโรคไข้เลือดออกในกลุ่มหัวหน้าครัวเรือนของจังหวัดนครนายก จำนวน 640 คน และเจ้าหน้าที่สาธารณสุขระดับตำบลที่รับผิดชอบงานควบคุมป้องกันโรคไข้เลือดออก จำนวน 37 คน เก็บรวบรวมข้อมูลระหว่างวันที่ 1 มิถุนายน ถึง 30 มิถุนายน 2546

ผลการวิจัยพบว่า หัวหน้าครัวเรือน ส่วนใหญ่เป็นเพศหญิง ร้อยละ 61.3 มีอายุเฉลี่ย 47.4 ปี การศึกษาระดับชั้นประถมศึกษา ร้อยละ 62.7 ประกอบอาชีพเกษตรกร ร้อยละ 32.7 มีจำนวนสมาชิกของครอบครัวเฉลี่ย 4 คน พบผู้ป่วยไข้เลือดที่ได้รับการรักษาอาการทุเลา จำนวน 6 คน ร้อยละ 0.9 ของหัวหน้าครัวเรือนมีความรู้เรื่องไข้เลือดออกระดับปานกลาง การรับรู้เกี่ยวกับโรคไข้เลือดออกโดยรวม อยู่ในระดับปานกลาง การรับรู้รายด้านที่ต้องปรับปรุงมากที่สุด คือ การรับรู้ความเสี่ยงของการเกิดโรค การมีส่วนร่วมกับชุมชน ในกิจกรรมการป้องกันโรคไข้เลือดออก อยู่ในระดับต้องปรับปรุง และมีพฤติกรรมการป้องกันโรคไข้เลือดออกในระดับดี ซึ่งสูงกว่าเกณฑ์ที่กำหนดของแผนงาน การสำรวจลูกน้ำยุงลายในครัวเรือนตัวอย่าง โดยใช้ค่า CI พบว่าอยู่ในระดับดี ร้อยละ 67.5 ความรู้ การรับรู้ และการมีส่วนร่วมกับชุมชน มีความสัมพันธ์กับพฤติกรรมการป้องกันโรคอย่างมีนัยสำคัญทางสถิติ ($p<0.05$) การวิเคราะห์เพื่อหาความสัมพันธ์เชิงเหตุผล พบว่า การมีส่วนร่วมกับชุมชนในกิจกรรมการป้องกันโรคไข้เลือดออก และการรับรู้ความเสี่ยงของการเกิดโรคไข้เลือดออก สามารถร่วมกันอธิบายความผันแปร ของพฤติกรรมการป้องกันโรคไข้เลือดออก ได้ร้อยละ 6.7 การดำเนินงานควบคุมป้องกันโรคไข้เลือดออกของเจ้าหน้าที่สาธารณสุขระดับตำบลพบว่าอยู่ในระดับดี ข้อเสนอแนะควรจัดกิจกรรมเสริมความรู้และความตระหนักโดยเฉพาะความเสี่ยงและความรุนแรงของการเกิดโรค รวมทั้งเสริมสร้างการเรียนรู้แบบมีส่วนร่วมของประชาชนกับชุมชนในกิจกรรมการป้องกันโรค เจ้าหน้าที่สาธารณสุขระดับตำบลจะต้องดำเนินกิจกรรมการป้องกันและควบคุมโรคไข้เลือดออกเป็นประจำและต่อเนื่องตลอดทั้งปี

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CHAPTER 1
INTRODUCTION

1.1 Rationale and Justification

Dengue Haemorrhagic Fever (DHF) is a tropical disease that causes serious medical and health problems due to its increasing severity. In addition, its endemic areas have quickly expanded from the Western Pacific Asian region, and South Pacific Islands to South American countries in the tropical zone (1). The ability to adapt to a changing environment, such as shorter winter, enables mosquitoes to survive better. Their abilities to adapt their feeding behaviors also enable them to spread very rapidly (2). In fact, the WHO classified DHF as a re-emerging disease and is a serious health problem for children younger than 15 years of age. For Thailand, the most serious DHF epidemic occurred in Bangkok in 1958 and was named “Thai haemorrhagic fever” (1) during which 2,158 cases and a mortality rate of 13.9 % was reported. Since then, the reported number of cases has been gradually increasing. In the first few outbreaks, the disease was mainly found in Bangkok and its surrounding areas. Since 1965, the disease has been reported in all regions of the country (3).

Studies of DHF in Thailand in the past 40 years, since 1958 revealed the following : The first decade of DHF (1958 - 1967). The DHF epidemics occurred once every two years with a slightly increasing trend : The average number of patients per year ranged between 2,000 and 8,000 or 3,114 cases/year. Most of the patients were in big provinces that were the regional hubs for transportation.. The case fatality rate was initially high, and gradually declined at the end of the phase. The second decade of DHF (1968 - 1977) : The disease occurred once every 2 to 3 years during this phase. The morbidity increased very significantly. The average annual number of cases ranged from 3,000 to 38,000 or 13,313 cases/year. The majority of the cases still occurred in big cities with high population density, municipal areas, or urban zones. The third decade of DHF (1978 - 1987) : In this phase, the disease began to spread

from urban to rural areas throughout the country. The average number of cases was 50,000 per year. The highest ever incidence of DHF in the country was observed in 1987 when 174,285 cases were reported. However, the case fatality rate was declining significantly from 1978 to 1987. The fourth decade of DHF (1988 - 1997): Throughout 1988-1993, DHF incidence began to drop because people were encouraged to be more cautious and more willing to participate with the prevention and control community-based programes. In addition, measures to control the fever were introduced to schools where the highest infection rate was found among students. Consequently, the DHF situation and its infection rate began to decline (3). Throughout 1994-1997, DHF became a major health problem throughout Thailand. The trend of the disease was on the increase significantly while the case fatality rates were quite low. The fifth decade of DHF 1998 to present : DHF incidence has continued to rise until 2001, during which 140,756 cases were reported. The average number of patients per year was 227.47/100,000 population and a fatality rate of 0.18% or 247 deaths. In 2002, from 1st January to 30th September, 108.54/100,000 cases and 0.14% deaths were reported (4).

When considering DHF incidence, it was found that the epidemic occurs once every 2 years and occurs more in large cities or large communities. Once DHF has spread to other provinces, its epidemic pattern changed to once every 3 to 4 years. It is clearly demonstrated that the number of infected cases have increased even during the low period of the epidemic. Thus, the DHF situation in Thailand is referred to as “hyperendemicity or epidemic-endemic” (1).

The epidemiological study of DHF in Nakhonnayok Province over the past ten years shows the following : After the epidemic in 1990 the infection rate decreased at the middle of the decade and then increased at the end of the decade. The epidemic pattern occurred once every three years with the highest number of infection in 1997. In 1989, the average number of infection cases was 200.37/100,000 population and reached a peak of 278.77/100,000 population in 1990. In 1991, the infection rate dropped to the lowest at 57.25/100,000 population and increased to 177.27/100,000 population in 1992. From 1993 to 1996 the infection rate began to drop and remain quite stable. It seemed that the epidemic pattern during this period was neither once every two years nor once every three years. The number of cases

reached 258.91/100,000 population in 1997, which was nearly as high as in 1990. In 1998, the infection rate dropped to 166.33/100,000 population and dropped insignificantly during 1999 and 2000. However, it reached 259.6/100,000 population in 2001 with 0.32% deaths. There was no report of deaths (6) from 1st January to 30th September 2002.

Among health problems, DHF problem has been the first priority for Nakhonnayok Province in the past two consecutive years (2001-2002) (7). This demonstrates that DHF problem in Nakhonnayok is very serious and continues to expand and threaten the lives of people. Thus the Provincial Health Office of Nakhonnayok has established annual measures to prevent and control DHF, in which the provincial program continues to be improved in accordance with the policies of the Department of Communicable Disease Control. These include the training of officers to attain accurate knowledge and necessary skills for handling the disease, surveying and data collection for the household index, container index, planning of disease prevention and control, and analysis of high-risk villages. Using information obtained from the analysis of operating outcomes, and the intensity of disease problems in each area in 2001, the Provincial Health Office of Nakhonnayok has established programes for prevention and control of DHF for 2002. The program aimed to provide a massive public educational campaign and facilitate the collaboration between related organizations and to ensure their participation in the DHF prevention and control program (8).

The objective of the program to control DHF of Nakhonnayok Province is to educate people by providing accurate knowledge and perception about DHF, including susceptibility of infection, severity, benefits and barriers of disease prevention, participation in community activities to prevention and control DHF, and acquisition of appropriate disease control practices. The outcome of the program is expected to result in the control of *Aedes aegypti* breeding sources, and consequently a reduction of the DHF infection rate (8) while addressing the objectives of DHF prevention and control program of the Regional office 2 (9). The 2001 evaluation of knowledge, attitudes and behaviors of people in Nakhonnayok Province regarding DHF shows a fair level of knowledge of DHF but that the people had not yet realized the importance of DHF prevention (10). In addition, the workshop to analyze the

performance to prevent and control DHF in Nakhonnayok Province in 2002 exhibited that it was difficult for the people to change their behavior because they did not see the importance of disease prevention and that they provided little cooperation when the disease broke out in their areas. Moreover, it was found that there was a lack of evaluation of the performance aspect of the control program (11).

The performance of any task requires knowledge and perception because behavior of individuals depends on their perceptions (12). Sawai Koheng (13) revealed that if people have accurate knowledge and perception, they will have accurate self-care behavior to protect themselves from illness. In addition, they will be more willing to participate in community activities, decision-making and be responsible because they realize that what happens in the community also affects them (14). In past years, only some activities of the DHF control program have been evaluated and the outcome was not clear. Thus it is impossible to effectively use these outcomes to modify the current measures to prevent and control DHF.

Presently, many organizations are showing more interest in evaluation because of its benefits in providing accurate policy-based decision-making, effective administration and efficient performance. Evaluation facilitates transparent and auditable performances (15). In addition, the policy of the current government aims to facilitate performance-based to extensively measure inputs and outputs, to be responsible for staff, and to facilitate rapid and smooth performances in order to address the needs of society where the people are recognized as the beneficiary (16). Thus evaluation is a tool used in data analysis by comparing the outcomes of various projects to a standard formerly set in order to judge its value and to determine other alternatives for further improvement of the program/project.

There are many reasons that motivate the investigator to study this research. Firstly, DHF continues to spread throughout the country. Secondly, while lacking a systematic evaluation method for the DHF prevention and control program, Nakhonnayok Provincial Health Office has proposed to evaluate the 2002 program in order to improve their DHF control systems and to reduce the infection rate to less than 50/100,000 population based on the policy of the Ministry of Public Health. Thus the investigator was motivated to evaluate the DHF prevention and control program of Nakhonnayok Province.

1.2 Objectives

1. To assess knowledge of DHF amongst the people living in Nakhonnayok Province.
2. To assess perception of DHF amongst the people living in Nakhonnayok Province including their perception of the susceptibility of infection, severity, benefits and barriers in DHF prevention and control.
3. To assess participation in community activities to prevention and control DHF.
4. To determine the associations between knowledge, perception, participation and preventive behaviors of the people living in Nakhonnayok Province.
5. To evaluate DHF surveillance performance of tambon health officers in the areas where data collection took place.

1.3 Hypotheses

1. Knowledge of the people about DHF has an association with their preventive behavior.
2. Perception of the people about DHF has an association with their preventive behavior.
3. Participation in community activities to prevention and control DHF has an association with their preventive behavior.

1.4 Scope of research

This research involved sample groups of household heads who had been living in Nakhonnayok Province for at least six months during April – September 2002.

1.5 Variables

Independent variables

1. Knowledge of DHF
2. Perception of DHF, concerning:
   2.1 Susceptibility

2.2 Severity

2.3 Benefits of DHF prevention

2.4 Barriers of DHF prevention

3. Participation in community activities

Dependent variable

DHF preventive behaviors

1.6 Operational definitions

Evaluation refers to the evaluation of the program to prevent and control DHF of Nakhonnayok Province which involves knowledge and perception of DHF, participation in community activities to prevention and control DHF , personal preventive behavior, and control of *Aedes aegypti* breeding sources. Evaluation in this research also involves the performance evaluation of tambon health officers in DHF surveillance in areas where data collection took place.

Dengue haemorrhagic fever refers to a viral infection caused by *Aedes aegypti*, which leads to symptoms such as high fever, rash, liver enlargement, and shock in some cases. For this research, DHF also refers to dengue shock syndrome, and dengue fever.

DHF patients refer to persons who are or were diagnosed or suspected as being infected with DHF, dengue shock syndrome, and dengue fever, who lived in Nakhonnayok Province during April –September 2002.

Knowledge of DHF refers to the ability of Nakhonnayok residents to know various facts about DHF such as causes, symptoms, and transmission of DHF, care, prevention, and life cycle of *Aedes aegypti*.

Perception of DHF refers to the manifestation of knowledge, understanding and feeling of Nakhonnayok residents about the susceptibility, severity, benefits and barriers of DHF prevention and control, which are interpreted from their experiences with DHF.

Perception of susceptibility refers to the situation when a person understands that he/she is at susceptibility of DHF infection.

Perception of severity refers to the situation when a person understand the severity of DHF which may lead to other opportunistic infections and death if a person did not receive accurate or timely treatment.

Perception of benefits of DHF prevention is when a person understands appropriate methods to prevent DHF and understands the advice of health officers, which are beneficial for them.

Perception of barriers of DHF prevention is when a person understands problems involved with DHF prevention such as no time, difficulties, inconvenience and risk.

Participation in community activities refers to participation of the people in DHF preventive activities. These activities may include assisting with DHF educational campaigns in communities, recommending solutions to DHF problems for communities, participating in meetings and DHF prevention campaigns such as the termination of *Aedes aegypti* breeding sources, using Abate granules or temephos to kill mosquito larvae, insecticide fog spraying and DHF patients screening.

DHF preventive behavior is the practice of the people to prevent themselves and their family members from becoming infected with DHF including keeping mosquito larval habitats under control.

Personal DHF preventive behavior is the practice of the people to prevent themselves and their family members from being bitten by mosquitoes, which is the cause of DHF, such as sleeping under mosquito nets, and use of mosquito repellants.

Controlling *Aedes aegypti* breeding sources is the practice of the people in keeping an eye on the mosquito larvae and terminating its breeding habitats including:

Physical: covering water containers, draining, burning, or burying possible breeding sources and cleaning and changing other water containers weekly.

Biological: putting gupa fish in water containers to control mosquito larvae.

Chemical: putting Abate granules (temephos) in containers that have to be left open or if unable to use physical or biological methods, putting other chemicals such as vinegar, detergent or salt in vases and other water containers.

Outcome of *Aedes aegypti* control is the result of the survey of the prevalence and control of mosquito larvae in households, based on the prevalence of *Aedes aegypti* larvae index (17).

Household Index (HI) is the percentage of households in which *Aedes aegypti* larvae are found.

$$HI = \frac{\text{number of households in which } \textit{Aedes aegypti} \text{ larvae are found x } 100}{\text{The total number of houses inspected}}$$

Container Index (CI) is the percentage of containers found with *Aedes aegypti* larvae.

$$CI = \frac{\text{number of containers found with } \textit{Aedes aegypti} \text{ larvae x } 100}{\text{The total number of containers inspected}}$$

Standard index for disease control in 2002 are as follows (17):

HI and CI	0-9	=	good
HI and CI	10-74	=	fair
HI and CI	≥75	=	need for improvement

Occurrence rate is the number of new patients in Nakhonnayok in 2002 who are infected by DHF out of the total number of the population in Nakhonnayok in the same year. This research uses the number of infection per 100,000 population.

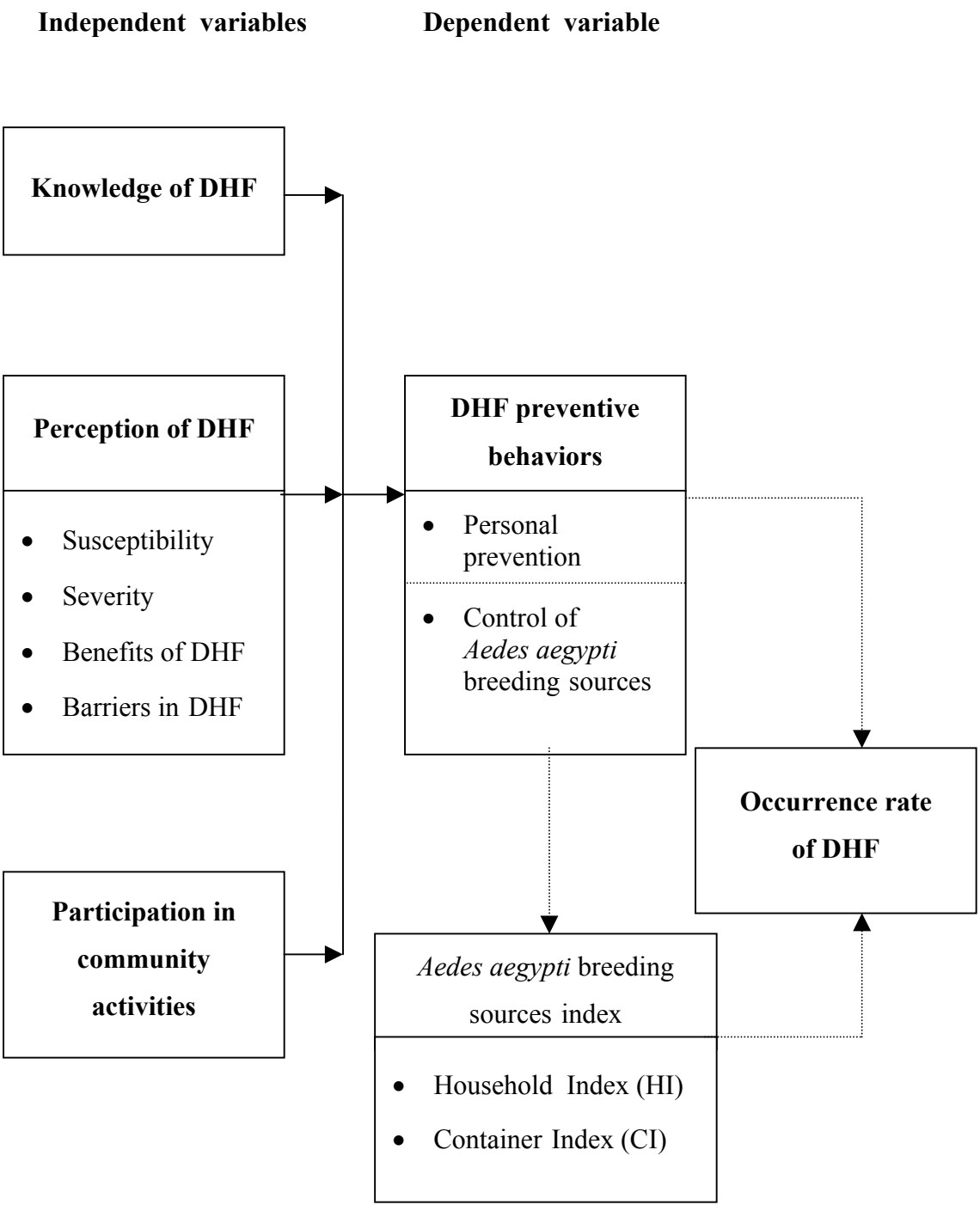

Figure 1 Conceptual framework

CHAPTER 2
LITERATURE REVIEW

The objective of the research was to evaluate the outcomes of the DHF prevention and control program of Nakhonnayok Province involves the following concepts, theories and other existed studies.

2.1 DHF, knowledge of DHF

2.2 DHF prevention and control program of Nakhonnayok Province for 2002

2.3 Concepts and theories of perception, perception of DHF

2.4 Concepts and theories of participation, participation in community activities

2.5 Concepts and theories of behavior, behavior to prevent and control DHF

2.6 Concepts of program/project evaluation

2.7 Related research

2.1 DHF, knowledge of DHF

Dengue haemorrhagic fever (DHF) is a mosquito borne haemorrhagic fever, transmitted by two types of viruses: dengue virus and the virus. About 90% of DHF cases are caused by the dengue virus (17) DHF has potentially deadly complications characterized by high fever with haemorrhagic diathesis often with enlargement of the liver - and in severe cases, circulatory failure and shock. Dengue virus is spread through the bites of an infected *Aedes aegypti* mosquito. The Chikungunya virus emerged from forest areas and is transmitted to hosts such as humans and primates through bites of the *Aedes aegypti* mosquito. This virus accounts for 1-3% of dengue infection cases. It often starts with symptoms of flu, including high fever, followed by body pains, and pains in the legs and rash in some cases. This virus does not cause shock. In most cases, patients are recovered within 3-7 days (17).

DHF was first recognized in the 1950s during the DHF epidemics in the Philippines in 1953 and Thailand in 1958, but today DHF affects most Asian countries and has become a leading cause of hospitalization and death among children. Dengue fever (DF) is not severe, flu-like illness that affects young children and adults, but seldom causes death. The clinical features of DF vary according to the age of the patient. Young children may have a non-specific febrile illness with rash. Older children and adults may have either a mild febrile syndrome, high fever, severe headache, pain behind the eyes, muscle and joint pains, and rash (maculopopular). It is sometime referred to as "break bone fever". DHF is a more severe form in which bleeding and sometimes shock occurs and leads to death. It is most serious in children. The symptom of bleeding usually occurs after 2-3 days of fever. Patients feel a lot of discomfort and are very weak after the illness. Thus the stark contrast between DF and DHF is shock and haemorrhagic diathesis (18).

Epidemiology of DHF (17)

Epidemiological studies of DHF since its first epidemic in 1958 is divided into four phases as follows:

The First Phase of DHF (1958 - 1967): The epidemics of DHF occurred once every two years with a slightly increasing trend. The average annual number of patients ranged between 2,000 and 8,000 or 3,114 cases/year over the entire period. Most of the patients were in big cities that were the regional hubs for transportation. The case fatality rate was initially high, and gradually declined at the end of the phase.

The Second Phase of DHF (1968 - 1977): The disease occurred once every 2 to 3 years during this phase. The morbidity increased very significantly. The average annual number of cases ranged from 3,000 to 38,000 or 13,313 case/year. The majority of the cases still occurred in big cities with high population density, municipal areas, or urban zones.

The Third Phase of DHF (1978 - 1987): In this phase, the disease began to spread from urban to rural areas throughout the country. The average number of cases was 50,000 per year. The highest ever incidence of DHF in the country was observed in 1987 when 174,285 cases were reported.

The Fourth Phase of DHF (1988 - present): DHF incidence began to drop since 1988 because people were encouraged to be more cautious and more willing to participate in the prevention and control of community-based programs. In addition, measures to control the fever were introduced to schools where the highest infection rate was found among students. Consequently, the DHF situation and its infection rate began to drop (3). However, it began to rise again in 2001 and became a major health problem throughout Thailand.

DHF incidence in Thailand (3)

The ratio of DHF infection among males and females is quite similar, 1:1.01. The highest number of infection cases are found among children age between 5-9 years old, followed by 10-14 years old, which is close to that of the 1-4 years old group. It has been observed that DHF has a tendency to affect populations in the higher age-groups (15 years or older). In some endemic areas, DHF is found in children younger than one year old. The youngest ever found was two months. The fatality rate among young age group is much higher than in the higher age group.

DHF infection is usually found among the native population of almost all countries in Southeast Asia, including countries and islands in the Pacific zone. A small number of infections were found among the Caucasians in these countries, dengue fever (DF) and Chikungunya infections are more common among this group. The fatality rate among the native population is much higher than among the Caucasians.

Causes and transmission of DHF (19)

DHF infection is caused by dengue virus, RNA virus, belongs to the family *Flaviviridae* (former Group B arbovirus). The four serotypes of dengue virus (designated DEN -1, DEN-2, etc.) can be distinguished by serological methods. Infection in humans by one serotype produces life-long immunity against re-infection by that same serotype, but only temporary and partial immunity against the other three serotypes, Secondary DHF infection or infection by other serotypes may occur in 6-60 months after the primary infection which is the main cause of dengue fever (DF).

Collaborative studies between the Children Hospital and the Armed Forces Research Institute of Medical Sciences (AFRIMS) reveal that 85-95% of DHF patients were the secondary DHF infection while the primary DHF infection was more common among children younger than one year of age. Thus, it can be said that factors contributing to DHF infection are the simultaneous endemic or sequential epidemic of multiple serotypes in high population density areas.

Transmission (19)

Dengue viruses are transmitted to humans through the bites of infective female *Aedes aegypti* mosquitoes. The mosquito generally acquires the virus while feeding on the blood of an infected person. The virus penetrates mosquito stomach lining and multiplies there before moving to the saliva glands. After virus incubation for 8-12 days, an infected mosquito is capable of transmitting the virus, during probing and feeding, to susceptible individuals for the rest of its life. The incubation period in human host is about 7-10 days, at approximately the same time as they have fever; *Aedes* mosquitoes may acquire the virus when they feed on an individual during this period.

This mosquito rests indoors, in closets and other dark places. Outside, it rests where it is cool and shaded. The female mosquito only bites during the daytime and lays her eggs in clear and still water containers in and around homes, such as vases, tins, used automobile types, pot plant drip catchers and gutters. These eggs become adults in about 10 days. In addition, infected female mosquitoes may also transmit the virus to their offspring by transovarial (via the eggs) transmission, but the role of this in sustaining transmission of virus to humans has not yet been delineated.

Seasonal spread of disease (20)

Reports of DHF infection cases have been received throughout the year and are particularly high during the rainy season. The number of mosquitoes increases more rapidly in rainy season because there are more water sources for breeding. Change of temperature and moisture affect mosquito biting rate and the life cycle of dengue virus inside the mosquito. In addition, children tend to spend more time insides houses or school during day time and thus more likely to be bitten. The pattern

of DHF infection is similar in most years in that the number of DHF patients increases significantly in May, reaches a peak in July or August and begins to drop although cases are occasionally reported in December. The exceptions were 1983, 1984 and 1986 where the number of infection case in November and December were relatively higher than that in the beginning of the years. The number of infection cases in the year after began to rise in April, which was too soon. In the non-epidemic year, number of infection cases kept rising for longer, until December before falling again.

Geographical spread of disease (20)

DHF is found in all parts of Thailand. It was first reported in Bangkok, followed by the north, northeast and south respectively. The massive population movements coupled with more water storage have been made in rural areas in accordance with the government's 'clean water' campaign have facilitated the spreading of diseases and thus more mosquito breeding sources.

The vector (21)

Mosquito is an insect of Class *Insecta* (hexapoda), Order *Diptera*, Family *Culicidae*. The mosquito goes through four separate and distinct stages of its life cycle and they are as follows: Egg, Larva (called instar), pupa, and adult. Each of these stages can be easily recognized by their special appearance.

Egg: Eggs are laid one at a time and they float on the surface of the water. Most eggs hatch into larvae within1-5 days.

Larva: The larva lives in the water and comes to the surface to breathe. They shed their skin four times growing larger after each molting, which takes 7-10 days. The stages between molts are called instars. Most larvae have siphon tubes for breathing and hang from the water surface. The larva feeds on microorganisms and organic matters in the water. On the fourth molt the larva changes into a pupa. Mosquito control is more effective during the larva stage due to its feeding habit.

Pupa: The pupae stage is a resting, non-feeding stage. This is the time the mosquito turns into an adult. It takes about two days before the adult is fully developed. When development is complete, the pupae skin splits and the mosquito emerges as an adult.

Adult: The newly emerged adult rests on the surface of the water for a short time to allow itself to dry and all its parts to harden. Also, the wings have to spread out and dry properly before it can fly. Males mosquitoes usually go through its life cycle 1-2 days faster than the females. They do not bite, but feed on the nectar of flowers. Only female mosquitoes bite animals and drink blood. Most female mosquitoes have to feed on an animal and get a sufficient blood meal before she can develop eggs. If they do not get this blood meal, then they will die without laying viable eggs. The life span of mosquito usually depends on several factors including food, temperature, humidity, sex of the mosquito and time of year. Most males live a very short time, about a week; and females live about a month depending on the above factors.

Aedes mosquitoes are distinctly black with white markings on the body and legs. They are painful and persistent biters, attacking during daylight hours (not at night). They are found mostly from 9.00 am to 11.00 am and 1 pm to 2.30 pm. Studies show that the inspection of 100 households found 200-300 containers contain *Aedes* mosquitoes (21).

Aedes mosquitoes breed in stored, exposed, water collection systems, particularly clear, and stagnant water. The favored breeding places are primarily in man-made containers like earthenware jars, metal drums and concrete cisterns used for domestic water storage, as well as discarded plastic food containers, used automobile types, jars, pots, buckets, flower vases, pot plants drip catchers, tanks, discarded bottles, tins, cans, water coolers, sagging roof gutters, tree holes, leaf axils etc., and other items that collect rainwater. The most common breeding sources in household and schools are water barrels, concrete cisterns used in toilets and flower vases. Studies show that *Aedes* mosquitoes are capable of laying eggs and grow in polluted water as well as clean water.

Eggs of *Aedes* mosquitoes are laid one at a time and they float on the surface of the water. Eggs have oval shape and white when they newly laid and turn brown and eventually black within 24 hours. A female *Aedes* mosquito lays about 140-144 eggs at a time and able to lay egg 4-5 times during its life cycle. Eggs are hatched within 4 days. Eggs can withstand long period of desiccation, sometimes for several months. They are hatched within 30 minutes when flooded with water but the

percentage of eggs hatched to larvae is lower with the long desiccation period. Most larvae have short siphon and hang themselves perpendicular to water surface. They don't like light and they shed their skin four times before becoming pupae which takes about 9 days or 4-7 days if the weather is warm. Pupae take about 2-3 days to develop to adults. After mating, female mosquitoes keep sperm in their spermatheca. Most females *Aedes* mosquito live for about 30-45 days.

Aedes mosquitoes are sometime called "day biting mosquito" because they feed during the day on human blood as well as other animal such as cows, buffalos, chickens and birds. Once fully fed they like to rest indoor, in closets, bathroom, and other dark places. Outside, it rests where it is cool and shaded. This mosquito can fly for a distance as far as 100 meters.

There are two types of *Aedes* mosquito in Thailand that are vectors of DHF (21). These are:

1. *Aedes aegypti* which is the main vectors
2. *Aedes albopictus*, which is less efficient than *Aedes aegypti*

Aedes aegypti is a tropical and subtropical species of mosquito firstly originated from the African continent and later found in countries located between latitudes 40°N and 40°S. The rapid geographic spread of this species has been largely attributed to the international trade particularly by boat. Nobody knows exactly when *Aedes aegypti* mosquitoes enter Thailand but Theobal F.V first reported it in the scientific publication in 1907. The distribution of this mosquito was firstly thought to be limited to large cities. However, Scanlon J.E. later reported that this mosquito was distributed throughout the countries including rural areas except those separated from transportation and trade routes. The study conducted at Doi Pui shows that distribution of this mosquito is limited by altitude. It is usually not found above 1000m from sea level which is different from *Aedes albopictus* that can survive the altitude as high as 6000 feet (17).

Indoors, 90% of female *Aedes aegypti* rest on shelves and various items hung in the house. Only 10% rest on the wall. A study conducted in Rayong Province found 66.5% females *Aedes aegypti* resting on hung clothes, 15.7% resting on rope and mosquito nets, 15.3% rest on other hung items, and 2.5% rest on the wall of the

houses. Studies of the feeding behavior of *Aedes aegypti* mosquitoes in Bangkok found they feed during the day, from sunrise to sunset, particularly from 9.00 am to 10.00 am and from 4.00 pm to 5.00 pm. The *Aedes aegypti* feeds on humans indoors but *Aedes albopuctus* feeds on human outdoors, with only small amount that feed indoors. On average it drinks about 0.75 mg blood per day and lay eggs three days after feeding (17).

Mosquitoes like to lay eggs on the following sources (21):

1. Rough surface of containers that contain water and enable mosquitoes to hang on whilst laying eggs.
2. Water tainted with organic and inorganic substances such as phosphate, carbonate and chloride ions that keep the pH of water at about 6-12.
3. Clean and stagnant water that could be slightly murky.
4. Water kept in containers for domestic uses.

Symptoms of DHF (19)

The illness commonly begins with the following:

1. A sudden rise in temperature accompanied by facial flush and other non-specific constitutional symptoms of DHF such as severe headache with body aches and joint pains. The fever usually continues for two to seven days.
2. Bleeding in skin and subcutaneous tissue on arms, legs and other parts of the body, bleeding in eye tissue and gums which occurs on the 2^{nd}-3^{rd} days of illness and disappear within 3-4 days. The most severe bleeding is the gastrointestinal hemorrhage in which patients frequently vomiting with brown or black blood as well as having black stools like coal tar. Liver is noticeably large on the 3^{rd} – 4^{th} day of illness.
3. In severe cases, the patient's condition may suddenly deteriorate after a few days of fever; the temperature drops, followed by signs of circulatory failure such as weak and rapid pulse, low pulse pressure as low as 20 mmHg or lower, low blood pressure. Patient may rapidly go into a critical state of shock and die within 24-48 hours, or quickly recover following appropriate volume replacement therapy.

4. Other symptoms include rashes similar to German measles, loss of appetite, vomiting, and abdominal pain. In some cases there are symptoms of infection in the brain, hepatic and kidney failures. Most patients recover after 7-10 days.

Severity

According to WHO (22), the severity of DHF is divided into four stages.

Stage1: sudden onset of high fever, headache, body aches and joints pains, a positive tourniquet test.

Stage2: symptoms resembling stage 1 with bleeding from the nose, mouth and gums or skin bruising, normal blood pressure.

Stage3: symptoms resembling stage 2, symptoms of circulation failure, rapid, weak pulse with narrowing of the pulse pressure (≤ 20 mmHg), hypotension with clammy and cold skin, restlessness, and gastrointestinal haemorrhagic manifestation.

Stage4: critical stage of shock, and blood pressure or pulse becomes imperceptible. Patients in shock are in danger of dying if appropriate treatment is not promptly administered. Symptoms resembling to stage 3 and 4 patients are characteristics of Dengue Shock Syndrome (DSS).

Treatment (19)

There is no anti-virus drug or vaccine for treatment of DHF. However, early diagnosis and careful clinical management by experienced physicians and nurses frequently saves the lives of DHF patients. Maintenance of the circulating fluid volume is the central feature of DHF case management. The following steps are usually recommended.

1. High fever stage: Particularly children with a history of shock, patients with severe headache, and body and joints pains. Paracetamol should be given with cautions to reduce fever. Aspirin and salicylates should be avoided, as they are known to increase the bleeding tendency and may lead to serious complication.

2. Thirst and hydration results from high fever and vomiting, thus fluid intake by mouth should be plenty. An electrolyte replacement solution or fruit juice is preferable to plain water. Oral Rehydration Solution (ORS) is recommended. If oral

rehydration solution is to be given to children under two years of age, additional milk or sugar should be given in the proportion of one volume for every two volumes of the ORS. Patients who vomit should be given small amounts in a steady rate. Intravenous fluid may be administered to those who lose appetite and vomit to expand plasma volume.

3. Patients should be closely monitored for signs of shock. The critical period is when fever begins to reduce which usually occurs after the third day. Symptoms occurring prior to shock may include abdominal pain, restlessness, less urination, cold hands, and feet as fever reduces. If any one of these symptoms is noticed, the patient should be taken to the hospital immediately. A patient may die within 12-24 hours after shock if appropriate treatment is not given.

4. Determination of hematocrit and platelets of those suspected of infected with dengue virus. Platelets usually decrease in DHF patients. Platelets are laboratory determined by microscopic examination of blood films, counting in 10 oil fields (OF). Platelets are considered low if the average is lower than 2-3/OF (≤100,000 mm). Hematocrit level must be closely observed, every two hours, in those with low platelets. Increasing of hematocrit indicates the plasma leakage, which requires immediate replacement of plasma loss.

5. It is not necessary to hospitalize all patients with suspected DHF, since shock develops in only about one-third. The finding of a continuing drop of platelets count concurrent with a rise in the hematocrit is an important indication of the onset of shock. Patients should have repeated platelets and hematocrit determinations so that early signs of shock can be recognized. Parents should be advised to watch for signs of deterioration or warning signs of shock such as restlessness, severe abdominal pain, cold skin, and vomiting. Patients with these signs should be hospitalized with close attention of doctors and nurses.

Prevention and control

WHO specifies the best way to control DHF is to control the vector, *Aedes aegypti* through the following environmental management methods (22).

1. Commence vector control during the low infection period so that transmission of virus is prematurely terminated.

2. Eliminate infected mosquitoes and break the transmission cycle by reducing mosquito populations to extremely low levels in order to reduce human-vector-pathogen contact.

3. Strictly control in areas where vectors are easily transmitted such as schools, and hospitals.

4. Permanently control of vector in areas that are at susceptibility for epidemic such as urban areas with high population density.

According to WHO's guidelines, the most effective vector control is destruction of mosquito breeding sources in order to reduce density, life span, and contact between vectors and human since there is no vaccine to prevent DHF.Vector prevention and control plan is divided into two stages (19) as follows:

1. Emergency control. During outbreaks, emergency control measures may also include the application of insecticides as space sprays to kill adult mosquitoes using portable or truck-mounted machines. Spraying is required twice in a 10 days interval.

2. Long term control. Public information campaign to educate people about danger of DHF through various sources such as pamphlets, posters, published documents, television, radio or group of people who are capable of relaying the message, such as teachers, monks, community leaders, health officers. Vector control method is particularly important because it requires regularity and sustainability.

Vector prevention and control measure is divided into the following (21):

1. Measure to control mosquito larvae

1.1 Physical control is the most economical method, simple and requires little labor. However, to be effective, it requires times and regularity and continuity for the whole year. These include:

1.1.1 Keep household water storage system covered at all times. If without lids, they should be covered with mesh, plastic or net and tied up with ropes.

1.1.2 Water in vases and other forms of containers should be drained and cleaned weekly to stop larvae from developing to adults.

1.1.3 Cans, coconut shells, barrels, and other containers that may serve as potential larval habitats should be buried or burnt appropriately.

1.1.4 Unused automotive tyres stored outside should be placed in a shed. If contains water, it can be filled with salt or detergent to kill mosquito larvae.

1.1.5 Ant traps used to protect food storage cabinets can be filled with oil or salty water, detergent or vinegar or hot water to kill mosquito larvae.

1.2 Biological control. The introduction of organisms that prey upon, parasitize, or compete with, in order to reduce the numbers of *Aedes aegypti.* Larvivorous fish is most frequently employed in concrete cisterns for water storage in toilets, and bathrooms.

1.3 Chemical control. Insecticide such as temephos (former Abate granules) is used for *Aedes. Aegypti* control. Temephos kills mosquito larvae and last as long as 3 months when used 10g in 100 L water. It should only be used where the numbers of larvae is very high, such as in toilets and bathrooms.

1.4 Other controls include larvae traps.

2. Measures to control adult mosquitoes

2.1 Space spraying is the spreading of microscopic droplets of insecticides in the air to kill adult mosquitoes. Two forms of space spraying used for *Aedes aegypti* control, thermal fog and ultra-low volume (ULV) aerosols and mists, are highly effective because it kills resting mosquitoes. However, it should only be used in emergency situations when an outbreak of DHF is already in progress or in the areas where there is regular outbreaks.

2.2 Other methods include spray cans insecticide or using handmade meshes.

3. Personal protection

3.1 Use mosquito nets to protect babies, old people and others who may rest during the day. The effectiveness of such nets can be improved by treating them with permethrin (pyrethroid insecticide).

3.2 Use mosquito repellents which are available in powder, liquid and creme or use electric vapor mats during the daytime. Care should be taken in using repellents or vapor mats on young children because it contains chemicals that may cause irritation for infants.

3.3 Mosquito elimination by chemical methods.

What to do when young children are suspected of DHF infection (23)

1. Children suspected of having DHF should be taken to doctors or health officers at the nearest hospital or health center for examination and treatment.

2. If children have fever parents should not attempt to give them medicine but seek medical advice from doctors or health officers, otherwise only Paracetamol should be given. Wrong medication may increase bleeding tendency and may lead to serious complication.

Dangerous signs of DHF in children include the following (23):

1. Frequent vomiting with or without blood, unable to drink or eat
2. Exhausted and weak
3. Black stool, breeding from nose, mouth and gums
4. Restlessness, pale and cold skin

If any of these symptoms are noticed, patients should be taken to hospital immediately.

DHF vector prevention and control comprises the control of mosquito larvae (or breeding habitats) and control of adult mosquitoes. Proper solid waste disposal and improved water storage practices, including covering containers to prevent access by egg laying female mosquitoes are among methods that are encouraged through community-based programs. All households should be encouraged to cooperate with these practices regularly and continually (24). This is because DHF epidemic can still occur if there are mosquito breeding habitats in only one household.

Services acquired from health service providers

People can acquire services and advice about DHF prevention and control from government health service providers on the following:

1. Acquire advice and knowledge about DHF from hospitals, health centers, health officers and health volunteers.

2. Acquire insecticide, temephos, from health centers, district or provincial health offices. In some provinces, temephos can also be purchased at hospitals.

3. Acquire larvivorous fish from the provincial health offices, malaria centers or malaria units. In some provinces, larvivorous fish are also available from district health offices.

4. Acquire DHF examination services from health centers and hospitals.

Concepts and theories of knowledge, knowledge about DHF

Goods (25) defines knowledge as a collection of experiences that a person has gained from studying facts, appearance and various details which can be used in later occasions.

Bloom (26) defines knowledge as the memory of specific or general events that occur in different situations, including methods, processes, patterns, structures, and settings. A person gains knowledge by different means including reading, listening, observing or perceiving directly and indirectly from experience.

Prapapen Suwan (27) refers to knowledge as the basic behavior or ability of a person to remember facts, theories, regulations, structure and methods of problem solving etc.

Thawatchai Chaijirachayakul (28) refers to knowledge as a learning process about memory and recollection of various issues and experience. Knowledge transforms something easy and unrelated into something complicated and related.

Level of knowledge

Bloom (26) describes six levels of knowledge or cognitive domains from the most simple to the most complicated as follows.

1. Knowledge as ability to remember or recall experiences. Some examples include knowledge of specific such as terminology, knowledge of ways and means of dealing with specifics such as knowledge of methodology.

2. Comprehension is a type of understanding or apprehension such that the individual knows what is being communicated and able to make use of the material or idea being communicated without necessarily relating it to other material or seeing its fullest implications. Some examples of comprehension include translation, interpretation, and extrapolation.

3. Application is the use of abstractions in particular and concrete situations. The abstraction may be in the form of general ideas, rules and procedures or generalized methods.

4. Analysis is the breakdown of a communication into its constituent elements or parts such that the relative hierarchy of ideas is made clear and the relations between the ideas expressed are made explicit. Such analysis intends to clarify the communication, to indicate how the communication is organized.

5. Synthesis is putting together of elements and parts so as to form a whole, rearranging and combining them in such a way as to constitute a pattern or structure not clearly there before.

6. Evaluation is judgments about the value of services, reatecials and methods for given purposes. Quantitative and qualitative judgments about the extent to which material and methods satisfy criteria, as well as use of a standard of appraisal.

In summary, knowledge is memory or recollection about facts, regulations, places and persons. Knowledge is gained directly and indirectly from experience. It involves both simple and complicated things.

For this research, knowledge of DHF includes what persons are able to remember, or recall about facts such as causes, symptoms, transmission, mosquito life cycle, treatment, and prevention of DHF among the people living in Nakhonnayok Province.

2.2 DHF prevention and control program of Nakhonnayok Province in 2002

Background and rationale

One of the policies of the Ministry of Public Health is to facilitate good health among all the people in order to prevent various dangerous diseases. The DHF problem is important and needs immediate attention for prevention and control in provincial, district and village levels. Resolution of DHF problem requires cooperation between government organizations, local administrative organizations and the people in communities.

DHF is an important problem for Nakhonnayok Province. In the past 10 years, the highest number of infection cases was found in 1992 with an average infection rate of 177.27/ 100,000 population. Later, the number of infection cases declined

slowly until 2001 when the epidemic re-occurred. To be prepared for the prevention and control of DHF, the Provincial Health Office has formulated the 2002 program for prevention and control of DHF in order to effectively lessen the consequences of DHF epidemic.

Goal

To reduce morbidity rate of DHF among the people in Nakhonnayok Province.

Objectives

1. To provide accurate knowledge of DHF for the people in Nakhonnayok Province.
2. To provide accurate perception of DHF which includes susceptibility and severity of DHF, benefits and barriers of DHF prevention.
3. To facilitate accurate and effective preventive behaviors among the people.
4. To reduce the prevalence of *Aedes aegypti* mosquitoes which is a vector of DHF.
5. To promote the participation of the people in community activities on DHF prevention and control.

Target indicators

1. The morbidity rate among all age groups is reduced to < 50 / 100,000 population.
2. 80% of the people in Nakhonnayok Province possess accurate knowledge about DHF.
3. 70% of the people in Nakhonnayok Province possess accurate perception about DHF.
4. 60% of the people in Nakhonnayok Province possess accurate preventive behaviors.
5. 60% of the people in Nakhonnayok Province participate in community activities on DHF prevention and control.

6. The prevalence of *Aedes aegypti* mosquito is reduced to the following:

6.1 Household index of less than 10 (HI < 10) among at least 80% of villages.

6.2 Container index of less than 10 (CI < 10) among at least 80% of schools and other places.

Operational strategies

1. Strategies to educate the people

1.1 Organize DHF training for housewives, teachers, students, monks and personnel of Tambon Administrative Organization.

1.2 Massive campaign by the following methods.

1.1.1 Educational campaigns by means of leaflets, posters, billboards, radio and mobile DHF information services.

1.1.2 Organize exhibition in hospitals and other service providers.

1.1.3 Sponsor and take part in organizing of exhibition in schools and other governmental units.

1.1.4 Evaluate people knowledge of DHF, as well as their attitudes and preventive behaviors

1.3 Support the distribution of DHF education by means such as leaflets, posters, cassette tapes, and video.

1.4 Establish information centers in district, tambon, villages, schools and health centers to provide accurate and updated information.

2. Strategies to facilitate accurate preventive behavior among the people

2.1 Provide DHF educational tools such as leaflets, posters and handbooks of DHF prevention and basic cares for dengue patients.

2.2 Arrange for a “mosquito free village” contest.

2.3 Monitor and evaluate preventive behaviors of the people

3. Strategies to facilitate and support the people to participate in community activities on DHF prevention program

3.1 Campaign to control and terminate mosquito breeding habitats.

3.2 Organize exhibitions to facilitate for "mosquito larvae free" environment.

3.3 Establish a DHF's awareness community in every village.

3.4 Establish a team to control and terminate mosquito breeding habitats in each village.

3.5 Campaign to improve environmental conditions in villages as well as keeping it clean.

3.6 Support the people in community in identifying DHF patients in their areas.

3.7 Establish cooperative network to prevent DHF in communities.

4. Strategies to reduce the number of DHF infection cases in Nakhonnayok Province

4.1 Prevention and control of DHF.

4.1.1 Administration and management that supports prevention and control of DHF.

4.1.2 Establish the provincial DHF prevention and control center at the Provincial Health Office in which the current situation of diseases are analyzed and presented to high level administrators and the organizations.

4.1.3 Specify responsible areas for the administrator for control, support, monitor and evaluation of DHF control.

4.1.4 Assign the Contracting Unit for Primary care (CUP) and Primary Care Unit (PCU) to set up DHF prevention and control program in their responsible areas and identify operational activities according to their circumstances using the Non Universal Coverage (NUC) budget, Universal Coverage (UC) budget, as well as the Tambon Administrative Organization budget.

4.1.5 Facilitate the performance of the PCUs by providing consumable items, equipment, and chemicals.

4.1.6 Coordinate with other related organizations in establishing a mosquito free project in public places, temples, and schools.

4.1.7 Appoint a Special Response Team to support the operation in villages, tambons and districts where DHF epidemic occurs.

4.2 DHF surveillance

4.2.1 Develop a measure to report the finding of infection cases informally by telephone between private clinics, Medical Center Hospital of Srinakarinwirot University, Phrajulajomklao College Hospital, general hospitals, community hospitals both during and after working hours in order to control disease promptly.

4.2.2 Coordinate with nearby provinces for disease surveillance.

4.2.3 Develop a network of reporting from villages to health officers within 24 hours when DHF suspected cases obtain treatment from other provinces.

4.2.4 Develop community capability in disease prevention and control in four Tambon Administration Organization.

4.3 Special response when disease breaks out

4.3.1 Review roles and activities of special response team at all level.

4.3.2 Specify duration of time for disease control operations.

5. Strategies to reduce the prevalence of the vector by controlling household index and container index

5.1 Campaign for mosquito free in houses, communities, temples, and schools during four different periods.

Period 1: 4-8 March 2002

Period 2: 27-31 May 2002

Period 3: 26-30 August 2002

Period 4: 25-29 November 2002

5.2 Identify HI and CI in houses, temples, and schools, by the team from province, tambon and district.

5.3 Organize a competition of mosquito free zones such as in houses, temples and schools.

Operating period

From October 2001 to September 2002.

2.3 Concepts and theories of perception, perception of DHF

Definition of perception

New Webster Dictionary (29) defines perception as the manifestation of knowledge, and understanding of a person**.**

Sucha Jun-em (30) defines perception as the behavioral–based perception as a process that takes place after the stimulus and before the response, as shown in the figure 2.

Kanya Suwannasang (31) defines perception as the utilization of past experience for the interpretation of stimuli after sensing takes place.

Garrison and Magoon (32) define perception as a process of interpretation and translation of stimuli that requires experience.

Bertley (33) defines perception as the ways individual gains knowledge about the world and accumulates those as experience which in turn influences the behavior and characteristics of a person.

In summary, perception is a process of interpretation and translation of the meaning of stimuli using past experience and knowledge. The meaning of stimuli is then collected as a new experience and ready to respond and affect the behaviors of a person.

Perception is a psychological conditions or events that occurred in human minds and cannot be observed directly. It is a process that overlaps understanding, thinking, sensing, memorizing, remembering, decision making and expressing of behavior, as shown in figure 2.

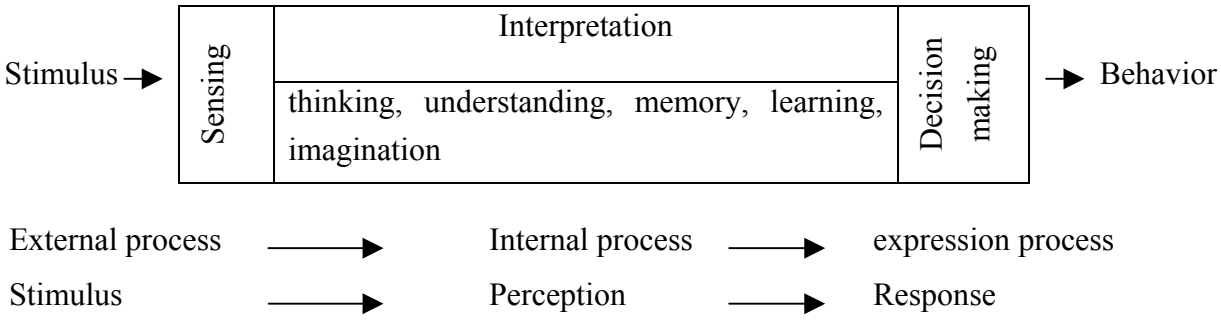

Figure 2 Process of perception

Source : Kanya Suwannasang (31)

Sensing is the basic process for learning. A person usually selects whether to respond to stimuli and their surrounding. The information received is brought into the perception process through the physical senses. The interpretation process is the next step where information received is rearranged and memorized and meaning is assigned to it. This process requires personal characteristics such as motivation, expectation, attitude, experience, knowledge and personal taste to selectively filter and translate the meaning of this information. As a result the individual can make decisions, evaluate the possible outcomes and act in accord with their decisions (31).

Schermerhorn, Hunt and Osborn (34) define perception process as a basic psychological process of interpretation of various stimuli in order to gain experience. Perception causes uniqueness in each individual. Figure 4 shows the perception process as described by Schermerhorn et al.

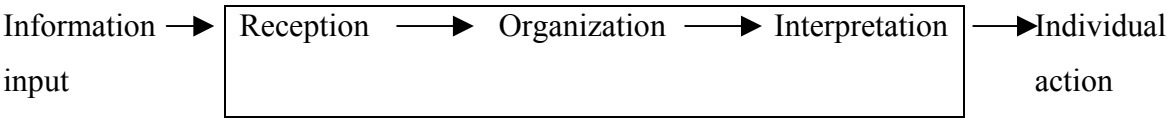

Figure 3 Perception process as described by Schermerhorn, Hunt and Osborn
Source : Schermerhorn JR, Hunt JG, and Osborn RN. (34).

Kast and Rosenzwig (35) say that perception occurs when information input is processed through the mechanism of perception formation, which includes selection, interpretation, and closure, using past experience. Factors influencing the mechanism of perception formation include pressure, peers, reactions, roles, referees, positions and works and rewarding systems, as shown in figure 4.

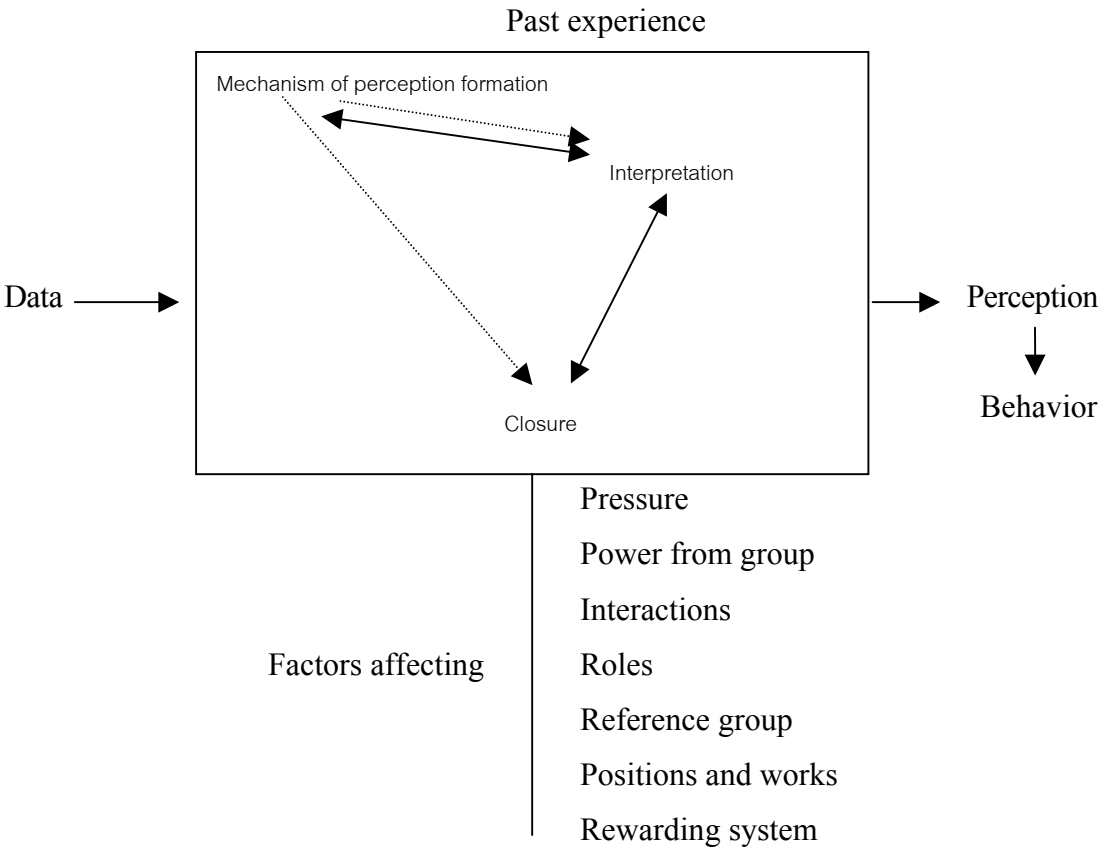

Figure 4 Process of perception as described by Kast and Rosenzwig
Source : Kast FE. and Rosenzweig JE. (35)

Significance of perception

Accuracy is the heart of the perception because accurate perception results in a good thinking, knowledge, understanding and attitude of a person. The importance of perception is summarized as follows:

1. Perception is important for learning. Without perception, learning cannot occur, as shown below.

Stimulus → Sensing of stimulus → Interpretation → Perception → Learning

2. Perception is important for determining attitude, mood, and behavioral trends. The sequence of events that occur following perception includes feeling, and mood that are later developed as the attitude and behavior of a person.

Factors determining perception

Two factors influencing the degree of accuracy of perceptions are the nature of the stimuli, and the individual. Stimuli that attract people's interests and attentions, such as repetitive and unique stimuli, determine the perception. Two factors, physical and psychological conditions of a person also influence perception. The physical conditions include the state (normal or abnormal) of the sensing organs of the individual such as their ears, eyes, noses, tongues and other sensing organs. Abnormal functioning of the sensing organs usually results in inaccurate perception. Psychological conditions include needs, emotions, attitude, knowledge, experience, social norms and customs of the individual (36). The psychological condition influencing perception are described as follows:

1. Knowledge: The perception process involves the steps of sensing, interpreting and translating meaning of stimuli, which requires knowledge relating to the stimuli. Thus, the more knowledge a person has, the more accurate their perception will be.
2. Needs: More needs usually result in more stress and inaccurate perception.
3. Attitude: Attitude is a feeling that selectively filters how to respond to stimuli. For example, if a person has a bad attitude towards other people, no matter how well these people act or behave, they will always look bad to this person.
4. Emotions: People with good emotion tend to be more attentive to stimuli and more likely to have the positive attitude towards stimuli. People who are in bad mood are more likely to develop a bad attitude towards stimuli. Angry people are less perceptive or inaccurately perceive. Physiologists reported that stress causes the muscle and nervous system to resist the nerve transduction, which leads to an inaccurate perception.
5. Culture, customs and social norms: Culture, customs and social norms have influences on the perception of people different societies. For example, kissing in public places is unacceptable in Thai society but it is normal and acceptable in western society, because people have different frame of references that they used to judge the quality and make decision about something.

Based on the above factors, the differences between knowledge and perception should now be evident. Knowledge involves the memory and recall of data, which can change if it is replaced or augmented by new information. Perception is a complicated psychological process concerned with the translation from the external, physical world to the internal, psychological world. It affects the learning, attitude, mood, and behavioral trends of people. Perception depends on many factors including culture, customs, and social norms which are the external factors. Unlike knowledge, perception is difficult to change. It is a time consuming process because it has become strongly influenced by the customs and cultures.

Perception of DHF

The Health Belief Model is a psychological model that attempts to explain and predict health-related behaviors by focusing on the attitudes of and benefit to an individual (37). It is based on the hypothesis that 'good health' means different things to different people which results in many levels of acceptance. It explains the motivation for different people to act, make decisions, and to achieve personal goals. The health belief model has been explains that people will change their health-related behavior only if they believe that there is the possibility of them becoming infected and that the damage it can cause their lives will motivate them to change their health-related behaviors and reduce the risks and severity of disease. The key variables of the Health Belief Model are as follows:

1. Perceived susceptibility: One's subjective perception of susceptibility of contracting a health condition. For example, some people believe that they are not susceptible to disease, while others believe that they are. Therefore, perceived susceptibility determines whether people will change their health-related behaviors.

2. Perceived severity: Knowledge concerning the seriousness of contracting an illness or of leaving it untreated (including evaluations of both medical and clinical consequences and possible social consequences) is different among different people. For example, if people perceived that a particular disease causes death or prolonged sickness or disability, they will change their health-related behavior.

3. Perceived benefits and barriers: The believed effectiveness of strategies designed to reduce the threat of illness and the potential negative

consequences that may result from taking a particular action, including physical, psychological and financial demand. Most people tend to believe in and pick the action that suits them the most with minimal barriers or obstacles. However, this also depends on the perceived susceptibility and severity of individual.

Thus, perception of DHF is the demonstration of knowledge, understanding and feelings occur internally regarding one's susceptibility to DHF, its severity as well as benefits and barriers of its prevention, which has been interpreted from the senses and DHF related experiences.

2.4 Concepts and theories of participation, participation in community activities

The investigator studied various publications and found that many people described about participation differently depending on their attitude and backgrounds.

WHO (38) describes participation in three means as follows:

1. Participation as collaboration. In this case it means people are volunteer or persuaded to participate in any project. This is usually demonstrated in the form of labor contribution or through other existing resources, in order to receive the expected output. Participation in this sense is stimulated by external organization.

2. Participation as specific targeting of project benefits. Participation in this sense aims to cover the disadvantaged group such as those lacking land for cultivation, poor people living in the city, and low-income farmers. It is expected that benefits of participation will reach these groups of people as project beneficiaries. Participation in this sense raised the questions whether participation then means benefits or participating in order to gain benefits. However, the main emphasis is that who is the project beneficiary. Therefore definition of participation in this sense must be given in parallel with the beneficiary assessment.

3. Participation as empowerment. This concept is highly supported by many people and the word "empower" is well accepted and has been used widely. It shows that the power or authority has been handed back to the people in the form of participation. It also includes more accessibility, controls of resources for development, as well as the political power to negotiate and to express opinion freely.

Oakley and Marsden (39) mention that participation involves three components as follows:

1. Participation must be active. According to this concept, it means people obtaining services, who are interested and take part in some activities only, are not regarded as participation but involvement.

2. Participation must involve choice. People have the right to choose whether to participate or not. If they choose to participate then they also have the right to choose one that is most beneficial for them because whatever choice they make will have effects on their life.

3. Participation's choice must have the possibility of being effective. The choice that the people make should be highly possible of becoming effective or in accordance with the way they want it.

Srinivasan (40) defines participation as a strategy for sustainable development.

Hollnsteiner (41) defines participation along the same line as the above. That is it must be active, rather than only involvement or passive. This includes the participation in which the people provide the ideas without being stimulated or forced by the organization.

Oakley and Marsden (39) summarize two ways to describe participation.

1. Participation as a means. Participation is viewed as a process of ascertaining that cooperation or collaboration for any development project is obtained. However, this still requires technical support from external organizations for the success of the projects. This concept is well accepted and it has been termed as 'participatory development'.

2. Participation as an end. Participation is viewed as containing goals in itself where the disadvantaged people are empowered by providing them some forms of skills, knowledge and experience. Participation is a tool used to gain more direct involvement from this group of people particularly with regard to self-improvement.

Niran Jongwutiwes (42) mentions three conditions of participation as described below. Without these three conditions, participation does not occur.

1. Freedom to participate
2. Ability to participate
3. Willingness to participate

In addition, the success of participation also depends on the following conditions:

1. The people must have time to participate in activities. Participation is not suitable for emergency situations.

2. The people must not required to pay more for the participation cost than the benefits they expect to get.

3. The people must have interests that are in accordance with the participating activities.

4. The people must be able to communicate well.

5. The people participating must not feel that they put their jobs or social status at risk.

Thawat Benjatikul (43) studied factors affecting participation among hill tribes people in improving their villages in Chiang Mai Province. The characteristics of their participation found in order of high to low magnitude are in the forms of the following: providing labor, material and equipment, taking care and maintenance of village, attending meetings, being a member, persuading neighbor, giving opinions, monitoring and evaluating, collaborating, taking responsible and financial contributing.

WHO (44) describes three models of participation as follows:

1. Volunteered participation involves the situations when many people get together in order to solve their common problems, without expecting help from outsiders.

2. Influenced participation is commonly found in developing countries where people's approval or support is needed by the government.

3. Compulsory participation is usually found in the various project organized by the government where the operators receive instant rewards but not long term rewards.

Additionally, WHO has proposed the most realistic model of participation that must consist of four steps of planning process. These are: analysis of problems, setting priority of the problems, setting strategy for resource utilization and setting methods of monitoring and evaluation. With this model, the people are strongly encouraged to take part in the decision making of all four steps, take part in the

operation of activities, the management of resources and services, and the utilization of the benefits. The people in communities must receive equal portions of the benefits.

Models of participation are divided into the following three categories: Content-based participative model involves the sharing in administration, planning and decision-making, activities, benefits and control and evaluation of activities.

1. Relationship-based participative model involves the participation of the people on the above via the relationship with each other both inside and outside the community. This may include voluntarily participation, induced participation, forced participation or representatively participation.

2. Activity - based participative model involves the participation of the people on the activities which could be competitive, uncompetitive or lengthy activities.

Mochny (45) describes three types of participation in community with the primary health care project by considering the nature of its establishment that requires experience from member countries.

1. Spontaneous participation reflects the willingness of the communities in solving their own problems when supports from government or outside organization are lacking. This model of participation is an ideal model and is rarely find in primary health care works.

2. Sponsored or induced participation is another type of the ‘aided self help’. This type of participation is stimulated by the catalysts which usually are civil servants and their volunteer trainees who participated in other activities.

3. Forced participation is an error of both concept and methods of participation. For example, poor people are forced to participate in the local development program, specified by personal opinion of leaders, which is not beneficial for the poor.

In summary, participation is a mental and emotional involvement of individual or group situations in which the result of the involvement contributes to the success of the group and facilitates the share in responsibility as a group.

For this research, participation in community activities means the cooperation of the people in community activities to prevent and control DHF. These include disseminate DHF information to communities, suggest solution to DHF problem, participate in meetings and campaigns to prevent DHF in communities, participate in the survey and termination of mosquito breeding sources and screening for patients in communities.

2.5 Concepts and theories of behavior, behavior to prevent and control DHF

The differences among human can be identified by their behavioral characteristics which look as though they are easy to understand but actually they are very difficult to study in-depth. Human possess both risk behavior and preventive behavior. Therefore, it is very important to study the basis of human behavior.

Definitions of Behavior

Preeyaporn Wong-anutraroj (46) defines behavior as any activities of a person that can be observed or tested by others including laughing, eating, crying etc.

Bloom (47) describes that human behavior is comprised of three components as follows:

1. Cognitive domain refers to knowledge or thought which are able to change human's behavior,

2. Affective domain refers to the feelings or beliefs of a person towards something or someone, and

3. Psychomotor domain refers to the actions or practices of a human which could be observed by others. Bloom also mentions that accurate knowledge and understanding of the people, as well as the willingness to cooperate are required in order to achieve the desired and sustained health behavior.

In addition, Nipa Manoonpiju (48) mentions there is a relationship between the knowledge and practices of a human. Knowledge leads to the appropriate practice where knowledge and attitude are not necessary related (K⟶P). Another opinion is that the behaviors that occur from knowledge could influence the practices of human

both directly and indirectly. The indirect effects require the attitude as a mediator to motivate the desired practices in humans. The right thinking and beliefs usually result in the appropriate practices.

Steel and Boom (49) define health behavior as any activities that are related to health care in order to prevent and avoid being sick.

The definition of behavior, as mentioned above can be summarized as any activities of a person both observable and unobservable.

Rosenstock (38), interested in studies of the health belief model, has described personal preventive behavior, based on the theories of Kurt Lewin, that perception of people determines their behavior. People are interested in, and practice things that they like and assume that it gives them benefits and they tend to avoid things that they don't like.

Accordingly, there is a relationship between knowledge and behavior. The execution of health behavior requires the components such as knowledge, feeling, and practice. The attitude helps a person to improve the execution of health behavior. The attitude is partly promoted and influenced by the experience and habits of a person as well as the norm and culture.

Health behavior and public health tasks (50)

Health behavior is important for public health tasks due to the following two reasons:

1. Inappropriate behavior leads to health problems for individuals and their families, and public health problems in communities. That is to say, most public health problems are caused by individuals' health behavior.

2. To solve health problems of individuals and families and health problems in communities, behavior of individuals must be changed first. That is to say, appropriate behavior are required in order to solve health problems caused by health behavior. Health behavior may be acquired since early childhood or during adulthood.

Health behavior of individual can be characterized as follows:

1. Promotive behavior includes activities and behavior of a person that promote their own health and their families.

2. Preventive behavior includes activities and behavior of a person that prevent themselves and their families from becoming sick.

3. Ailing behavior includes activities and behavior of a person when being sick or when their family members are sick.

4. Caring behavior includes actions of a person as recommended by doctors or as specified by the treatment guidelines.

5. Participative behavior includes actions in order to prevent or solve health problems in communities.

6. Self-care behavior includes the actions of a person in order to take care of themselves and their families with regards to treatment, prevention and health promotion in accordance with their own abilities.

DHF prevent and control behavior

Harris and Guten (51) define preventive behavior as health protective behavior which refers to any actions of a person that are usual and common and aim directly for good health such as exercising.

Behavior to prevent and control DHF include the practices of the people that help prevent dengue virus from entering the body which could lead to DHF infection, as well as the actions to prevent and control the spreading of mosquitoes and reduce disease infections the area.

For this research, behavior to prevent DHF means the practices of the people in order to prevent themselves and their family members from becoming infected with DHF, as well as to control mosquito breeding habitats.

Personal behavior to prevent and control DHF means the practices of the people in order to prevent themselves and their family members from being bitten by *Aedes* mosquitoes, which may lead to DHF infection, by sleeping under mosquito nets, using mosquito repellants and chemical spray insecticides.

Behavior to control mosquito breeding sources refers to the practices of the people when inspecting the numbers of mosquito larvae and destroy its breeding habitats in their households, which involves three methods as follows:

1. Physical method: keeping household water storage system covered at all time; draining water in vases and other forms of containers and cleaned weekly to

stop larvae from developing to adults; burying or burning cans, coconut shells, barrels, and other containers that may serve as potential larval habitats.

2. Biological method: the introduction of organisms that prey upon mosquito larvae such as larvivorous fish and fighting fish are most frequently employed in concrete cisterns for water storage in toilets, and bathrooms.

3. Chemical control: using insecticide such as temephos with containers that cannot be covered or when unable to use physical or biological methods, or applying vinegar, detergents and salt in ant traps used to protect food storage or flower vases.

Steps involved in mosquito larvae control are as follows.

1. Inspection of mosquito larvae

Inspection of the numbers of mosquito larvae in different seasons enable the determination of types and the number of mosquito breeding sources in different areas that are at risk, which is beneficial for planning the campaigns to control and prevent DHF. In addition, the outcome of vector surveillance is used for the evaluation of DHF control projects at local and national levels by monitoring the prevalence of *Aedes* mosquito in each area. The low level of mosquito prevalence is usually found among the areas that possess effective disease control measures. Otherwise, the pre-epidemic measures to control disease are strongly recommended for the areas with ineffective disease control measures (17). The mosquito larvae inspectors must possess good knowledge of mosquito such as its characteristics, behavior, and ecology, conditions of its breeding habitats, characteristics of its eggs and larvae, adults, and its feeding time. This is important because these factors determine the inspection methods to be used and enable the differentiation between *Aedes* mosquito larvae and other mosquito larvae as well as enabling the identification of adult mosquitoes with the naked eye (17).

2. Methods of mosquito larvae inspection

Inspection should be done in every corner of the house both inside and outside. The number of houses inspected depends on the area and density of the households. Normally, torches are used to shine inside containers for mosquito larvae. If at least one mosquito larva is found, it is assumed that container is a good breeding source for *Aedes* mosquito. However, only containers that retain water are regarded as

breeding sources for mosquito. During the inspection, all kind of containers is counted and all containers must be recorded in the mosquito larvae inspection form. All containers located under the roof, although outside the house, are regarded as inside containers and those that are located outside the roof areas are regarded as outside containers.

Upon completion of the inspection, all record forms are collected and the total number of containers found with mosquito larvae and containers found without mosquito larvae, the number of households inspected, the number of households that mosquito larvae found determine the prevalence index of *Aedes* mosquito larvae (17).

Container Index (CI) or Receptacle Index (RI) is the number of containers infested with *Aedes* mosquito larvae or pupae out of 100 containers inspected.

$$\text{CI or RI} = \frac{\text{number of containers infested with mosquito larvae or pupae x 100}}{\text{The total number of containers inspected}}$$

Household Index (HI) is the number of households infested with *Aedes* mosquito larvae or pupae out of 100 households inspected.

$$\text{HI} = \frac{\text{number of households infested with mosquito larvae or pupae x 100}}{\text{The total number of households inspected}}$$

Measurement of mosquito larvae prevalence

WHO recommends two methods for determining the prevalence of mosquito larvae.

1. Visual larvae survey refers to the random survey of containers in 50 to 100 households in each town or community. This is because 90-98% mosquito larvae found in containers located both inside and outside households are *Aedes aegypti* larvae. The household index and container index are then used as a reference.

2. Adult mosquito survey refers to the method of using a human as bait for a period of time. All mosquito landing are taken and characterized based on its type. The landing rate determined is used as a reference.

Larvae index

Many indexes are used to determine mosquito larvae but only the interesting ones are mentioned here.

1. Container index (CI) demonstrates the percentage of containers infested with *Aedes* mosquito larvae or pupae. Epidemiologically, the container index is not very beneficial for epidemiological tasks because there are more households in which mosquito larvae are found which may lead to the discrepancy of the prediction of infection risk.

2. Household Index (HI) is the percentage of households infested with *Aedes* mosquito larvae or pupae. It is the roughest index used to predict infection risk because it does not involve the number of containers in which mosquito larvae are found in the households. However, it is very useful for epidemiologists and entomologists because it helps predict the risk of DHF infection in each area.

3. Breteau Index (BI) is the number of positive containers per 100 households inspected. It is the best index used to determine the density of mosquito larvae because it involves both the number of households and the containers in which mosquito larvae are found.

4. The Larval Density Index (LDI) is used to determine the average number of mosquito larvae in each household.

5. Stegomyia Index (SI) is used to determine the number of containers in which mosquito larvae are found among the population of 1,000. Epidemiologically it is a good index but it is impractical because some people may be away from home during the survey which may affect the reliability of the index.

For this research, to control mosquito breeding sources refer to the survey of mosquito prevalence and the termination of household mosquito larvae using the CI and HI which are (17):

Household Index (HI) is the percentage of households infested with *Aedes* mosquito larvae or pupae.

$$HI = \frac{\text{number of households infested with mosquito larvae or pupae x 100}}{\text{The total number of households inspected}}$$

Container Index (CI) is the percentage of water-holding containers infested with *Aedes* mosquito larvae or pupae.

$$CI = \frac{\text{number of water-holding containers infested with mosquito larvae or pupae x 100}}{\text{The total number of containers inspected}}$$

Standard index for disease control in 2002 are as follows (17):

HI and CI	0-9	=	good
HI and CI	10-74	=	fair
HI and CI	≥75	=	need improvement

2.6 Concepts of program/project evaluation

Many experts define evaluation as follows:

Rossi (52) defines evaluation as the use of social research methods to judge and improve aspects of planning, monitoring and following up the efficiency and effectiveness of socially related programs.

Herbert (53) defines evaluation as the assessment of the performance of staff by their superiors, involving the observation and actual evaluation of operational outcomes.

Gronlund (54) defines evaluation as a systematic process of collection, analysis and explanation of how individual staff are progressing in reference to original objectives and goals of policies, plans, or projects.

Chambers (55) defines evaluation as the process of characterization, collection, analysis and presentation of the data and information for the consideration of options for carrying out other plans and projects

Nawarat Suwannapong (15) defines evaluation of planned activities as a systematic method of data collection and analysis. By comparing the outcomes with established standards, the value of the program and the alternatives for the improvements can be considered, in order to achieve the objectives of the project more effectively and efficiently.

In summary, evaluation is the systematic process of data collection, analysis and presentation of information in order to judge the value of the program and consider the alternatives for its improvements. By comparing the actual outcomes with the expected ones, the achievement of the original objectives and goals of the program is determined. Evaluation is the methods of identifying the drawbacks of the operation in order to achieve the most efficient and effective operation, which is very essential for all level administrators and operators.

Type of evaluation

Many types of evaluation based on different categories are listed as follows:

1. Evaluation based on the stage of planning is divided into 3 types (56);
    1. Ex-ante or pre-evaluation of planned activities
    2. Operational or ongoing evaluation
    3. Ex-post evaluation of completed activities

2. Evaluation based on time (57) is the intrinsic evaluation of the program prior to the operation in order to study its feasibility (feasibility study or formative evaluation). The evaluation after the operation (pay-off evaluation or summative evaluation) includes both ongoing evaluation and post evaluation.

3. Types of evaluation based on models.
    1. The goal attainment model evaluates outcome only in comparison to objectives.
    2. The system model evaluates the whole process including input, output and its impacts.

In addition, Suchman (57) has divided the evaluation into 7 categories:

1. Need assessment is used to assess problems and needs whether the planned activities will accommodate the needs of groups or communities by considering the importance and scope of the problem. It is usually carried out prior to the operation of the program.

2. Effort evaluations are designed to assess the quality and input including the qualification of personnel, the resources of the program and the duration of both the operation and evaluation process, and decide whether the resources and output are reasonable, using the Program Evaluation Planning Checklist.

3. Process evaluation or program operation evaluations assess how the program really works, and its strengths and weakness.

4. Performance evaluations assess the following 5 components: 1) appropriateness equity, and responsiveness, 2) economic efficiency, 3) effectiveness 4) technical efficiency and 5) adequacy.

5. Continuous monitoring is the evaluation of program's function and its progress.

6. Outcome evaluations assess the extent to which programs are meeting predetermined goals or objectives.

7. Impact evaluations assess the long-term and short-term impacts both positive and negative.

Need assessment and effort evaluations are usually carried out prior to the start of the program. This step is referred to as project appraisal. The process evaluation, performance evaluation and continuous monitoring are carried out during the ongoing operation of the program and outcome evaluation and impact evaluation are carried out after the completion of the program.

Methods of evaluation

There are two methods of evaluation: analytical evaluation and evaluation research

Analytical evaluation is the procedure that analyses the resources and attempts to identify the significant output by applying the concept of research to make the process a lot simpler. It can be carried out at any stage of the program. This evaluation considers whether or not the program is meeting its intended goals and whether or not the program has any drawbacks and how to improve it.

Evaluation research is defined in many ways:

Riceken (58) defines evaluation research as the process of determining both the expected and unexpected outcomes of the ongoing program, in order to pursue the original goals. In addition, evaluation research is a study considering personal opinions, personal records, and impartial information about the outcome. These could be both positive and negative, temporary or permanent, urgent or relaxed, in order to pursue its goals.

Alkin (59) defines evaluation research as related to decision making, data collection, analysis and reporting useful information for decision-makers about the operation and the implementation of knowledge for the administration and operation of program.

Rossi (52) defines evaluation research as the systematically application of the processes of social science research to make decision, to improve program planning and to monitor the efficiency and the effectiveness of plans relating to public health, education, social welfare and other public services.

Models of evaluation research

Several models of evaluation research have been proposed by many people, based on thought, fact, theory, reason, belief, the appropriate circumstances and status of problem. Most common models used for evaluation are (60):

1. The system analysis approach is mainly interested in the expected outcome of program. Models of planned activities and its results must be quantitatively measurable and its cause-effects must be identifiable.

2. The behavioral objective or goal-based approach evaluates the extent to which programs are meeting predetermined goals or objectives. The information obtained is useful for decision-makers and provides options for administrators (52). For example, the CIPP model of evaluation research (Context, Input, Process, Product) has divided decision making into 4 types as follow: 1) decision related to planning or the setting of objectives; 2) decisions on the structure of the program for setting up evaluation process; 3) decisions on the operation, 4) decisions to adjust the outcome of the program (61). The emphasis of this type of evaluation can be divided into four categories: 1) context evaluation, 2) input evaluation, 3) process evaluation and 4) product evaluation.

3. The goal-free approach is the evaluation of all actual effects and the comparison of the importance of those, whether or not they met the intended effects.

4. The art criticism approach is the criticism of research using knowledge, expertise and standards to evaluate the value or merit of arts in each aspect of the studies.

5. The professional review approach is the assessment of the subject by people in the same field to accredit the academic standard. The evaluation of the overall standard includes both oral and written examinations.

6. The quasi-legal approach applies the interrogation system of jurors in court, particularly with the evaluation of important social problems, case investigation, opinion investigation, and unsettled cases due to opposition or objections.

7. The case-study approach is the provision made for audience to have better understanding of the program in all aspects. It is a participation-based study, a study of different contexts of the program under normal conditions, and detailed interviews, including study of the program history and how well it was conducted. These are qualitative studies.

Three types of evaluation, suitable and helpful for the evaluation of public health tasks are (15):

1. The goal-based model evaluates the outcome of the program based only on the predetermined goals and put focus on behavioral objectives, and whether the program achieved their overall, predetermined objectives. This type of evaluation has been developed from the concept of educational evaluation of students' performance proposed by Ralph W. Tyler. With this concept, the behavioral-based objectives are to be set up first, then identify the evaluation tools or methods for to evaluate the performance of students. These concepts and methods were adapted and widely used in both government and business sectors because the concept of management by objectives was commonly accepted at that time.

2. The goal-free model was developed to address the limitations of the goal-based model, that is, the possibility that evaluators overlook other components and impacts of the program if only the predetermined goals are considered. This evaluation model requires the freedom for setting up objectives of the program which are to be evaluated independently. It also reduces the bias of evaluators who only want to evaluate the predetermined objectives. Therefore a new set of objectives is set up as the frame of reference for the evaluation of the program.

3. The decision making model evaluates the outcome of the program in order to make the overall decision whether to improve or to continue the program (for the operation or ongoing evaluation) and/or whether or not to disseminate the program to other sites (for the ex-post evaluation of completed activities). The important information such as the program outcome and its effects, and the implementation requirements, are required for the decision to approve the continue funding of the program and/or to adjust the funding. Many types of this model have been developed such as 1. CIPP Model, 2) Center for the Study of Evaluation Model, CSE Model, 3) the Discrepancy Model.

There are two models suitable for evaluation of top and mid-level plans; system analysis model and accreditation model.

1. The system analysis model is the model that Alice M. Rivlin adapted from the evaluation system of the Army which emphasizes the utilization of information quantitatively to analyze and compare the relation between inputs and outputs. The success of public health tasks is also depending on the administration and service systems (57), which are related as shown in figure 5 (15).

2. The accreditation model focuses on professional review, which is suitable for professions such as medicine and engineering. As they get together and form a central organization, they evaluate each other, criticize, and provide suggestions for improvement at some stages of program and keep monitoring from time to time until the desired outcome is achieved. This will lead to accreditation and acceptance of future operations. This type of evaluation is mostly carried out by central organization to build standards, rather than to evaluate a program at the operational level.

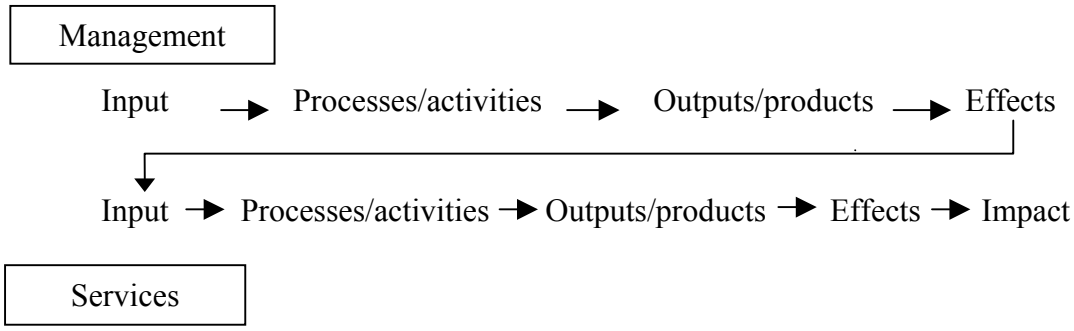

Figure 5 The relationship between management and services

Source : Nawarat Suwannapong and Chaweewan Boonshuya (15).

This research is a goal-based evaluation and system analysis. It evaluates the 2002 DHF prevention and control program in Nakhonnayok Province by evaluating knowledge, perception, preventive behavior to control mosquito breeding sources, and participation of the people in communities in comparison to the project indicators by determining their associations with DHF infection.

2.7 Related research

Knowledge

Choo-anong Arsarath (62) studied DHF related health behavior among the primary school students in region 9 and found that their knowledge of DHF as well as their practices to prevent and control DHF were at the average levels.

Nuanla-or Wiwatworapan (63) evaluated the DHF prevention and control project in primary schools in the Muang district of Nakhon Ratchasima Province. The study sample was 210 teachers who taught year 3 to year 6 from 11 schools and 1,100 students of year 3 to year 6 from the same schools. The knowledge, attitude and practices to prevent and control DHF were evaluated. The result showed that four schools had fully completed the project in accordance with the specified guidelines and the majority of students have a moderately good knowledge of DHF.

Manee Sookprasert (64) studied factors affecting the readiness of health education teachers for the DHF prevention and control and DHF knowledge among school students in primary schools in Pathumthani Province. The study involved 172 health education teachers and 450 students from years 4 – 6. The results showed that 68.6% of health education teachers were reasonably ready for the DHF prevention and control in primary schools and 60.2% of students had a fairly good level of knowledge about DHF, and particularly very good among year 6 students.

Arpaporn Krisanapan (65) studied the operation to prevent and control DHF at tambon level in Uthai thani Province. The study involved 88 tambon health officers who were responsible for DHF prevention and control. It was found that knowledge of health officers was not related to their operations.

Perception

Wannapa Yannaroj (66) studied factors affecting DHF infection in Chiang Mai Province by comparison between a district that has the highest infection rate and one that has the lowest infection rate, with a sample size of 220 households for the first group and 320 households for the later group. The study also involved the observation of environmental conditions and the prevalence of mosquito larvae in every household. The results showed that the perception of the severity of DHF and the perception of the benefits of following advices of health officers were significantly different in the community with the highest infection rate and one with the lowest infection rate ($p<0.05$ and $p< 0.001$).

Narit Singsatitaya (67) studied the development of behavior to prevent and control DHF among a group of housewives in the Lei Province. The study involved 125 housewives, 65 in an experimental group and 63 in the control group. The results showed that the perception of susceptibility, the severity of DHF and the benefits of following advice to prevent and control DHF were significantly related to their behavior to prevent and control DHF ($p<0.05$).

Supatra Sombut (68) studied the effectiveness of the application of motivation theory in disease prevention in combination with behavior to prevent and control DHF among village health volunteers, Tambon Kut-Ngong, Panatnikom District, Chonburi Province. This experimental study involved 42 village health volunteers and 155 villagers. The results showed that the perception of susceptibility and the severity of DHF after the experiment were significantly better ($p=0.001$). The expectation of the effectiveness of the behavior to prevent DHF after the experiment was significantly higher ($p=0.05$). Behavior to prevent DHF after the experiment was found in a significantly higher number of the people ($p=0.05$).

Manoo Trungpetch (69) studied the effectiveness of health education programs by applying motivation theory in combination with social support in order to prevent DHF in year 5 students in Nakhon Srithammarat Province. The study involved 91 students, 43 in an experimental group and 48 in the control group. The results showed that, perception of severity, susceptibility of infection, ability to prevent DHF at home and at school of the experimental group, after the experiment, were better than before the experiment and significantly better than the control group ($p<0.05$).

Participation

Panwadee Arwaeni (70) studied the effectiveness of health education and participation in DHF prevention and control in primary schools, Yarang District, Pattani Province. This was a quasi-experimental study and involved 177 students from year 4-6. The results showed that health education affected the perception of students and has caused the reduction in the container index in schools (CI<10). When comparing the differences of the average scores for general and specific perception, before and after the experiment, the scores were significantly different ($p<0.05$).

Nathaporn Meesuk (71) studied the participation of the communities in controlling the mosquito larvae in Muang District of Chonburi Province. This was a quasi-experimental study and involved 202 representatives of families, 108 were in the experimental group, who were given activity assignment lasted for 8 weeks and 94 were in the control group. The results showed that, after the experiment, the experimental group had better knowledge, perception of susceptibility, severity of DHF and the benefits of mosquito larvae control, and significantly better than those in the control group ($p<0.05$). After the experiment, the HI, CI and BI in the household of the experimental group decreased drastically and significantly lower than that of those of the control group. Thus it can be said that the organizing of health education program by applying the community participation lead to the improvement of behavior to control mosquito larvae in households.

Behavior

Samrong Kunnawut (72) studied DHF prevention by the changing of behavior in primary school students, Sawangha District, Angthong Province. The objective of this study was to determine the effectiveness of the health education program when introducing it to school students. The study involved 120 primary school students, 60 were in the experimental group, who were given activity assignment lasted for 5 weeks and another 60 were in the control group. The results showed that after the experiment, the experimental group had better perception of severity and susceptibility of DHF infection and better DHF preventive behavior than before the experiment, and significantly better than those in the control group ($p<0.05$). In

addition, the perception of severity and susceptibility were significantly related to DHF preventive behavior, HI, CI and BI of the experimental group.

Siwara Tiarawiboon (73) studied the application of motivation theory in disease control, in combination with social support in order to improve DHF preventive behavior of a housewives group in Muang District of Pathumthani Province. This was a quasi- experimental study and involved 120 housewives who had children younger than 14 years, 57 were in the experimental group, who were given activity assignment lasted for 9 weeks, and 63 were in the control group. The results showed that, after the experiment, the experimental group had better perception of severity, susceptibility of DHF infection, intention to have preventive behavior, and better DHF preventive behavior than before the experiment, and significantly better than those in the control group ($p<0.05$). In addition, the perception of susceptibility was not related to the intention to have preventive behavior while perception of severity was. Thus, it can be said that the introduction of health education program, by applying motivation theory in combination with the social supports, was effective and able to change preventive behaviors.

Sri-Amporn Mekmork (74) studied factors affecting DHF preventive and control behavior in students in Burirum Province. This was a cross sectional study an involved 350 year 5 students of schools under the administration of Plabplachai Primary Education Office. The results showed that, their knowledge, attitude, up bringing, education, advises and information received from health officers were directly related to DHF preventive and control behavior at the significant level $p <0.05$. Up bringing, resources available, knowledge and information received were able to explain the variation of DHF preventive behavior at 17.5%.

Chalat Klin-ubon (75) studied factors affecting DHF preventive behavior of primary school students in Petchaburi Province. This study involved 400 year 6 students of schools under the administration of Petchaburi Primary Education Office. It was found that DHF preventive behavior of students was reasonably good. Three factors affected their preventive behavior were stimulation and reminders from teachers, information about DHF, and knowledge of DHF, which were directly related to DHF preventive behavior and were able to predict the preventive behavior for 20.4%.

Control of mosquito breeding sources

Wipa Limkamsuk (76) studied the appropriate technology for DHF prevention and control. This study involved 720 people, 360 in the patient group and 360 in the control group. It was found that at least two technologies were required in combination with the control of household environmental conditions, in order to be able to prevent DHF effectively.

Rungtiwa Sudsiri (77) studied development of school health promotion materials in order to prevent and control DHF for primary school students in Nakhonnayok Province. This study involved 66 year 4-6 students and 53 parents. It was found that, after the completion of various activities specified which were components of health promoting schools, the CI, HI and BI, both at home and schools, were lowered.

Based on the above literature review, most of the DHF related research were studied in the aspect of the competency evaluation of health officers in prevent and control DHF. Too little interest is placed on the evaluation of the program to prevent and control DHF at the provincial level. Thus this research involves evaluation of the 2002 DHF prevention and control program in Nakhonnayok Province. This provincial level evaluation uses the indicators of the program to assess whether its performance was successful. In addition, the operations of district level officers responsible for DHF prevention and control are also evaluated.

CHAPTER 3
MATERIALS AND METHODS

The research entitled "Evaluation of DHF prevention and control program of Nakhonnayok Province" comprises study design, population and samples, research instruments, data collection, data analysis, and research ethics. The details are described as follows.

3.1 Study design

This cross-sectional evaluation research aimed to evaluate the 2002 dengue haemorrhagic fever prevention and control program of Nakhonnayok Province.

3.2 Study population and samples

The people who live in Nakhonnayok Province and the tambon health officers who work in the health centers of Nakhonnayok Province were the research population for this study.

The household heads who lived in Nakhonnayok Province from April to September 2002 and the tambon health officers who worked in health center in the fiscal year 2002 and were responsible for DHF prevention and control in villages where data collection took place comprise the research sample for this study.

The sample size for this research was set at the 95% confidence interval where acceptable error is not greater than 5% and the design effect is not greater than 2. The sample size is determined by using the formula below.

$$n_{cls} = \frac{Z^2_{\alpha/2} p(1-p)}{d^2} \times Deff$$

$$n_f = \frac{n_{cls}}{1 + n_{cls}/N}$$

Where

n_{cls} = the number of household used for cluster sampling

$z\alpha/2$ = standard value under the normal distribution curve at the CI 95% which is equal to 1.96

P = DHF preventive behavior in Nakhonnayok Province is 72.55% (85)

1-p = 1-0.725 = 0.275

d = acceptable level of error which is 0.05

Deff = Design effect is 2

n_f = the number of household obtained from sampling

N = the population of Nakhonnayok Province is 205,274 people

Using the above formula with these values the sample size for this research was at least 611 household.

3.3 Methods of sampling

There are two stages involved with cluster sampling, probability of selection is proportional to cluster size and involves 40 clusters.

Step 1: Selection of sample village

1. List the name of all villages in Nakhonnayok Province and its population by giving each village a number. There are 406 villages in Nakhonnayok Province.

2. Determine the total population of village 1 to 406, which is the total population of the province.

3. Set the number of villages to be sampled (40 clusters for this research) in order to determine the sampling interval (I).

$$I = \frac{\text{population size}}{\text{no. of villages samples}} = \frac{205,274}{40} = 5,132$$

4. Select random start number (S) by drawing (S = 4,015)

5. Determine cluster of villages by adding I to the number in the previous cluster or S, S+I, S+2I, S+3I, ... S+39I which is 4,015, 9,147, 14,279, ..., 204,163. Clusters and villages selected are shown in table 1.

Table 1 Villages selected as samples for this study categorized according to its health Centers, Sub-districts and Districts

No	Cluster	Village name	Tambon	Health center	District
1	1	Kiriwan	Srinava	Srinava	Muang
2	2	Korkrashai	Kaopra	Kaoturien	Muang
3	10	Pakchong	Koapra	Pakchong	Muang
4	3	Sarika	Sarika	Chalermprakiat	Muang
5	11	Kaodaeng	Sarika	Chalermprakiat	Muang
6	2	Kaonoi	Prommanee	Tormaidaeng	Muang
7	7	Wangton	Prommanee	Pakkratoom	Muang
8	14	Thebpratan	Prommanee	Wangplajued	Muang
9	2	Bhotaram	Thasai	Thasai	Muang
10	6	Wangyaichim	Hintang	Wangyaichim	Muang
11	1	Tha-koi	Banyai	Banyai	Muang
12	11	Bangprang	Srichula	Bangprang	Muang
13	7	Klong 3	Donyor	Chuadbua	Muang
14	5	Bangpanied	Thachang	Jedithong	Muang
15	6	Nong-ai klom	Wangkrajom	Klongmuang	Muang
16	2	Khumkao	Nongsaeng	Nonghualingnai	Pakplee
17	6	Pailom	Pakplee	Pailom	Pakplee
18	4	Dongkha	Korbho	Dongkha	Pakplee
19	1	Korwai	Korwai	Banmai	Pakplee

Table 1 Villages selected as samples for this study categorized according to its health Centers, Sub-districts and Districts (cont.)

No	Cluster	Village name	Tambon	Health center	District
20	8	Saraboat	Arsa	Pai-kwaung	Banna
21	1	Pikunkaew	Pikun-ork	Laemmaiyoi	Banna
22	2	Klongpaknam	Pakha	Krangpratuwang	Banna
23	10	Tonkabok	Pakha	Krangpratuwang	Banna
24	9	Banpraw	Banpraw	Nong-ri	Banna
25	6	Klong 30	Thonglang	Klong 30	Banna
26	1	Talad siyaek	Thonglang	Thonglang	Banna
27	1	Kaoperm	Kaoperm	Kaoperm	Banna
28	5	Nongjik	Banprig	Banprig	Banna
29	11	Klong 33	Banprig	Nongkanjarm	Banna
30	5	Nongkankrao	Srikra-arng	Lawa	Banna
31	2	Watratchapradit	Srisakrabue	Klong 24	Ongkarak
32	11	Sawang Arom	Srisakrabue	Klong 24	Ongkarak
33	5	Ban lang	Bangplakod	Banbon	Ongkarak
34	6	Klong 14 Padwa	Buesarn	Banladchang	Ongkarak
35	6	Pakbeungpai	Chumpon	Tamnob	Ongkarak
36	9	Klong-orm	Saimoon	Bangnanglek	Ongkarak
37	9	Mahawong	Bhotan	Khmerphangtai	Ongkarak
38	1	Pakklongpraarjarn	Bangsomboon	Bangsomboon	Ongkarak
39	5	Klongyai	Klongyai	Klongyai	Ongkarak
40	6	Banglooksue	Banglooksue	Bannai	Ongkarak

Step 2: Sampling of households

1. List all selected villages from step 1 in the order of its clusters, from 1 to 40.
2. Divide the number of households constituting the sample (611 households) by the number of cluster (40 clusters). Then the number of households which are representatives of selected villages are determined, which are 16 households from each village and the total 640 households.

Sampling of households

1. List all households in each village in order of the household numbers.
2. Set the number of households to be sampled to 16, in order to determine the sampling interval (I).

$$I = \frac{\text{Total number of households in a village}}{\text{Number of households to be sampled}}$$

3. Select start number (S) by a random draw.
4. Determine the selected households by adding I to the previous household number or S, S+I, S+2I, S+3I, ... S+15I. The selected households are then identified.

In the case where there is no household head or an interview with the selected households is not possible, the nearest household is selected for the interview.

Inclusion criteria

1. The household heads who lived in Nakhonnayok Province from April to September 2002 and capable of discussion and communication in Thai and willing to participate.
2. The tambon health personnel who worked in health center in the fiscal year 2002, responsible for DHF prevention and control in villages where data collection took place. These included 37 tambon health officers.

Exclusion criteria

1. The household heads who could not communicate in Thai or had any disabilities which would be barriers in communication.
2. The tambon health personnel who took leaves with any reason e.g. continue education, deliver a baby.

3.4 Research instrument

1. The questionnaire is used for data collection from household heads. This form consisted of four parts.

Part 1: Twenty items regarding the knowledge of DHF with true or false answers.

Part 2: Twenty items regarding the perception of DHF, having a 1 to 5 rating scale answers to which were applied from the methods by Likert. These are: strongly agree, agree, uncertain, disagree and strongly disagree. These 20 items are divided into 4 different categories as follows:

Susceptibility:	Question 1-5
Severity:	Question 6-10
Benefits of prevention:	Question 11, 13, 14, 15, 16 and 18
Barriers of prevention:	Question 12, 14, 17, 19 and 20

Part 3: Ten items regarding the participation in community activities in DHF prevention with 3 choices of answer; perform regularly, occasionally and never perform.

Part 4: Nine items regarding the behavior to prevent DHF have 3 choices of answer; regularly, occasionally, and never.

2. The questionnaire is used for data collection from tambon health officers. It consists of 3 parts, and was created in accordance with the performance guidelines for DHF surveillance, prevention and control by the Department of Communicable Diseases, Ministry of Public Health.

Part 1: Questionnaire consisted of 8 open-ended items regarding general information such as gender, age, marital status, education level, current position, length of service in current position, and length of service at the health center.

Part 2: Questionnaire consisted of 25 items regarding operations to prevent and control DHF with 3 choices of answer: regularly, occasionally, and never.

Part 3: Questionnaire consisted of 2 open-ended items regarding the outcomes of DHF control and prevention.

3. The instrument used for data collection when inspecting mosquito breeding sources is the household mosquito larvae inspection form which describes the household index and container index.

Household Index (HI) is the percentage of households infested with *Aedes* mosquito larvae or pupae.

$$HI = \frac{\text{Number of households infested with mosquito larvae or pupae x 100}}{\text{The total number of households inspected}}$$

Container Index (CI) is the percentage of water-holding containers infested with *Aedes* mosquito larvae or pupae.

$$CI = \frac{\text{Number of containers infested with mosquito larvae or pupae x 100}}{\text{The total number of containers inspected}}$$

3.5 Validity and Reliability

1. Content validity: the questionnaires were examined by the supervisors for the clarity of language and the target population.

2. Reliability: The amended and approved the questionnaires were then used as a trial with a sample group similar to the population to be studied, 30 household heads and 30 tambon health officers in Prachinburi Province. The instruments were then tested for reliability using Cronbach's Alpha Coefficient. The reliabilities of the instruments to evaluate the knowledge and perception of DHF, participation in preventing DHF and the program to control and prevent DHF were 0.76, 0.75, 0.94 and 0.87 respectively.

3.6 Data collection

1. Interviews of household heads or representation by them involved the following steps:

1.1 All villages that were the samples for this research were listed.

1.2 A meeting with research assistants (health officers of Nakhonnayok Province) was organized to discuss objectives and details involved with the interviews and for research assistants to practice interviewing.

1.3 A total of 640 sets of the interview form were sent to research assistants. Each set of the questionnaires was numbered. Each assistant was only given a certain number of forms, the same as the number of households they were to interview. The data collection interview took place from 1st to 30th June 2003.

1.4 Completed forms were collected from research assistants (all must be collected).

1.5 Before data analysis the forms were examined for completeness.

2. Data collection from tambon health officers. Research assistants gave the questionnaires to health officers who were responsible for DHF prevention and control measures in the previously selected areas.

3. Mosquito larvae breeding sources where inspected by research assistants at the households of the previously selected households.

3.7 Data analysis

1. Criteria for scoring

1.1 Interview of household heads

1.1.1 Score for the knowledge of DHF: One score is given for correct answer and 0 score for incorrect or unanswered question. The full score is 20 and the lowest score is 0. The total score are categorized and compared to the guideline given by the province (8) at 80% as follows:

80-100% (16-20 scores) means Good level of knowledge

60-79% (12-15 scores) means Moderate level of knowledge

<60% (0-11 scores) means Need for improvement

1.1.2 Score for the perception of DHF which cover susceptibility, severity and benefits and barriers of prevention:

	Positive question (score)	Negative question (score)
Strongly agree	5	1
Agree	4	2
Uncertain	3	3
Disagree	4	2
Strongly disagree	5	1

Nine positive questions are: question 3, 6, 7, 8, 11, 12, 13, 16, and 17

Eleven negative questions are: question 1, 2, 4, 5, 9, 10, 14, 15, 18, 19 and 20

The total score is categorized as overall perception and specific perception and compared to the guideline given by the province (8) .

For the overall perception and each aspect i.e. perceived susceptibility, perceived severity, perceived benefit, and perceived barriers, the scores were classified into 3 levels as follows :

70-100% were at Good level

50-69% were at Moderate level

<50% were at Need for improvement

1.1.3 Score for participation in community activities on DHF prevention and control (10 items)

Answer	Score
Regularly	2
Occasionally	1
Never	0

The total score is categorized and compared to the guideline of the province (8) at 60% as follows:

60-100% means Good level of participation

50-59% means Moderate level of participation

<50% means Need for improvement

1.1.4 Score for behavior to prevent DHF (9 items)

Behavior	Score
Regularly	2
Occasionally	1
Never	0

Grouping of behaviors to prevent DHF is based on the practice of 9 activities.

Good preventive behavior means a person practices all 9 activities

Need for improvement means a person practices 1-8 activities

1.2 Questionnaires for tambon health officers regarding their performance to prevent and control DHF:

Answer	Score
Regularly	2
Occasionally	1
Never	0

The full score is 50 and the lowest score is 0. The total score is categorized based on the guideline of the Office of the Permanent Secretary of the Ministry of Public Health for performance of health officers, at 80% of 25 questions as follows:

80–100% means Good level of performance

60–79% means Moderate level of performance

<60% means Need for improvement

1.3 Inspection form for mosquito breeding sources in which the standard index for disease control in 2002 are as follows (17):

HI and CI 0-9 = good

HI and CI 10-74 = fair

HI and CI ≥75 = need for improvement

2. Statistics

2.1 Descriptive statistics including frequency, percentage, mean, and standard deviation were used to explain knowledge of DHF, perception of DHF, participation and behavior to prevent DHF.

2.2 Inferential statistic was used to determine the relationship between knowledge, perception, participation, and behavior. Chi-square and stepwise multiple linear regression analysis were used to determine variables that are affecting the preventive behaviors of household heads

2.3 The significant level was set at $\alpha = 0.05$

3.8 Ethical considerations

This research was performed in accordance with international ethical guidelines, which include the following:

1. Respect for person: The investigator respected decisions made by the people of Nakhonnayok Province who participated in the study. The interviews were conducted with their written consent.

2. Benefits or susceptibility: This research did not employ harmful chemicals. Personal information of the interviewees such as names and address were not recorded and remained confidential.

3. Justice: All interviewees were treated with respect and were provided with correct information after the completion of the interviews.

This research follows the ethical clearance requirements, which involved the following:

1. Approval from Mahidol university ethical committee to conduct this research.

2. Approval of the Provincial Chief Medical Officer (PCMO) of Nakhonnayok Province for data collection.

3. Respondents were informed of the purposes of this research and had right to refuse or cancel their participation both during the survey period and the interview. Written consent was gained from all participated subjects.

4. Information provided by the study participants during the interviews was kept confidential.

5. Research outcomes would be presented in a general format and with no prejudice. Thus it would not affect the employment status of any individual.

6. Research results would be used to improve public health tasks and services in the future only.

CHAPTER 4
RESULTS

This research evaluates the 2002 DHF prevention and control program of Nakhonnayok Province. Data collection took place from 1st – 30th June 2003 and involved 640 household heads and 37 tambon health officers who worked in health centers during the 2002 fiscal year, and were responsible for DHF prevention and control in the villages where data collection took place. The instruments used for data collection from both groups of samples were questionnaires.

The evaluation results are presented as the following:

Evaluation of the activities of household heads in prevention and control of DHF comprise 6 measurements:

4.1 General characteristics of household heads

4.2 Knowledge of DHF

4.3 Perception of DHF

4.4 Participation in community activities to prevent and control of DHF

4.5 DHF preventive behaviors

4.6 The performance to prevent and control DHF of tambon health officers comprise of 3 measurements:

4.6.1 General characteristics of tambon health officers

4.6.2 Performance in prevention and control DHF

4.6.3 Outcomes of performance in prevention and control DHF

Evaluation of the activities of household heads in prevention and control of DHF

4.1 General characteristics of household heads

The majority of household heads or their representatives were female (61.3%) aged between 15 years to 85 years or 47.44 years on average, and 28.9% aged older than 55 years. The education level of most of the household heads (62.7%) was a

primary school certificate, 32.7% were farmers, 79.2% had a family size of 1-5 people or 4 people on average. Amongst these, 6 people (0.9%) were infected by DHF and had been treated and were recovering; 4 were infected in August and 2 were infected in September. Details are shown in Table 2.

Table 2 General characteristics of household heads

Characteristics	Number	Percentage
Total sample	640	100.0
Sex		
Male	248	38.8
Female	392	61.3
Age (years)		
15 – 24	33	5.2
25 – 34	77	12.0
35 – 44	175	27.3
45 – 54	170	26.6
> 55	185	28.9
Mean $\pm$ Standard deviation	47.44 $\pm$ 14.36	
Range	15 – 85	
Education		
No education	51	8.0
Primary school level	401	62.7
Secondary school level	137	21.4
Diploma	22	3.4
Bachelor' degree or equivalence	27	4.2
Higher than bachelor degree	2	0.3
Occupation		
Unemployed	45	7.0
Student	18	2.8
Housewife	88	13.8
Laborer	189	29.5

Table 2 General characteristics of household heads (cont.)

Characteristics	Number	Percentage
Occupation		
Farmers	209	32.7
Merchant	66	10.3
Civil servant/Employee of government enterprises	25	3.9
Number of family members	507	79.2
1 – 5	507	79.2
6 – 10	130	20.3
11 – 15	3	0.5
Mean ± Standard deviation	4.29 ± 1.83	
Range	1 – 15	
Number of dengue haemorrhgic fever patient found in the household (person)		
No	634	99.1
Treated and recovering	6	0.9
August 2545	4	0.6
September 2545	2	0.3

4.2 Knowledge of DHF

Knowledge of DHF amongst the majority of household heads (53%) was at the moderate level followed by 25% at a good level and 22% needed for improvement. Details are shown in Table 3.

Table 3 Levels of knowledge of DHF amongst household heads (n= 640)

Knowledge Level	Number	Percentage
Good	160	25.0
Moderate	339	53.0
Need for Improvement	141	22.0

When considering knowledge about DHF of household heads judged from each question asked, 99.1% felt that when DHF patients were found in the village, mosquito breeding sources around houses should destroyed, followed by 97.2% felt that *Aedes aegypti* mosquito can be controlled by destroying mosquito larvae in water retaining containers weekly, and 95.6% correctly identified that DHF symptoms of high fever and dejected need immediate hospitalization. However, only 6.6% determined that symptoms of high fever and vomiting require hospitalization, followed by 27.7% for the symptoms of cold extremities, and only 31.4% correctly answered the question regarding adult mosquitoes control via insecticide fogging. Details are shown in Table 4.

Table 4 Knowledge of DHF of household heads by items (n= 640)

Knowledge	Correct Answer	
	Number	Percentage
Mosquitoes that cause DHF like to feed during the night.*	523	81.7
Mosquitoes that cause DHF like to rest inside the house where there is bright light and good air flow.*	440	68.8
The symptoms of high temperature, headache, dispirited demeanor and bleeding on the skin and subcutaneous tissue on arms, legs and other parts of the body could be symptoms of DHF.	594	92.8
Symptoms of suspected DHF that may need immediate hospitalization include the following:		
High temperature and vomiting*	42	6.6
High fever and a dispirited demeanor	612	95.6
High fever and restlessness	530	82.8
No fever but cold skin, particularly the feet	177	27.7
A person having fever and suspected of DHF should be given medicine to reduce fever immediately.*	439	68.6
DHF occurs in the rainy season only.*	377	58.9
DHF prevention includes sleeping under a mosquito net during the day.	555	86.7

* nagative statement

Table 4 Knowledge of DHF of household heads by items (cont.)

Knowledge	Correct Answer	
	Number	Percentage
DHF can be prevented by a vaccine.*	452	70.6
The best way to prevent DHF is to spray thermal fog to kill adult mosquito.*	201	31.4
Aedes aegypti mosquitoes like to lay eggs in polluted water.*	350	54.7
Killing mosquito larvae weekly in water retaining containers help control mosquitoes.	622	97.2
Vinegar and detergent can kill the mosquito larvae in the ant traps used to protect food storage cabinets.	593	92.7
If DHF patient is found in the village, the following should be done:		
Destroy mosquito breeding sources around the house	634	99.1
Prevent mosquito bites by using mosquito repellants	536	83.3
Confirm dengue infection by blood test after being bitten by mosquito	247	38.6
There is no need to do anything if the DHF patient's house is far away	441	68.9
Abate granules should be applied to the polluted water because that is the mosquito breeding ground.	274	42.8

* nagative statement

4.3 Perception of DHF

Overall perception of DHF was at the average level for 51.7% household heads while 48.3% had a good level of perception. When considering perception of specific aspect of DHF, 82.8% had good perception of the severity of DHF, followed by susceptibility of infection (66.7%), barriers and benefits of DHF prevention (32.8% and 32.7%). Details are shown in Table 5.

Table 5 Perception of DHF among household heads by levels of perception (n=640)

Perception of DHF	Percentage of Perception levels		
	Good	Moderate	Need for Improvement
Overall perception of DHF	48.3	51.7	0
Susceptibility	66.7	31.6	1.7
Severity	82.8	17.0	0.2
Benefits of prevention	32.8	66.7	0.5
Barriers of prevention	32.7	66.4	0.9

Perception of susceptibility: With the positive questions, 23% agreed and 65.6% mostly agreed that it was possible for children who were bitten by mosquito during the day to be infected with DHF. With the negative question, 48.9% disagreed and 20.8% strongly disagreed that DHF only occur in children.

Perception of severity of disease: With the positive questions, 63.1% and 30.9% agreed and strongly agreed that children with dengue shock syndrome may die if did not receive immediate treatment, followed by 62.8% and 27.8% agreed and strongly agreed that DHF was curable. With the negative questions, 48.3% and 10.9% disagreed and strongly disagreed with the statement that a healthy person would never be infected with dengue virus.

Perception of benefits of DHF prevention: With the positive questions, 65.6% and 16.7%, agreed and strongly agreed that Abate granules were not health hazard, followed by 60.8% and 34.2% of household heads agreed and strongly agreed that weekly inspection and termination of mosquito breeding sources helped prevent DHF. With the negative questions, 9.7% and 3.0% disagreed and strongly disagreed that the termination of mosquito larvae in the village should be led by health officers while 3.1% and 1.6% disagreed and strongly disagreed that dejected children with high fever should be observed for 1-2 days before seeing doctors.

Perception of barriers of DHF prevention: With the positive questions, 65.5% and 27%, agreed and strongly agreed that termination of mosquito breeding sources around the house was easy, followed by 69.8% and 20.2% agreed and strongly agreed that termination of mosquito breeding sources by using Abate granules was easy and effective. With the negative questions, 43.9% and 12.5% disagreed and strongly disagreed that draining water from uncovered containers weekly was a waste of time, while 12.7% and 0.9% disagreed and strongly disagreed that the cost of DHF treatment affected family budgets. Details are shown in Table 6.

Table 6 Perception of DHF among household heads by items (n=640)

Perception of DHF	Percentage of Perception				
	Strongly agree	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
Susceptibility					
All types of mosquito can transmit DHF.*	4.5	16.1	16.7	41.9	20.8
DHF only occurs in young children because adults are immune to it.*	1.7	14.8	13.8	48.9	20.8
It is possible for young children who are bitten by mosquito during the day to be infected by DHF.	23.0	65.6	8.8	2.0	0.6
It is only the male mosquito that likes to bite and feed on human blood.*	2.5	18.4	34.7	29.7	14.7
It is possible for young children who are bitten by mosquito during the day to be infected by DHF.	23.0	65.6	8.8	2.0	0.6

* nagative statement

Table 6 Perception of DHF among household heads by items (n=640) (cont.)

Perception of DHF	Percentage of Perception				
	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
It is only the male mosquito that likes to bite and feed on human blood.*	2.5	18.4	34.7	29.7	14.7
Infection in humans produces life-long immunity against re-infection.*	3.9	24.4	25.6	32.7	13.4
Severity					
DHF is curable.	27.8	62.8	6.4	2.0	0.9
DHF may lead to death if a prompt and accurate treatment is not given.	42.5	51.7	3.4	0.9	1.4
Children infected with DHF may die of shock if not treated promptly.	30.9	63.1	5.3	0.5	0.2
A healthy person will not be infected by DHF.*	3.6	18.9	18.3	48.3	10.9
High temperature that suddenly drops within 24 hours in DHF patient is a sign of recovery. There is no need to go to hospital.*	3.9	27.5	16.7	38.6	13.3
Benefits of prevention					
Weekly inspection and eliminating of mosquito larvae breeding sources helps prevent DHF.	34.2	60.8	3.4	1.3	0.3

* nagative statement

Table 6 Perception of DHF among household heads by items (cont.)

Perception of DHF	Percentage of Perception				
	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
Eliminating of mosquito breeding sources around houses is a simple thing to do.	10.0	60.3	18.4	10.9	0.3
Using mosquito repellant during the day is one of the methods used to prevent DHF.*	30.0	59.8	5.5	3.1	1.6
The cost of treatment of DHF is very high.	16.7	65.6	11.3	5.8	0.4
Observe the symptoms of fever, hot skin and unusually dispirited in young children in the household for a few days before taking them to see doctors.*	19.5	63.3	4.5	9.7	3.0
Barriers of prevention					
Abate granules applied in water to kill mosquito larvae does not cause any harm to human health.	27.0	65.5	6.6	0.6	0.3
Eliminating of mosquito larvae by using Abate granules is simple and effective.*	17.8	57.0	11.6	12.7	0.9

* nagative statement

Table 6 Perception of DHF among household heads by items (cont.)

Perception of DHF	Percentage of Perception				
	Strongly agree	Agree	Uncertain	Disagree	Strongly Disagree
Health officers should take the leading role in controlling mosquito to larvae in the village.	20.2	69.8	7.7	2.2	0.2
Weekly drain and clean of any forms of uncovered containers is a waste of time.*	4.7	31.3	7.7	43.9	12.5
Spraying of thermal fog to kill mosquito is to be performed by health officers only. It is not possible for the people in villages to do that themselves.*	18.4	51.6	7.5	18.1	4.4

* nagative statement

4.4 Participation in community activities to prevent and control DHF

Most of the household heads (58.6%) need to improve their participation in community activities while 28% were doing reasonably good and 13.4% were average. Details are shown in Table 7.

Table 7 Level of participation in community activities to prevent and control DHF (n = 640)

Level of participation	Number	Percentage
Good	179	28.0
Moderate	86	13.4
Need for Improvement	375	58.6

When considering participation in each activity it was found that most household heads (30.3%) participated regularly with the dissemination of DHF related information, followed by 29.7% recommended neighbors who have symptoms of high fever, headache, and bleeding in skin to seek treatment at hospitals or health centers, while 29.2% participated in the inspection and termination of mosquito breeding sources and mosquito larvae in the villages. Only 6.7% of household heads participated with the insecticide fogging during the campaign or when DHF patient was found. Details are shown in Table 8.

Table 8 Participation of household heads in community in DHF prevention based by items (n = 640)

Topics	Percentage of participation		
	Always	Sometime	Never
Tell neighbors about the danger of DHF.	20.9	59.7	19.4
Introduce methods to kill mosquito larvae to your neighbors.	27.0	53.0	20.0
Attend the village meeting to establish DHF prevention and control program.	19.4	45.9	34.7
Assist in the spraying of thermal fog during the campaign or when DHF patients are found in the village.	6.7	29.2	64.1
Participate in the activities, organized in villages or communities, to prevent and control DHF.	18.6	60.6	20.8

Table 8 Participation of household heads in community in DHF prevention based by items (n = 640) (cont.)

Topics	Percentage of participation		
	Always	Sometime	Never
Recommend solutions to DHF problems to neighbors or communities.	15.0	52.0	33.0
Cooperate with the officials in dissemination of useful information about DHF.	30.3	50.6	19.1
Participate in the inspection and eliminating of mosquito larvae and its breeding sources in villages.	29.2	44.5	26.3
Participate in the inspection and eliminating of mosquito larvae and their breeding sources in schools.	8.8	31.3	60.0
Suggest that your neighbors who have symptoms of fever, headache, demeanor and bleeding on skin, arms and legs, should seek treatment at health centers or hospitals.	29.7	46.7	23.6

4.5 Preventive behaviors for DHF

Most household heads (82%) have good preventive behavior (performed all preventive activities) and 12% failed to perform all activities and thus needed to improve their preventive behavior. Details are shown in Table 9.

Table 9 Level of preventive behavior of household heads (n = 640)

Level of behavior	Percentage of behavior
Good	82.0
Need for Improvement	18.0

When considering specific aspects of behavior, most household heads (74.7%) used electric fans to prevent mosquito bites during the day, followed by using mosquito coils (54.8%), and mosquito nets (38.4%) while 4.7% failed to prevent mosquito bites.

To prevent mosquitoes laying eggs in drinking water, 82.7% of household heads covered their containers, followed by 32.5% who used Abate granules every 3 months, 29.7% drained the water weekly while 1.1% failed to carry out any preventive activities.

To prevent mosquitoes laying eggs in household water, 65.3% used Abate granules every 3 months, followed by 50% who covered all containers, 50% drained the containers weekly, while 1.3% failed to carry out any preventive activities.

To prevent mosquitoes laying eggs in concrete cisterns for water storage in bathrooms or toilets, most household heads (70.55%) used Abate granules every 3 months, followed by drained water weekly (55.5%), employed larvivorous fish in the concrete cisterns (19.5%) while 0.6% failed to carry out any preventive activities.

To prevent mosquitoes laying eggs in the ant traps used to protect food storage cabinets, most household heads (38.4%) tainted the traps with vinegar and Abate granules, followed by 35% tainted with salt and 23.1% tainted with engine oil, while 3.3% failed to carry out any preventive activities.

To prevent mosquitoes laying eggs in flower vases, 45.3% drained the water and cleaned up the vases every week, 19.1% tainted with temephos or Abate granules every 3 months, 13.3% wadded the neck of the vases with cotton or tissue, while 3.0% failed to carry out any preventive activities.

To prevent mosquitoes laying eggs in pot plant saucers, 22.8% cleaned and drained the water weekly, 20.9% and 7.2% used temephos and building sand respectively, while 3.0% failed to carry out any preventive activities.

To prevent mosquitoes laying eggs in water bowls for pets, 45.9% cleaned and drained water weekly, 7.7% cleaned and drained water occasionally, while 3.8% failed to carry out any preventive activities.

When considering the disposal of unused containers such as cans, tins, bottles, glasses, types, 45.9% buried and burnt these items weekly, 26.6% buried and burnt these items occasionally, 24.5% disposed these items using public garbage system, while 1.3 % failed to carry out any preventive activities. Details are shown in Table 10.

Table 10 Preventive behavior of household heads by items

Preventive behavior	Number	Percentage
Avoid being bitten by mosquito during the day.*		
No prevention	30	4.7
Use mosquito repellants	110	17.2
Use mosquito coils	351	54.8
Spray insecticide	205	32.0
Sleep under mosquito net	246	38.4
Install screens	141	22.0
Turn on the fan	478	74.7
Avoid having mosquito larvae in drinking water.*		
Cover all water containers	529	82.7
Cover some of water containers	63	9.8
Drain and clean every week	190	29.7
Drain and clean occasionally	71	11.1
Apply Abate granules once every three months	208	32.5
Apply Abate granules from time to time	56	8.8
Do nothing	7	1.1
Avoid having mosquito larvae in household water storage system.*		
Cover all water containers	320	50.0
Cover some of water containers	99	15.5
Drain and clean every week	320	50.0
Drain and clean once in a while	71	11.1
Always have larvivorous fish in the containers	125	19.5
Occasionally have larvivorous fish in the containers	38	5.9
Apply Abate granules once every three months	418	65.3
Apply Abate granules from time to time	50	7.8
Do nothing	8	1.3

* Multiple response

Table 10 Preventive behavior of household heads by items (cont.)

Preventive behavior	Number	Percentage
Avoid having mosquito larvae in water containers in bathroom or toilets.*		
Cover all water containers	95	14.8
Cover some of water containers	20	3.1
Drain and clean every week	355	55.5
Drain and clean once in a while	106	16.6
Always have larvivorous fish in the containers	125	19.5
Occasionally have larvivorous fish in the containers	21	3.3
Apply Abate granules once every three months	451	70.5
Apply Abate granules from time to time	45	7.0
Do nothing	4	0.6
Avoid having mosquito larvae in the ant traps used to protect food storage cabinet.*		
Put vinegar in the ant traps	246	38.4
Put salt in the ant traps	224	35.0
Put engine oil in the ant traps	148	23.1
Put ant poison	42	6.6
Use resin	63	9.8
Use Abate granules (Temephos)	246	38.4
Put detergent	108	16.9
Put hot water	24	3.8
No prevention	21	3.3
Do not have food storage cabinet or ant trap	140	21.9
Avoid having mosquito larvae in flower vases.*		
Drain and clean every week	290	45.3
Drain and clean once in a while	35	5.5
Always have larvivorous fish in the containers	19	3.0
Occasionally have larvivorous fish in the containers	6	0.9
Apply Abate granules once every three months	122	19.1

* Multiple response

Table 10 Preventive behavior of household heads by items (cont.)

Preventive behavior	Number	Percentage
Avoid having mosquito larvae in flower vases.*		
Apply Abate granules from time to time	44	6.9
Cover the vases with tissues or cotton balls	85	13.3
Do nothing	19	3.0
Do not have vase	241	37.7
Avoid having mosquito larvae in pot plant drip catchers.*		
Drain and clean every week	146	22.8
Drain and clean once in a while	33	5.2
Always have larvivorous fish in the containers	36	5.6
Occasionally have larvivorous fish in the containers	5	0.8
Apply Abate granules once every three months	134	20.9
Apply Abate granules from time to time	37	5.8
Put aggregate sand	46	7.2
Do nothing	19	3.0
Do not have pot plant or drip catcher	354	55.3
Avoid having mosquito larvae in water bowls for pets inside the house.*		
Drain and clean every week	294	45.9
Drain and clean once in a while	49	7.7
Do nothing	24	3.8
Do not have water bowl for pets	270	42.2
There are some unused items such as tins, cans, coconut shells, bottles, glasses, used tyres and others that retain water, how do you dispose them.*		
Burn and burry every week	294	45.9
Burn and burry every once in a while	170	26.6
Dispose in the bin provided in the village	157	24.5
Do nothing	8	1.3
Do not have containers	103	16.1

* Multiple response

Mosquito larvae inspection

The inspection of mosquito larvae using the container index (CI) and household index (HI) reveals that 27 villages or 67.5% have a good level CI value (lower than 10%) while 13 villages or 32.5% have an average level CI value (between 10-74%). With the HI index, 21 villages or 52.5% have an average level HI value (between 10-74%), while 14 villages or 35.0% have a good level HI value (less than 10%) and 5 villages or 12.5% have the HI value higher than 75% which indicates further improvement. Details are shown in Table 11.

Table 11 Outcome of mosquito larvae inspection using the HI and CI values by level (n = 40 villages)

Level	Percentage of household	
	CI	HI
Good (< 10%)	67.5	35.0
Average (10% – 74%)	32.5	52.5
Need for improvement (> 75%)	0	12.5

The inspection outcome shows that 3 villages that the households had the CI and HI lower than 10% were cluster 2 Ban Khumkao, cluster 2 Watratchapradit and cluster 6 Ban Bangluksue, and 4 villages that the households had the CI and HI higher than 75% were cluster 7 Ban Wangton, cluster 11 Ban Wangprang, cluster 6 Ban Phailom and cluster 1 Talad Seeyak. Details are shown in Table 12.

Table 12 CI and HI of villages (n = 40)

No	Cluster	Village name	Tambon	District	CI	HI
1	1	Kiriwan	Srinava	Muang	5.22	37.50
2	2	Korkrashai	Kaopra	Muang	0	0
3	10	Pakchong	Koapra	Muang	7.08	43.75
4	3	Sarika	Sarika	Muang	2.07	12.50
5	11	Kaodaeng	Sarika	Muang	10.12	62.50
6	2	Kaonoi	Prommanee	Muang	13.91	62.50
7	7	Wangton	Prommanee	Muang	12.79	75.00
8	14	Thebpratan	Prommanee	Muang	3.33	18.75
9	2	Bhotaram	Thasai	Muang	0	0
10	6	Wangyaichim	Hintang	Muang	1.38	12.50
11	1	Tha-koi	Banyai	Muang	4.89	43.75
12	11	Bangprang	Srichula	Muang	15.32	75.00
13	7	Klong 3	Donyor	Muang	1.38	18.75
14	5	Bangpanied	Thachang	Muang	14.50	43.75
15	6	Nong-ai klom	Wangkrajom	Muang	11.95	37.50
16	2	Khumkao	Nongsaeng	Pakplee	0.36	6.25
17	6	Pailom	Pakplee	Pakplee	11.28	93.75
18	4	Dongkha	Korbho	Pakplee	0	0
19	1	Korwai	Korwai	Pakplee	0	0
20	8	Saraboat	Arsa	Banna	3.49	25.00
21	1	Pikunkaew	Pikun-ork	Banna	0	0
22	2	Klongpaknam	Pakha	Banna	0	0
23	10	Tonkabok	Pakha	Banna	0	0
24	9	Banpraw	Banpraw	Banna	1.52	18.75
25	6	Klong 30	Thonglang	Banna	1.61	12.50
26	1	Talad siyaek	Thonglang	Banna	13.02	87.50
27	1	Kaoperm	Kaoperm	Banna	0	0
28	5	Nongjik	Banprig	Banna	9.18	18.75

Table 12 CI and HI of villages (cont.)

No	Cluster	Village name	Tambon	District	CI	HI
29	11	Klong 33	Banprig	Banna	32.27	81.25
30	5	Nongkankrao	Srikra-arng	Banna	15.49	62.50
31	2	Watratchapradit	Srisakrabue	Ongkarak	0.68	6.25
32	11	Sawang Arom	Srisakrabue	Ongkarak	0	0
33	5	Ban lang	Bangplakod	Ongkarak	0	0
34	6	Klong 14 Padwa	Buesarn	Ongkarak	3.40	31.25
35	6	Pakbeungpai	Chumpon	Ongkarak	1.86	25.00
36	9	Klong-orm	Saimoon	Ongkarak	11.76	6.25
37	9	Mahawong	Bhotan	Ongkarak	17.65	12.50
38	1	Pakklongpraarjarn	Bangsomboon	Ongkarak	5.80	25.00
39	5	Klongyai	Klongyai	Ongkarak	15.66	37.50
40	6	Banglooksue	Banglooksue	Ongkarak	1.28	6.25

4.6 The performance to prevent and control DHF of tambon health officers

4.6.1 General characteristics of tambon health officers

Half of the tambon health officers who participated were male (54.1%), average age 33.19 years old, 62.2% aged between 30 – 39 years old, 59.5% were married, 56.8% graduated with a bachelor degree, 59.5% were community health officers, 32.4% were health technical officer and 8.1% were health administrative officers. The average service period was 11.27 years, in which 35.1% had served for 11-15 years, and 32.4% had served for 6-10 years. The average working period at the health center was 8.14% years in which 67.6% had worked for 1-10 years, followed by 29.7% who had worked for 11-20 years. Details are shown in Table 13.

Table 13 General characteristics of tambon health officers

Characteristics	Number	Percentage
Total sample	37	100.0
Sex		
Male	20	54.1
Female	17	45.9
Age (years)		
20 – 29	10	27.0
30 – 39	23	62.2
Over 40	4	10.8
Mean $\pm$ Standard deviation	33.19 $\pm$ 6.09	
Range	23 - 52	
Marital status		
Single	12	32.4
Married	22	59.5
Widow/Divorced/Separated	3	8.1
Education		
Lower than bachelor degree	16	43.2
Bachelor degree	21	56.8
Position		
Health administration officer	3	8.1
Health technical officer	12	32.4
Community health worker	22	59.5
Length of service (years)		
1 - 5	6	16.2
6 - 10	12	32.4
11 - 15	13	35.1
16 - 20	4	10.8
21 - 25	2	5.4
Mean $\pm$ Standard deviation	11.27 $\pm$ 4.92	
Range	4 - 25	

Table 13 General characteristics of tambon health officers (cont.)

Characteristics	Number	Percentage
Length of service at this health center (years)		
1 - 10	25	67.6
11 - 20	11	29.7
21 - 30	1	2.7
Mean ± Standard deviation	8.14 ± 4.83	
Range	2 - 24	

4.6.2 Performance to prevent and control DHF

Performance to prevent and control DHF of 83.8% tambon health officers in general was good, followed by 13.5% was on average while 2.7% needed further improvement. Table 14 shows the details.

Table 14 Level of performance to prevent and control DHF of tambon health officers (n = 37)

level of performance	Number	Percentage
Good	31	83.8
Moderate	5	13.5
Need for improvement	1	2.7

It was found that the most regularly performed task was the establishment of measures to control and prevent DHF in risk areas in accordance with the DHF control program as well as reporting the HI and CI values four times a year (100% for both); followed by operating in accordance to the steps contained in the DHF prevention and control program; specifying risk areas in accordance with the epidemiological guidelines; providing information to the people when a DHF patient is found in the responsible areas or nearby villages in order to prevent further infection, participating in the inspection of mosquito larvae four times a year, and reviewing data of DHF in order to predict risk areas in the year after (97.3% for all). The least regularly performed was advising the people to bury or burn domestic waste

or garbage and follow up at least once a month (43.2%), followed by providing information regarding DHF to the people via the village public address and speaker tower system at least once a month (51.4%) and advising the people to employ larvivorous fish or fighting fish in concrete cisterns for water storage in bathroom and follow up at least once a month. Table 15 demonstrates this in more details.

Table 15 Performance to prevent and control DHF of tambon health officer (n = 37)

Items	Percentage of performance		
	Regularly	**Occasionally**	**Never**
Follow the steps contained in the DHF prevention and control program.	97.3	0	2.7
Specify risk areas in accordance with the epidemiological guidelines.	97.3	0	2.7
Establish measures to control and prevent DHF in risk areas in accordance with the DHF control program.	100	0	0
Provide information regarding DHF to people during your site visit at least once a month.	94.6	5.4	0
Provide information regarding DHF to people via the village public address and speaker tower system at least once a month.	51.4	43.2	5.4
Disseminate leaflets and posters contain information of DHF to people at least once a month.	62.2	37.8	0
Educate people by providing health education in schools at least once a month.	70.3	27.0	2.7

Table 15 Performance to prevent and control DHF of tambon health officer (cont.)

Items	Percentage of performance		
	Regularly	**Occasionally**	**Never**
Request assistance and cooperation in DHF prevention from the local administrative organization during their meetings.	73.0	27.0	0
Request cooperation with DHF prevention from community leaders.	86.5	13.5	0
Give advice all the time, during your visiting, to people on how to prevent mosquito bites by sleeping under mosquito net or spraying insecticide.	91.9	8.1	0
Advise people to keep household water storage system covered or to change the water regularly, and you follow up at least once a month to see if your advice had been implemented.	83.8	16.2	0
Advise people to put Abate granules or vinegar or salt in the ant traps used to protect food storage cabinets, and follow up at least once a month to see if advice had been implemented.	81.1	16.2	2.7
Advise people to put Abate granules or to drain water in vases, pot plants drip catchers and other forms of containers, and follow up at least once a month to see if advice had been implemented.	81.1	18.9	0

Table 15 Performance to prevent and control DHF of tambon health officer (cont.)

Items	Percentage of performance		
	Regularly	**Occasionally**	**Never**
Advise people to burry or burn domestic waste or garbage and follow up at least once a month to see if advice had been implemented.	78.4	21.6	0
Advise people to employ larvivorous fish or fighting fish in concrete cisterns for water storage in bathroom and follow up at least once a month to see if advice had been implemented.	59.5	40.5	0
Suggest people to use Abate granules to kill mosquito larvae every time on visiting to their homes.	81.1	18.9	0
Suggest people to use insecticide spray every time on visiting to their homes.	43.2	48.6	8.1
Assist in the spraying of thermal fog during the outbreak of DHF in the area or during the DHF prevention and control campaign.	83.8	10.8	5.4
Inform people when a DHF patient is found in responsible areas in order to prevent further infection.	97.3	0	2.7
Participate in the inspection of mosquito larvae four times a year in according to the DHF control program of Nakhonnayok Province.	97.3	0	2.7
Record details and history of all DHF patients diagnosed by doctors.	91.9	0	8.1

Table 15 Performance to prevent and control DHF of tambon health officer (cont.)

Items	Percentage of performance		
	Regularly	**Occasionally**	**Never**
Follow up with all DHF suspected patients after being transferred to hospitals.	94.6	0	5.4
Review data of DHF in order to predict risk areas in the year after.	97.3	0	2.7
Analyze and evaluate DHF situation every month, both before and after the outbreak.	91.9	0	8.1
Report the HI and CI values four times a year.	100	0	0

The epidemiological reports of health centers in the inspected areas and the Nakhonnayok Provincial Health Office shows that 42 DHF patients were found in 55% of the sampled villages or 0.16% of the total population from sampled villages.

4.6.3 Outcomes of performance to prevent and control DHF

The study revealed that incidence of DHF was 0.22% and the highest fraction of DHF patients (1.1%) was found in Ban Pailom. Table 16 showed more detail of DHF incidence.

Table 16 CI and HI and the percentage of DHF patients by sampled villages (n= 16 households from each village, a total of 40 villages.)

Cluster	Village name	CI	HI	Percentage of dengue fever patients
1	Kiriwan	5.2	37.5	0
2	Korkrashai	0	0	0.27
10	Pakchong	7.1	43.8	0.55
3	Sarika	2.1	12.5	0.31
11	Kaodaeng	10.1	62.5	0.38
2	Kaonoi	13.9	62.5	0.20
7	Wangton	12.8	75.0	0.00
14	Thebpratan	3.3	18.8	0.00
2	Bhotaram	0	0	0.00
6	Wangyaichim	1.4	12.5	0.25
1	Tha-koi	4.9	43.8	0.30
11	Bangprang	15.3	75.0	0.00
7	Klong 3	1.4	18.8	0.17
5	Bangpanied	14.5	43.8	0.00
6	Nong-ai klom	12.0	37.5	0.25
2	Khumkao	0.4	6.3	0.00
6	Pailom	11.3	93.8	1.01
4	Dongkha	0	0	0.31
1	Korwai	0	0	0.12
8	Saraboat	3.5	25.0	0.23
1	Pikunkaew	0	0	0.36
2	Klongpaknam	0	0	0.00
10	Tonkabok	0	0	0.12
9	Banpraw	1.5	18.8	0.00
6	Klong 30	1.6	12.5	0.11

Table 16 CI and HI and the percentage of DHF patients by sampled villages (cont.)

Cluster	Village name	CI	HI	Percentage of dengue fever patients
1	Talad siyaek	13.0	87.5	0.19
1	Kaoperm	0	0	0.20
5	Nongjik	9.2	18.8	0.11
11	Klong 33	32.2	81.2	0.10
5	Nongkankrao	15.5	62.5	0.00
2	Watratchapradit	0.7	6.3	0.00
11	Sawang Arom	0	0	0.00
5	Ban lang	0	0	0.00
6	Klong 14 Padwa	3.4	31.3	0.00
6	Pakbeungpai	1.9	25.0	0.00
9	Klong-orm	11.8	6.3	0.16
9	Mahawong	17.7	12.5	0.17
1	Pakklongpraarjarn	5.8	25.0	0.00
5	Klongyai	15.7	37.5	0.00
6	Banglooksue	1.28	6.25	0.00

4.7 Association between knowledge, perception, participation in community activities to prevent and control of DHF and DHF preventive behaviors

The study of factors affecting DHF preventive behavior, including knowledge and perception of DHF and the participation in community activities in DHF control and prevention can be summarized as follows:

Household heads who had good level of knowledge had better preventive behavior than those with knowledge of DHF that could be improved (90% and 79.4%). It was found that knowledge of DHF and preventive behavior was significantly related (p=0.004).

Regarding the perception of DHF, household heads whose perception was at a good level have better preventive behavior than those with the perception that need for improvement (86.1% and 78.2%). These two variables were found significantly related to each other (p=0.013).

With the perception of susceptibility, household heads whose susceptibility perception was at a good level have better preventive behavior than those with susceptibility perception that could be improved (85.5% and 75.1%). These two variables were found significantly related to each other (p=0.002).

With the perception of severity, household heads whose perception of severity was at a good level have better preventive behavior than those with severity perception that could be improved (82.4% and 71.8%). These two variables were found significantly related to each other (p=0.003).

The perception of benefits of disease prevention was not related to preventive behavior (p>0.05).

With the perception of barriers to disease prevention, household heads whose perception of barriers was at a good level have better preventive behavior than those whose perception of barriers could be improved (85.6% and 80.3%). However, these two variables were found no association (p-value> 0.05).

Regarding participation in community activities, household heads whose participation in community activities was at a good level have better preventive behavior than those with participation in community activities that could be improved (97.2% and 76.1%). The participation in community activities was significantly related to prevent behavior (p-value < 0.01).

Table 17 Association between knowledge, perception, participation in community activities, and the preventive behaviors for DHF

Factor	Total	Preventive behavior		p-value
		Need for Improvement	Good	
Knowledge				
Improvement	480	20.6	79.4	0.004
Good	160	10.0	90.0	
Overall perception				
Improvement	331	21.8	78.2	0.013
Good	309	13.9	86.1	
Susceptibility				
Improvement	213	24.9	75.1	0.002
Good	427	14.5	85.5	
Severity				
Improvement	110	28.2	71.8	0.003
Good	530	15.8	84.2	
Benefits				
Improvement	430	17.4	82.6	0.699
Good	210	19.0	81.0	
Barriers				
Improvement	431	19.7	80.3	0.121
Good	209	14.4	85.6	
Participation				
Improvement	461	23.9	76.1	0.000
Good	179	2.8	97.2	

4.8 Stepwise multiple linear regression analysis to determine significant variables that are affecting the preventive behaviors of household heads

With the stepwise multiple linear regression analysis, there were 2 variables out of 6 variables that were significantly affecting preventive behaviors of household heads ($p<0.01$). The first variable selected was the participation in community activities in prevention of DHF which was able to explain variation in preventive behavior 6.1% ($R^2 = 0.061$). The second variable selected was perception of susceptibility of DHF infection which was able to explain the variation in preventive behavior 6.7% ($R^2 =0.067$). Thus the prediction based on Table 18 was:

Preventive behavior for DHF = 0.721 + 0.197 (participation) + 0.066 (perception of susceptibility)

The equation showed that significant variables related to preventive behavior of household heads in Nakhonnayok Province were participation in community activities in DHF prevention and the perception of the severity of DHF. Correlation coefficient of participation was 0.197. This means a one-unit increase in participation in DHF prevention results in an increasing of preventive behaviors of 0.197 provided that other factors remain unchanged. Similarly, a one-unit increase of perception of susceptibility results in an increasing of preventive behavior of 0.066 provided that other factors remain unchanged.

Thus, it can be concluded that both the participation in community organizations in DHF prevention and the perception of susceptibility of DHF infection are able to explain the variation in preventive behavior of household heads by 6.7%. This means those who regularly participate in community organizations in DHF prevention activities and have good perception of susceptibility of DHF would also have good preventive behaviors. Table 18 demonstrates this in more detail.

Table 18 Stepwise multiple linear regression analysis of the preventive behavior (n=640)

Step	Variable	R^2	R^2 adj.	b	S.E. (b)	b adj.	t	P
1	participation	0.061	0.059	0.211	0.033	0.246	6.419	.000
	constant			0.761	0.017		43.865	.000
2	participation	0.067	0.064	0.197	0.033	0.230	5.898	.000
	perception of susceptibility			0.066	0.032	0.082	2.101	.036
	constant			0.721	0.026		27.731	.000

The comparison of the study outcomes and the expectations specified in the DHF prevention and control program of Nakhonnayok Province (8) showed that only preventive behavior exceeded the target (82%), the rest were below the target. Table 19 showed more details.

Table 19 Comparison of the actual outcomes and the target specified in the DHF prevention and control program of Nakhonnayok Province

Indicators	Target (%)	Actual outcomes (%)	Remark
Knowledge of DHF	80.0	25.0	Below the standard
Perception of DHF	70.0	48.3	Below the standard
Participation in community organization	60.0	28.0	Below the standard
Preventive behaviors	80.0	82.0	Higher than the standard
Index			
- CI	80.0	67.5	Below the standard
- HI	80.0	35.0	Below the standard

CHAPTER 5
DISCUSSION

This research evaluated the outcomes of DHF prevention and control program of Nakhonnayok Province in 2002. It involved evaluation of preventive behavior by household heads, and its associations with knowledge of DHF, perception of DHF, and participation in community activities to prevent DHF. The discussion of results are outlined in 5 parts as follows:

5.1 Preventive behavior of household heads in Nakhonnayok Province

5.2 Associations between knowledge of DHF and preventive behaviors

5.3 Associations between perception of DHF and preventive behaviors

5.4 Associations between participation in community activities and preventive behaviors

5.5 Stepwise multiple linear regression of preventive behaviors of household heads in Nakhonnayok Province

5.1 Preventive behavior of household heads in Nakhonnayok Province

The results showed that 82% of household heads had good preventive behavior and only 12% needed further improvement. Regarding specific aspects of knowledge of DHF, the results revealed the following:

Most of the household heads (74.7%) felt that using the electric fans was the simplest and most convenient method to prevent mosquito biting whilst sleeping during the day, by 54.8% used mosquito coils, 38.4% used mosquito nets 32.0% used insecticide spray, 22.0% installed window gauze or fly screen, and 17.2% used mosquito repellants. It was found that 4.7% did not attempt to prevent mosquito bites because they did not sleep during the day. The results showed that most household heads turned on electric fans to prevent mosquito bites when sleeping during the day. Unlike the method of using mosquito nets which can prevent mosquito biting at all times during sleeping, the fan may not point at the people or it may not able to ward off mosquito all the times and consequently the people may get bitten.

The most convenient method regularly performed in order to prevent mosquitoes laying eggs in drinking water was to cover water containers (82.7%). Adding Abate granules in drinking water was not very popular because it caused bad taste in water but 32.5% of household heads still used it in drinking water every 3 months, 29.7% drained the water weekly. Other methods less popular were to drain the water occasionally (11.1%), to cover only some containers (9.8%) and to use Abate granules every now and then (8.8%). People rarely added abate granules to their drinking water supplies due to concerns about drinking chemically tainted water, the results showed that only 32.5% added Abate granules to drinking water every 3 months and 8.8% added granules occasionally. Surprisingly, the interview revealed that health officers or health volunteers added granules to drinking water during their visits, rather than the household heads.

Using Abate granules every 3 months to prevent mosquitoes laying eggs in household water was the first choice among 65.3% household heads due to its easy access to the substance at the health centers. In addition, health volunteers used the substance during the regular inspection when mosquito breeding sources were found. The equal number of household heads (50%) covered and drained all containers weekly, and 19.5% employed larvivorous fish. Other less frequently practiced methods were: to cover some containers only (15.5%) cleaned and drained water occasionally (11.1%) and employed larvivorous fish occasionally (5.9%). The number of household heads who used Abate granules every 3 month to prevent mosquitoes laying eggs in household water and in concrete cisterns for water storage in bathrooms or toilets was as high as the number of those who chose to drain water and clean the containers every week. The interviews showed that most of the time Abates granules were added by health volunteers. The rest of the granules given to household heads were added when they drained water and cleaned containers weekly. If they had no granules, household heads chose to drain and clean water containers weekly.

Abate granules and vinegar were used to taint ant traps used to protect food storage cabinets among 38.4% household heads in order to prevent mosquitoes laying eggs in it. This is because Abate granules were readily available from health centers and recommended by health volunteers and vinegar was cheap and easy to obtain. In

addition, 35% tainted with salt, 23.1% tainted with engine oil, 16.9% tainted with detergent, while the other 10.0% tainted with rasin, insecticide and hot water.

To prevent mosquitoes laying eggs in flower vases and pot plant saucers, cleaned the vases and drained the water weekly was practiced among 45.3% and 22.8% respectively since it was the most convenient method. Other methods used were, tainted with Abate granules every 3 months, wadded the neck of the vases with cotton or tissue, and use of larvivorous fish. To prevent mosquitoes laying eggs in water bowls for pets, 45.9% chose to clean and drain water weekly because it was the most convenient method.

With the disposal of unused containers that may retain water, 45.9% buried and burnt these items weekly, 24.5% disposed these items using public garbage system, and 26.6% buried and burnt these items occasionally.

According to the result, it can be concluded that preventive behavior of household heads in Nakhonnayok Province was at a good level of (82%) which is higher than the indicators set by the Provincial Health Office (80%). Thus performance of DHF prevention and control program was successful.

5.2 Associations between knowledge of DHF and preventive behaviors

The majority of household heads (53%) had moderate level of knowledge of DHF. When judging from each question asked, more than 90.0% of household heads answered correctly that mosquito breeding sources around houses should be destroyed (99.1%) when DHF patients were found in the village, followed by *Aedes aegypti* mosquito can be controlled by destroying mosquito larvae in water retaining containers weekly (97.2%), and 95.6% correctly identified that DHF symptoms of high fever and a dejected demeanor needed immediate hospitalization. This is because there are the mosquito control campaigns organized by health officers and health volunteers in the area every year and every time when DHF patients were found.

However, only 6.6% knew that symptoms of high fever and vomiting require hospitalization, followed by 27.7% for the symptoms of cold extremities without fever. Most of the household heads still lacked appropriate knowledge of DHF

symptoms that required hospitalization. The interview showed that household heads felt that if a person has other symptoms in addition to having high fever during monsoon season or during DHF epidemic, he/she should see doctors immediately. In addition, only 42.8% knew the correct method for the use of Abate granules. About half of the household heads thought that *Aedes* mosquitoes breed in all sorts of water and thus Abate granules should also be added to polluted water. Only 38.6% of household heads correctly understood the role of blood tests in confirming the presence of DHF, the rest thought that a blood test was the best method used to confirm DHF infection. Only 31.4% understood the limitations of chemical fogging as a DHF preventative. This is because household heads thought that once adult mosquitoes are killed, the number of mosquito larvae could be reduced.

As a result of the lack of accurate knowledge of household symptoms, DHF prevention and *Aedes* mosquito breeding sources control, the overall knowledge level of DHF among household heads was moderate. Moreover, the fact that 62.7% of household heads have primary school education level may also affect their overall knowledge of DHF.

The knowledge of DHF of household heads was found significantly related to their preventive behaviors ($p = 0.004$) which is in agreement with Rungtiwa Sudsiri (77), Duangpa Vanicharak (78) and Sri-amporn Mekmork (74) whose studies showed that people with good knowledge of diseases and its prevention have better preventive behavior for themselves and family members. This is also in accordance with the theory that knowledge involves recollection of specific things and various processes. A person can gain knowledge from reading, listening, observation and perception from experience both directly and indirectly. Knowledge affects actions or behavior of a person (26).

The result showed that only 25% of household heads had a good level of knowledge of DHF in comparison to the indicators (80%) set in the provincial program (8). So the knowledge indicator was below the standard.

5.3 Associations between perception of DHF and preventive behaviors

The overall perception of DHF among household heads was at the average level (51.7%). With the perception of specific aspects of DHF, further improvement is needed on susceptibility perception (1.7%). The results showed that 29.7% and 14.7% disagreed and strongly disagreed that only male Aedes mosquito bite and feed on humans while 32.7% and 13.4% disagreed and strongly disagreed that people infected with DHF was immune from further DHF infection. According to perception on these two aspects, it can be said that less than half of household heads had accurate perception. Most of them were unsure that all Aedes mosquito could cause DHF infection. In addition, they also felt that DHF was similar to other diseases such as small pox and mumps where patients were immune to re-infection.

With the perception of barriers of DHF prevention, 57.0% and 17.8% agreed and strongly agreed that the cost of treatment for DHF was high and it affected the family expenses. They believe that sickness involve visiting hospitals or private clinics or purchasing medicines from pharmacists. Although they are entitled to the "30 baht for all treatment scheme" there still some other expenses. Furthermore, if hospitalization is required for a patient, then family members have to take leave off work in order to be with the patient at hospitals. Thus the family earned less income due to the sickness from DHF. In addition, 58.6% and 18.4% agreed and strongly agreed that only health officers could perform fogging. This is because household heads thought that fogging was the responsibility of health officers and villagers did not have their own fogging equipment. Although the machine was available in some Tambon Administrative Organization (TAOs) it was believed that only health officers could operate it.

Regarding the perception of benefits of DHF prevention, 39.8% and 30.0% agreed and strongly agreed that children who have a high temperature and are unusually distressed should be closely observed for 1-2 days and then be taken to doctor if the symptoms do not improve. This is because they thought that it might not be DHF. This is in agreement with the research results on the knowledge of DHF symptoms in which household heads were lacking. In addition, 63.3% and 19.5%

agreed and strongly agreed that health officers should be the spearhead for the termination of mosquito larvae in villages. They felt that health officers regularly visited the village in order to inspect mosquito larvae or during the campaign or when DHF patients were found in the village. Mosquito larvae were inspected by health volunteers at other times. Consequently, they believed that sickness is the direct concerns of doctors or health officers whom therefore should be responsible for, or take the lead in, various health activities.

With the perception of severity, 38.6% and 13.3% disagreed and strongly disagreed that the symptoms of high fever that very quickly receded within 24 hours indicated an improvement, and it was unneccessary to see doctor. This showed that only half of household heads have an accurate perception of the severity of DHF. The interviews with household heads showed that they believed that a patient has recovered when their body temperature returns to normal while some thought that the symptom belonged to the common flu because it did not occur during a DHF epidemic.As a consequence of their poor knowledge of symptoms of DHF, they also had poor perception of symptoms of DHF.

The results showed that the overall perception of DHF was significantly related to their preventive behavior ($p = 0.013$). When considering specific aspects of perception it was found that perception of severity of DHF was significantly related to their preventive behavior ($p = 0.003$). The perception of susceptibility was also significantly related to their preventive behavior ($p = 0.002$) which is in agreement with Duangpa Vanicharak (78) and Narit Singhasatit (67) whose studies showed that perception of susceptibility and severity of diseases were related to behavior and practices to prevent and control DHF. In addition, Wanapa Yanaroj (66) found that perception of susceptibility and severity of diseases of the people in community with high DHF infection rate were different from perception of those in community with low DHF infection rate. However, perception of benefits and barrier of DHF prevention were not related to preventive behavior of household heads ($p = 0.699$ and $p = 0.121$ respectively). The results show that the overall perception of DHF was 48.3% in comparison to the indicator (70%) set by DHF prevention and control team of Nakhonnayok Province (8). Thus perception of DHF was below the target which indicates the program was unsuccessful.

5.4 Associations between participation in community activities and preventive behaviors

Most of the household heads (58.6%) needed to improve their participation in community activities while only 28.0% were doing reasonably well. This is because they were already engaged in other activities or they only participated during a DHF prevention campaign. When considering participation in each activity it was found that 64.1% never participate with the insecticide fogging during the campaign or when DHF patient are found. Most of them felt that the task was the responsibility of health officers, health volunteers or authorized personnel only while others were afraid of causing damage to the machines. The next 60% of household heads never participate with the inspection and termination of mosquito breeding sources and mosquito larvae in schools because they felt that it should also be the responsibility of health officers, teachers and students. The activity that household heads (30.3%) participated most regularly was the dissemination of DHF related information because they received the information from health officers during the meetings or home visiting. In some areas, household heads received information from the village public address and speaker tower system and thus able to disseminate information to family members and neighbors.

The results showed that quite a large number of household heads occasionally participated in community activities to prevention DHF. For example, 60.6% joined in the DHF prevention and control campaign organized in villages or communities, 45.9% attended the meeting to set up strategies to prevent and control DHF in villages, and 44.5% assisted in the survey and elimination of mosquito breeding sources and elimination of mosquito larvae in villages. It was observable that once they were motivated, they would feel like to participate.

The overall participation of household heads was significantly related to preventive behavior ($p < 0.001$) which is in agreement with Nuttaporn Meesuk (71) whose study showed that the application of concepts of participation led to the improvement of participation in mosquito larvae control of household representatives. The result showed 28% participation of household heads in comparison to the indicator (60%) set by DHF prevention and control team of Nakhonnayok Province (8). Thus participation in community activities by household heads was below the target, which indicated the program needed to be improved.

5.5 Performance to prevent and control DHF of tambon health officers in Nakhonnayok Province

The performance of 83.3% tambon health officers was at a good level which prevention and control activities were over 90%. This because the activities needed to be reported regularly both at district and provincial levels. Campaign to prevent and control DHF is in a year plan and is strengthened whenever DHF in epidemic. Provincial Health Office needs to monitor DHF program seriously as sometimes, the activities are ignored because the health personnel has to follow other health activities which are also the policy of the ministry e.g. exercise. With limited manpower but serve all health policies to be implementing in the responsible area may make from weaknesses.

5.6 Stepwise multiple linear regression of preventive behaviors of household heads in Nakhonnayok Province

The results showed that the factors significantly affecting DHF preventive behavior of household heads ($p<0.01$) was including them in community DHF control and prevention activities. This influences the preventive behavior the most (R^2 = 0.061), followed by the perception of susceptibility of DHF infection (R^2 = 0.067). This means DHF preventive behavior of household heads in Nakhonnayok Province can be improved by promoting participation in community activities and improving their perception of the susceptibility of DHF infection. The equation below showed the causal model of preventive behavior.

Preventive behavior of DHF = 0.721 + 0.197 (participation) + 0.066 (perception of susceptibility)

Limitations of the study

The evaluation of preventive behavior involved the recall memory of household heads regarding their behavior or practices in the past which may affect the reliability of the collected data. In addition, the survey of container index (CI) was

performed during data collection period of this study which may have caused the inconsistent of data because the survey of CI was a cross-sectional survey and was performed during a short period of time. However, the CI values can still reflect on the current situation regarding the preventive behavior adopted by people against DHF.

CHAPTER 6
CONCLUSION AND RECOMMENDATIONS

This research aimed to evaluate the DHF prevention and control program in Nakhonnayok Province. The objectives of this study was to evaluate knowledge of DHF, perception about DHF, participation in community activities of DHF prevention and control of household heads and to determine factors affecting their preventive behaviors. This descriptive study, collected data from household heads or representatives of 640 households aged 15 years and over using questionnaire. Data collection was performed by 37 tambon health officers who worked at health centers in the fiscal year B.E. 2002 and were responsible for DHF prevention and control program in the sampled villages from 1st June to 30th June, 2003. The research instruments were tested in Prachinburi Province for its reliabilitiy, which was 0.765 for the knowledge of DHF, 0.75 for perception of DHF, 0.94 for the participation in community activities of DHF prevention and control, and 0.87 for the DHF preventive behaviors. Statistics used for this research included percentage, means, standard deviation and stepwise multiple linear regression analysis.

6.1 Conclusion

The majority of household heads or their representatives were female (61.3%) aged range from 15 years to 85 years with the mean of 47.44 years, and 28.9% aged older than 55 years. The education level of 62.7% was a primary school certificate, 32.7% were farmers, 79.2% had a family size of 1-5 people or 4 people on average. Amongst these, 6 people (0.9%) were DHF patients who had been treated and were recovering; 4 were infected in August and 2 were infected in September, 2002.

The preventive behavior of 82% of the population was at a good level and was higher than the target set by Nakhonnayok Province (8). This indicates a success of DHF prevention and control program.

Knowledge of DHF was at the moderate level amongst 53% and was lower than the target set by Nakhonnayok Province (8). Knowledge of DHF of household heads was significantly related to their preventive behavior ($p = 0.004$), which was in agreement with hypothesis number 1.

The overall perception of DHF was at a moderate level of 51.7% of household heads in which perception of susceptibility of DHF infection (1.7%) was most in need of further improvement. The overall perception of DHF was lower than the target set by the province (8). The overall perception of DHF was significantly related to preventive behavior ($p = 0.013$), which is in agreement with the hypothesis number 2.

The results revealed that 28% had a good level of participation. However, this is still lower than the target set by the province and indicated that the program was not fully effective. The participation in community activities was significantly related to preventive behavior ($p<0.001$) and was in agreement with the hypothesis number 3.

The inspection of mosquito larvae showed 67.5% of households had the CI value at a good level. However, this is still lower than the target set by the province (8) thus indicated that the DHF prevention and control program needed to be improved.

Participation in community activities of DHF prevention and control and susceptibility perception most affected preventive behavior of household heads. Both factors were able to explain the variations of preventive behavior by 6.7% ($R^2 =0.067$).

Performance of 83.8% tambon health officers was at a good level. The action most frequently performed by officers in all health centers was to formulate strategies to control DHF in risk areas and the report of the CI and HI values fours times a year. The activity that was least performed by officers (43.2%) was giving advice to the people to destroy garbage, and containers that might retain water and follow up inspections it at least once a month.

The epidemiological reports (Report No. 506) of health centers in the inspected areas and the Nakhonnayok Provincial Health Office showed that 42 DHF patients were found in 55% of the sampled villages or 0.16% of the total population from sampled villages. However, the inspection during this research found 6 DHF patients or 0.02% of the total population from sampled villages.

6.2 Recommendation for implementation

The result indicated that addition actions are required for performance to prevent and control DHF of Nakhonnayok Province in order to improve the quality of its performance effectively. The following are recommendations from this study.

1. Organize educational campaigns about DHF that focus on the symptoms that require immediate examination by doctors, a proper treatment for DHF patients, and elimination of mosquito breeding sources as well as methods of killing mosquitoes based on local wisdom. Health officers and health volunteers should carry out this educational campaign not only during the rainy season but also throughout the year. In addition, providing DHF information to the people via the village public address and speaker tower system, via students or religious leaders are any other methods. Facilitate accurate perception of susceptibility and severity of DHF as well as barriers and benefits of DHF prevention among the people. Personal experience with DHF told by former DHF patients to other members in community, together with recommendations of health officers could facilitate the accuracy of their perception and improve their preventive behavior.

2. Increase public awareness of susceptibility and severity of DHF because they were not well acquainted with prevention methods and symptoms indicating DHF infection. In addition, another problem involved DHF prevention was a misconception among the people that important activities or one that involved machinery, such as fogging machine, must be carried out or be supervised by health officers only. Thus health officer must develop correct understanding for the people in order to be able to prevent diseases, to take care of themselves and family members and avoid being infected.

3. Organize activities that facilitate the people to participate in community activities and health officers in prevention and control of DHF in the areas. This involves the application of a participative approach such as encouraging the people to inspect and destroy mosquito-breeding sources themselves. The health volunteers and health personnel should monitor closely.

4. Tambon health officers should encourage community for the inspection of mosquito breeding sources, evaluation mosquito control in villages regularly and continuously throughout the year. Moreover, tambon health officers should analyze and monitor the DHF situation in their areas regularly in order to study the trend of infection and set up DHF prevention action plan for the areas.

5. Provincial health officers should strengthen the surveillance of the DHF in all districts and tambons. And also monitor and evaluate performance of tambon health officer on DHF prevention and control throughout the year. Provincial health officers should also work together with the local authority for DHF prevention and control. The possibility of serious infection found in the risk areas should be brought to attention of administrators in order to set up strategies to prevent further epidemics.

6.3 Recommendation for further study

1. Comparison of factors affecting preventive behaviors of household heads in areas with high DHF incidence to those living the low DHF incidence in Nakhonnayok Province should be considered.

2. The performance of all tambon health officers involved in the operation to prevent and control DHF of the province should be evaluated.

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74. ศรีอัมพร เมฆหมอก. ปัจจัยที่มีความสัมพันธ์กับพฤติกรรมการป้องกันและควบคุม
โรคไข้เลือดออกของเด็กวัยเรียน จังหวัดบุรีรัมย์. วิทยานิพนธ์ปริญญามหาบัณฑิต,
บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล. 2542.
75. ชลัช กลิ่นอุบล. ปัจจัยที่มีผลต่อพฤติกรรมการป้องกันโรคไข้เลือดออกของนักเรียน
ชั้นประถมปีที่ 6 ในจังหวัดเพชรบุรี. วิทยานิพนธ์ปริญญามหาบัณฑิต,
บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล. 2542.
76. วิภา ลิ่มคำสุข. การประเมินเทคโนโลยีที่เหมาะสมเพื่อป้องกันและควบคุมโรคไข้เลือดออก.
วิทยานิพนธ์ปริญญามหาบัณฑิต, บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล. 2540.
77. รุ่งทิวา สุดศิริ. การพัฒนารูปแบบโรงเรียนส่งเสริมสุขภาพเพื่อป้องกันและควบคุมโรค
ไข้เลือดออกของนักเรียนชั้นประถมศึกษาตอนปลาย จังหวัดนครนายก. วิทยานิพนธ์
ปริญญาวิทยาศาสตร์มหาบัณฑิต, สาขาสุขศึกษาและพฤติกรรมศาสตร์
บัณฑิตวิทยาลัย มหาวิทยาลัยมหิดล. 2544.
78. ดวงผา วานิชรักษ์. รูปแบบการมีส่วนร่วมของชุมชนในการป้องกันและควบคุมโรค
ไข้เลือดออกในเขตอำเภอปากพลี จังหวัดนครนายก. วิทยานิพนธ์ปริญญาวิทยาศาสตร์
มหาบัณฑิต, สาขาสุขศึกษา บัณฑิตวิทยาลัย มหาวิทยาลัยเกษตรศาสตร์. 2545.

APPENDIX

I.D. No. □□□

Questionnaire for household heads

Evaluation of dengue haemorrhagic fever prevention and control program in Nakhonnayok Province

I, Mr. Sanya Kittisoontaropas, am a M Sc. student at the Department of Public Health Administation, Faculty of Public Health, Mahidol University. I have received permission to conduct research for my thesis entitled "Evaluation of dengue haemorrhagic fever prevention and control program in Nakhonnayok Province". The objective of this study is to assess knowledge, perception and participation in community activities in prevention and control dengue haemorrhagic fever in Nakhonnayok Province. The interview form is divided into four parts as follows:

Part 1: Knowledge of dengue haemorrhagic fever

Part 2: Perception of dengue haemorrhagic fever

Part 3: Participation in community activities in prevention and control dengue haemorrhagic fever

Part 4: Preventive behavior to control dengue haemorrhagic fever

Instruction

- The participants include household heads who were living in Nakhonnayok Province from May to September 2002 and able to communicate in Thai language.
- If there is no household heads or he/she has some conditions e.g. deafness which make him/her unable to answer questions, the interview can be conducted with husband or wife or other members of the family, 15 years or older and lived in the house during May to September 2002 and able to communicate in Thai language.

This research complies with the principles of human rights. Your participation is of your own accord in which you can withdraw from the interview any time. Please answer the questions truthfully. Your answers are kept confidential and will be presented in a general format only. Thus it does not affect your employment situation or any benefits you may gain from the government agencies. Your participation enables the investigator to study and to improve the dengue haemorrhagic fever prevention and control tasks of Nakhonnayok province.

Thank you very much for your participation with this study.

Sanya Kittisoontaropas
M.Sc student of the Department of Public Health Administration,
Faculty of Public Health, Mahidol University

Part 1: Knowledge of dengue haemorrhagic fever

Instructions: Please complete your details carefully in the blank and make ✓ in appropriate boxes

Topics	True	False
1. Mosquitoes that cause dengue haemorrhagic fever like to feed during the night.		
2. Mosquitoes that cause dengue haemorrhagic fever like to rest inside the house where there is bright light and good air flow.		
3. The symptoms of high temperature, headache, dispirited demeanor and bleeding on the skin and subcutaneous tissue on arms, legs and other parts of the body could be symptoms of dengue haemorrhagic fever.		
4. Symptoms of suspected dengue haemorrhagic fever that may need immediate hospitalization include the following:		
4.1.High temperature and vomiting		
4.2.High fever and a dispirited demeanor		
4.3.High fever and restlessness		
4.4.No fever but cold skin, particularly the feet		
5. A person having fever and suspected of dengue haemorrhagic fever should be given medicine to reduce fever immediately.		
6. Dengue haemorrhagic fever occurs in the rainy season only.		
7. Dengue haemorrhagic fever prevention includes sleeping under a mosquito net during the day.		
8. Dengue haemorrhagic fever can be prevented by a vaccine.		
9. The best way to prevent dengue haemorrhagic fever is to spray thermal fog to kill adult mosquito.		
10. Aedes aegypti mosquitoes like to lay eggs in pollutedwater.		
11. Killing mosquito larvae weekly in water retaining containers help control mosquitoes.		
12. Vinegar and detergent can kill the mosquito larvae in the ant traps used to protect food storage cabinets.		
13. If dengue haemorrhagic fever patient is found in the village, the following should be done:		
13.1. Destroy mosquito breeding sources around the house		
13.2. Prevent mosquito bites by using mosquito repellants		
13.3. Confirm dengue infection by blood test after being bitten by mosquito		
13.4. There is no need to do anything if the dengue patient's house is far away		
14. Abate granules should be applied to the polluted water because that is the mosquito breeding ground.		

Part 2: Perception of dengue haemorrhagic fever

Instructions: Please complete your details carefully in the blank and make ✓ in appropriate boxes

Topics	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1. All types of mosquito can transmit dengue haemorrhagic fever.					
2. Dengue haemorrhagic fever only occurs in young children because adults are immune to it.					
3. It is possible for young children who are bitten by mosquito during the day to be infected by dengue haemorrhagic fever.					
4. It is only the male mosquito that likes to bite and feed on human blood.					
5. Infection in humans produces life-long immunity against re-infection.					
6. Dengue haemorrhagic fever is curable.					
7. Dengue haemorrhagic fever may lead to death if a prompt and accurate treatment is not given.					
8. Children infected with dengue haemorrhagic fever may die of shock if not treated promptly.					
9. A healthy person will not be infected by dengue haemorrhagic fever.					
10. High temperature that suddenly drops within 24 hours in dengue haemorrhagic fever patient is a sign of recovery. There is no need to go to hospital.					
11. Weekly inspection and termination of mosquito larvae breeding sources helps prevent dengue haemorrhagic fever.					
12. Termination of mosquito breeding sources around houses is a simple thing to do.					

Topics	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
13. Using mosquito repellant during the day is one of the methods used to prevent dengue haemorrhagic fever.					
14. The cost of treatment of dengue haemorrhagic fever is very high.					
15. You should observe the symptoms of fever, hot skin and unusually dispirited in young children in your household for a few days before taking them to see doctors.					
16. Abate granules applied in water to kill mosquito larvae does not cause any harm to human health.					
17. Termination of mosquito larvae by using Abate granules is simple and effective.					
18. Public health officers should take the lead in the termination of mosquito larvae in the village.					
19. Weekly drain and clean of any forms of uncovered containers is a waste of time.					
20. Spraying of thermal fog to kill mosquito is to be performed by public health officers only. It is not possible for the people in villages to do that themselves.					

Part 3: Participation in community activities in prevention and control dengue haemorrhagic fever

Instructions: Please complete your details carefully in the blank and make ✓ in appropriate boxes

Topics	Always	Sometime	Never
Did you perform the following during May to September 2002			
1. Did you tell your neighbors about the danger of dengue haemorrhagic fever?			
2. Did you introduce methods to kill mosquito larvae to your neighbors?			
3. Did you attend the village meeting to establish dengue haemorrhagic fever prevention and control plans?			
4. Did you assist in the spraying of thermal fog during the campaign or when dengue patients are found in the village?			
5. Did you participate in the activities, organized in villages or communities, to prevent and control dengue haemorrhagic fever?			
6. Did you recommend solutions to dengue haemorrhagic fever problems to neighbors or communities?			
7. Did you cooperate with the officials in dissemination of useful information about dengue haemorrhagic fever?			
8. Did you participate in the inspection and termination of mosquito larvae and its breeding sources in villages?			
9.Did you participate in the inspection and termination of mosquito larvae and their breeding sources in schools?			
10.Did you suggest that your neighbors who have symptoms of fever, headache, demeanor and bleeding on skin, arms and legs, should seek treatment at health centers or hospitals?			

Part 4: Preventive behavior to control dengue haemorrhagic fever

Instructions: Please complete your details carefully in the blank and make ✓ in appropriate boxes

1. How do you avoid being bitten by mosquito during the day? (You can choose more than one answer)

( ) 1. No prevention ( ) 2. Use mosquito repellants
( ) 3. Use mosquito coils ( ) 4. Spray insecticide
( ) 5. Sleep under mosquito net ( ) 6. Install screens
( ) 7. Turn on the fan
( ) 8. Other methods, please specify …….

2. How do you avoid having mosquito larvae in drinking water? (You can choose more than one answer)

( ) 1. Cover all water containers
( ) 2. Cover some of water containers
( ) 3. Drain and clean every week
( ) 4. Drain and clean occasionally
( ) 5. Apply Abate granules once every three months
( ) 6. Apply Abate granules from time to time
( ) 7. Do nothing
( ) 8. Other methods, please specify …….

3. How do you avoid having mosquito larvae in household water storage system? (You can choose more than one answer)

( ) 1. Cover all water containers
( ) 2. Cover some of water containers
( ) 3. Drain and clean every week
( ) 4. Drain and clean once in a while
( ) 5. Always have larvivorous fish in the containers
( ) 6. Occasionally have larvivorous fish in the containers
( ) 7. Apply Abate granules once every three months
( ) 8. Apply Abate granules from time to time
( ) 9. Do nothing
( ) 10. Other methods, please specify …….

4. How do you avoid having mosquito larvae in water containers in bathroom or toilets? (You can choose more than one answer)

( ) 1. Cover all water containers
( ) 2. Cover some of water containers
( ) 3. Drain and clean every week
( ) 4. Drain and clean once in a while
( ) 5. Always have larvivorous fish in the containers
( ) 6. Occasionally have larvivorous fish in the containers
( ) 7. Apply Abate granules once every three months
( ) 8. Apply Abate granules from time to time
( ) 9. Do nothing
( ) 10. Other methods, please specify …….

5. How do you avoid having mosquito larvae in the ant traps used to protect food storage cabinet? (You can choose more than one answer)

( ) 1. Put vinegar in the ant traps ( ) 2. Put salt in the ant traps
( ) 3. Put engine oil in the ant traps ( ) 4. Put ant poison
( ) 5. Use resin ( ) 6. Use Abate granules (Temephos)
( ) 7. Put detergent ( ) 8. Put hot water
( ) 9. No prevention
( ) 10. Do not have food storage cabinet or ant trap
( ) 11. Other methods, please specify …….

6. How can you avoid having mosquito larvae in flower vases? (You can choose more than one answer)

( ) 1. Drain and clean every week
( ) 2. Drain and clean once in a while
( ) 3. Always have larvivorous fish in the containers
( ) 4. Occasionally have larvivorous fish in the containers
( ) 5. Apply Abate granules once every three months
( ) 6. Apply Abate granules from time to time
( ) 7. Cover the vases with tissues or cotton balls
( ) 8. Do nothing
( ) 9. Do not have vase
( ) 10. Other methods, please specify …….

7. How can you avoid having mosquito larvae in pot plant drip catchers? (You can choose more than one answer)

( ) 1. Drain and clean every week
( ) 2. Drain and clean once in a while
( ) 3. Always have larvivorous fish in the containers
( ) 4. Occasionally have larvivorous fish in the containers
( ) 5. Apply Abate granules once every three months
( ) 6. Apply Abate granules from time to time
( ) 7. Put aggregate sand
( ) 8. Do nothing
( ) 9. Do not have pot plant or drip catcher
( ) 10. Other methods, please specify …….

8. How can you avoid having mosquito larvae in water bowls for pets inside the house? (You can choose more than one answer)

( ) 1. Drain and clean every week ( ) 2. Drain and clean once in a while
( ) 3. Do nothing ( ) 4. Do not have water bowl for pets
( ) 5. Other methods, please specify …….

9. There are some unused items such as tins, cans, coconut shells, bottles, glasses, used tyres and others that retain water, how do you dispose them? (You can choose more than one answer)

( ) 1. Burn and burry every week ( ) 2. Burn and burry every once in a while
( ) 3. Dispose in the bin provided in the village
( ) 4. Do nothing
( ) 5. Do not have containers ( ) 6.Other methods, please specify .....

Information of the interviewees

1. Sex ( ) 1. Male ( ) 2. Female

2. Age …….. Years

3. Education attainment

( ) 1. No education ( ) 2. Primary school level

( ) 3. Secondary high school level ( ) 4. High school level

( ) 5. Diploma ( ) 6. Bachelor degree or equivalence

( ) 7. Higher than bachelor level

4. Occupation

( ) 1. Unemployed ( ) 2. Student

( ) 3. Housewife ( ) 4. Laborer

( ) 5. Farmers (or chardists, broad acre farmers, live stock farmers)

( ) 6. Merchant

( ) 7. Civil servant/ employee of government enterprises

5. Number of your family members …….. people

6. Was there dengue haemorrhagic fever patient in your house during May to September 2002?

( ) 1. No

( ) 2. Yes and was treated and is recovering. Specify the month …….

( ) 3. Yes and died of dengue haemorrhagic fever.

Specify the month of sick/death ……

Date of the interviews ……..

Interviewer ……...

I.D. No. □□□

Questionnaire for Tambon health officers

Evaluation of dengue haemorrhagic fever prevention and control program in Nakhonnayok Province

I, Mr. Sanya Kittisoontaropas, am a M Sc. student at the Department of Public Health Administation, Faculty of Public Health, Mahidol University. I have received the permission to conduct research for my thesis entitled "Evaluation of dengue haemorrhagic fever prevention and control program in Nakhonnayok Province". The objective of this study is to evaluate the operations of tambon health officers conducting dengue surveillance according to the 2002 operational plan. The study took place in the areas where data collection from family heads was performed. The interview form is divided into 3 parts, as follows:

Part 1: General information

Part 2: Dengue fever prevention and control operation

Part 3: Outcomes of dengue fever prevention and control operations

Instructions

The participants include health center staff who have been responsible for dengue fever prevention and control tasks throughout the fiscal year 2002 in the area where data collection took place.

This research complies with the principles of human rights. Your participation is of your own accord in which you can withdraw from the interview any time. Please answer the questions truthfully. Your answers are kept confidential and will be presented in a general format only. Thus it does not affect your employment situation. Your participation enables the investigator to study and to improve the dengue fever prevention and control tasks of Nakhonnayok Province.

Thank you very much for your participation with this study.

Sanya Kittisoontaropas

M.Sc student of the Department of Public Health Administration,

Faculty of Public Health, Mahidol University

Part 1: General information

Instructions: Please complete your details carefully in the blank and make ✓ in appropriate boxes

1. Sex ( ) 1. Male ( ) 2. Female

2. Age …….. Years

3. Marital status

( ) 1. Single ( ) 2. Married

( ) 3. Widow/Divorced/Separated

4. Education

( ) 1. Lower bachelor degree

( ) 2. Bachelor degree

( ) 3. Higher than bachelor degree

5. Position

( ) 1. Health administration officer

( ) 2. Health technical officer

( ) 3. Professional nurse

( ) 4. Community health worker

( ) 5. Technical nurse

( ) 6. Dental health nurse

6. Length of service ……. Years

7. Length of service at this health center ……. Year (up to 30 September 2002)

Part 2: Dengue fever prevention and control program

Instructions: Please complete your details carefully in the blank and make ✓ in appropriate boxes

No.	Operations	Regularly	Occasionally	Never
Did you perform the following during the fiscal year 2002?				
1	Did you follow the steps contained in the dengue haemorrhagic fever prevention and control program?			
2	Did you specify risk areas in accordance with the epidemiological guidelines?			
3	Did you establish measures to prevent and control dengue haemorrhagic fever in risk areas in accordance with the dengue haemorrhagic fever control program?			
4	Did you provide information regarding dengue to the people during your site visit at least once a month?			
5	Did you provide information regarding dengue haemorrhagic fever to the people via the village public address and speaker tower system at least once a month?			
6	Did you disseminate leaflets and posters contain information of dengue haemorrhagic fever to the people at least once a month?			
7	Did you educate the people by providing health education in schools at least once a month?			

No.	Operations	Regularly	Occasionally	Never
8	Did you request assistance and cooperation in dengue haemorrhagic fever prevention from the local administrative organization during their meetings?			
9	Did you request cooperation with dengue haemorrhagic fever prevention from community leaders?			
10	Did you give advice all the time, during your visiting, to the people on how to prevent mosquito bites by sleeping under mosquito net or spraying insecticide?			
11	Did you advise the people to keep household water storage system covered or to change the water regularly, and you follow up at least once a month to see if your advice had been implemented?			
12	Did you advise the people to put Abate granules or vinegar or salt in the ant traps used to protect food storage cabinets, and follow up at least once a month to see if your advice had been implemented?			
13	Did you advise the people to put Abate granules or to drain water in vases, pot plants drip catchers and other forms of containers, and follow up at least once a month to see if your advice had been implemented?			

No.	Operations	Regularly	Occasionally	Never
14	Did you advise the people to burry or burn domestic waste or garbage and follow up at least once a month to see if your advice had been implemented?			
15	Did you advise the people to employ larvivorous fish or fighting fish in concrete cisterns for water storage in bathroom and follow up at least once a month to see if your advice had been implemented?			
16	Did you suggest the people to use Abate granules to kill mosquito larvae every time on your visiting to their homes?			
17	Did you suggest the people to use insecticide spray every time on your visiting to their homes?			
18	Did you assist in the spraying of thermal fog during the outbreak of dengue fever in the area or during the dengue fever prevention and control campaign?			
19	Did you inform the people when a dengue patient is found in your responsible areas in order to prevent further infection?			
20	Did you participate in the inspection of mosquito larvae four times a year in according to the dengue control program of Nakhonnayok province?			
21	Did you record details and history of all dengue fever patients diagnosed by doctors?			

No.	Operations	Regularly	Occasionally	Never
22	Did you follow up with all dengue haemorrhagic fever suspected patients after being transferred to hospitals?			
23	Did you review data of dengue haemorrhagic fever in order to predict risk areas in the year after?			
24	Did you analyze and evaluate dengue haemorrhagic fever situation every month, both before and after the outbreak?			
25	Did you report the HI and CI values four times a year?			

Part 3: Outcomes of dengue fever prevention and control operations

Instructions: Please complete your details carefully in the blank

1. The prevalence of lavae found in your areas are:

	HI	CI
1st inspection (4-8 March 2002)	..….	…….
2nd inspection (27-31 May 2002)	…….	…….
3rd inspection (26-30 Aug 2002)	…….	…….
4th inspection (25-29 Nov 2002)	…….	…….

2. The number of dengue fever patients, all age group (Oct 2001- Sep 2002)

Number of patients	…….	Morbidity rate	…….
Number of illed	…….	Fatality rate	…….

Household mosquito larvae inspection form

District …… Tambon …… Moo …… House number…… Inspection results ( ) 1. Found laevae ( ) 2. Did not find larvae

Container inspected	Number of container inspected (✓ for each container Inspected)	Number of larva found (✓for each container infested with larvae)	Total number of container inspected (piece)	Total number of container infested with larvae (piece)	Index	
					HI	CI
1. Drinking water						
2. Concrete cisterns for water storage in toilets, and bathrooms.						
3. Water cisterns, cement pipes used as water drums, pot for aquatic plants, water cisterns for foot wash						
4. Vases for fresh flowers, glasses of water offering to statue of Buddha, vases and glassess of water in spirit shrines						
5. Ant traps used to protect food storage cabinet						
6. Drip catchers of pot plants						
7. Other items around the house such as cisterns, tyres, plastic bags, bottles, cans, coconut shells etc						

Signature……Inspector

Date ……

เลขที่แบบสัมภาษณ์ □ □ □

แบบสัมภาษณ์หัวหน้าครัวเรือน

การประเมินผลแผนงานควบคุมป้องกันโรคไข้เลือดออก จังหวัดนครนายก

ข้าพเจ้า นายสัญญา กิตติสุนทโรภาศ นักศึกษาปริญญาโท สาขาบริหารสาธารณสุข คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดล ได้รับอนุมัติให้ทำวิทยานิพนธ์เรื่อง การประเมินผลแผนงานควบคุมป้องกันโรคไข้เลือดออก จังหวัดนครนายก โดยมีวัตถุประสงค์เพื่อประเมินความรู้ การรับรู้ และการมีส่วนร่วมของประชาชนในชุมชน ในการป้องกันโรคไข้เลือดออก ของ หัวหน้าครัวเรือนในจังหวัดนครนายก ซึ่งแบบสัมภาษณ์ฉบับ ประกอบด้วย 4 ส่วน ดังนี้

ส่วนที่ 1 แบบสัมภาษณ์เกี่ยวกับความรู้เรื่องโรคไข้เลือดออก

ส่วนที่ 2 แบบสัมภาษณ์เกี่ยวกับการรับรู้เรื่องโรคไข้เลือดออก

ส่วนที่ 3 แบบสัมภาษณ์เกี่ยวกับการมีส่วนร่วมของประชาชนในชุมชมในการป้องกันโรคไข้เลือดออก

ส่วนที่ 4 แบบสัมภาษณ์เกี่ยวกับพฤติกรรมการป้องกันโรคไข้เลือดออก

คำชี้แจงการตอบแบบสัมภาษณ์

- ผู้ตอบแบบสัมภาษณ์ต้องเป็นหัวหน้าครัวเรือน ที่มีภูมิลำเนาหรืออาศัยอยู่ในจังหวัดนครนายก ตั้งแต่เดือนพฤษภาคม – กันยายน 2545 และสามารถสื่อสารด้วยภาษาไทยได้

- กรณีที่ไม่พบหัวหน้าครัวเรือน หรือไม่สามารถตอบคำถามได้ ให้สัมภาษณ์สามีหรือภรรยา หรือสมาชิกของครัวเรือนที่มีอายุ 15 ปีขึ้นไป ที่อาศัยอยู่ในครัวเรือนเดียวกันตั้งแต่เดือนพฤษภาคม – กันยายน 2545 และสามารถสื่อสารด้วยภาษาไทยได้

การวิจัยครั้งนี้ ได้คำนึงถึงสิทธิมนุษยชน ผู้ตอบแบบสัมภาษณ์เข้าร่วมวิจัยด้วยความสมัครใจ มีสิทธิบอกเลิกการเข้าร่วมวิจัยเมื่อใดก็ได้ ดังนั้นกรุณาตอบแบบสัมภาษณ์ตามความเป็นจริง หรือตามความคิดเห็นของท่าน เพื่อผู้วิจัยจะนำผลที่ได้ไปใช้ในการศึกษาและพัฒนางานควบคุมป้องกันโรคไข้เลือดออก ของจังหวัดนครนายก ต่อไป

ขอขอบพระคุณที่ท่านให้ความร่วมมือในการตอบแบบสัมภาษณ์ครั้งนี้

สัญญา กิตติสุนทโรภาศ
นักศึกษาหลักสูตรวิทยาศาสตรมหาบัณฑิต (สาธารณสุขศาสตร์)
สาขาบริหารสาธารณสุข คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดล

ส่วนที่ 1 แบบสัมภาษณ์เกี่ยวกับความรู้เรื่องโรคไข้เลือดออก

คำชี้แจง โปรดทำเครื่องหมาย ✓ ลงใน ☐ ตามความเป็นจริง

ข้อคำถาม	ถูก	ผิด
1. ยุงที่นำโรคไข้เลือดออกเป็นยุงที่ชอบออกหากินเวลากลางคืน		
2. ยุงที่นำโรคไข้เลือดออกชอบอาศัยอยู่ในบ้าน บริเวณที่มีแสงสว่างส่องถึง และมีลมพัดผ่าน		
3. อาการไข้สูง ปวดศรีษะ ซึม และมีจุดเลือดออกที่ผิวหนัง แขน ขา น่าจะเป็นอาการของโรคไข้เลือดออก		
4. อาการของผู้ที่สงสัยว่าเป็นโรคไข้เลือดออกที่ต้องนำส่งโรงพยาบาลทันที มีดังต่อไปนี้ 4.1. มีไข้ร่วมกับอาเจียน		
4.2. มีไข้สูงและมีอาการซึม		
4.3. มีไข้สูงร่วมกับอาการกระสับกระส่าย		
4.4. ไม่มีไข้ แต่ปลายมือปลายเท้าเย็น		
5. ถ้ามีไข้และสงสัยว่าเป็นโรคไข้เลือดออก ควรให้กินยาลดไข้ชนิดใดก็ได้ทันที		
6. โรคไข้เลือดออกสามารถพบได้เฉพาะฤดูฝนเท่านั้น		
7. การป้องกันยุงลายกัดคือนอนกางมุ้งตอนกลางวัน		
8. โรคไข้เลือดออกสามารถป้องกันได้ด้วยวัคซีน		
9. การป้องกันโรคไข้เลือดออกที่ดีที่สุด คือการพ่นหมอกควันเพื่อกำจัดยุงโตเต็มวัย		
10. ยุงลายชอบวางไข่ในน้ำเน่า น้ำครำ		
11. การกำจัดลูกน้ำยุงลายในภาชนะที่มีน้ำขังทุกสัปดาห์ สามารถควบคุมยุงลายได้		
12. น้ำส้มสายชู ผงซักฟอก สามารถทำลายลูกน้ำยุงลายในจานรองขาตู้กับข้าวได้		

ข้อคำถาม	ถูก	ผิด
13. เมื่อมีผู้ป่วยไข้เลือดออกในหมู่บ้าน ควรปฏิบัติดังนี้		
13.1. ทำลายแหล่งเพาะพันธุ์ยุงรอบๆบริเวณบ้าน		
13.2. ป้องกันไม่ให้ยุงกัดด้วยการทายากันยุง		
13.3. ตรวจเลือดเพื่อให้แน่ใจว่าไม่ติดเชื้อ เมื่อถูกยุงกัด		
13.4. ไม่ต้องทำอะไรเลย ถ้าบ้านผู้ป่วยอยู่ไกลจากบ้านท่าน		
14. ควรใส่ทรายอะเบทในแหล่งน้ำเน่า เพราะเป็นแหล่งเพาะพันธุ์ยุงลาย		

ส่วนที่ 2 แบบสัมภาษณ์เกี่ยวกับการรับรู้เรื่องโรคไข้เลือดออก

คำชี้แจง โปรดทำเครื่องหมาย ✓ ลงใน ☐ ตามความเป็นจริง

ข้อคำถาม	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
1. ยุงทุกชนิดสามารถนำโรคไข้เลือดออกได้					
2. โรคไข้เลือดออกเป็นกับเด็กเท่านั้น ผู้ใหญ่ไม่เป็น เพราะมีภูมิต้านทาน					
3. เด็กที่ถูกยุงลายกัดในตอนกลางวัน มีโอกาสป่วยเป็นโรคไข้เลือดออก					
4. ยุงลายตัวผู้เท่านั้นที่ชอบกัดและดูดเลือดคน					
5. คนที่เคยป่วยเป็นโรคไข้เลือดออกแล้ว จะมีภูมิคุ้มกันและไม่ป่วยเป็นโรคไข้เลือดออกซ้ำอีก					
6. โรคไข้เลือดออกเป็นโรคที่สามารถรักษาให้หายได้					
7. โรคไข้เลือดออกเป็นโรคที่มีความรุนแรงถึงตายได้ ถ้าไม่ได้รับการรักษาที่ถูกต้องและทันเวลา					

ข้อคำถาม	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
8. เด็กที่ป่วยเป็นโรคไข้เลือดออกจะตายด้วยภาวะช็อก หากรักษาไม่ทันเวลา					
9. คนที่มีร่างกายสมบูรณ์แข็งแรง จะไม่ป่วยเป็นโรคไข้เลือดออก					
10. ผู้ป่วยโรคไข้เลือดออก ที่มีไข้สูง ตัวร้อนจัด แล้วไข้ลดลงอย่างรวดเร็วภายใน 24 ชั่วโมง แสดงว่าอาการดีขึ้น ไม่ต้องไปพบแพทย์					
11. การสำรวจและทำลายแหล่งเพาะพันธุ์ลูกน้ำยุงลายทุกสัปดาห์ ช่วยป้องกันการเกิดโรคไข้เลือดออกได้					
12. การกำจัดแหล่งเพาะพันธุ์ยุงลาย เช่น ในภาชนะที่มีน้ำขังรอบบ้านของท่าน เป็นเรื่องที่ทำได้ง่าย					
13. การใช้ยาทากันยุงเพื่อป้องกันยุงกัด ในเวลากลางวันเป็นวิธีการหนึ่งที่ช่วยป้องกันโรคไข้เลือดออกได้ดี					
14. การป่วยเป็นโรคไข้เลือดออกทำให้เสียค่าใช้จ่ายที่เกี่ยวข้องกับการรักษาสูง มีผลกระทบต่อค่าใช้จ่ายของครอบครัว					
15. เมื่อบุตรหลานของท่านเป็นไข้ ตัวร้อนจัด ซึมผิดปกติ ควรสังเกตอาการ 1 – 2 วัน ถ้าไม่ดีขึ้นควรพาไปพบแพทย์					
16. การใส่ทรายอะเบทในน้ำใช้เพื่อป้องกันลูกน้ำยุงลายไม่ทำให้เกิดอันตรายต่อสุขภาพ					

ข้อคำถาม	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
17. การกำจัดแหล่งเพาะพันธุ์ยุงลายโดยใช้ทรายอะเบท ทำได้ง่ายและได้ผลดี					
18. การกำจัดลูกน้ำยุงลายในหมู่บ้าน เจ้าหน้าที่สาธารณสุขควรเป็นแกนนำในการดำเนินงาน					
19. การขัดล้าง และถ่ายน้ำภาชนะเก็บกักน้ำที่ไม่มีฝาปิดทุกสัปดาห์ ทำให้เสียเวลา					
20. การพ่นหมอกควันกำจัดยุงโดยชาวบ้านไม่สามารถปฏิบัติได้เอง ต้องอาศัยเจ้าหน้าที่สาธารณสุข เท่านั้น					

ส่วนที่ 3 แบบสัมภาษณ์เกี่ยวกับการมีส่วนร่วมของประชาชนในชุมชนในการป้องกันโรคไข้เลือดออก

คำชี้แจง โปรดทำเครื่องหมาย ✓ ลงใน ☐ ตามความเป็นจริง

ข้อคำถาม	ทำเป็นประจำ	ทำเป็นบางครั้ง	ไม่เคยทำ
ในเดือน พฤษภาคม – กันยายน 2545 ท่านปฏิบัติดังนี้หรือไม่			
1. ท่านบอกถึงอันตรายของโรคไข้เลือดออกแก่เพื่อนบ้าน			
2. ท่านแนะนำวิธีการกำจัดลูกน้ำยุงลายแก่เพื่อนบ้าน			
3. ท่านเข้าร่วมประชุมหรือวางแผนป้องกันและควบคุมโรคไข้เลือดออกในหมู่บ้าน			
4. ท่านช่วยพ่นหมอกควันในชุมชน เมื่อมีการรณรงค์หรือเมื่อพบผู้ป่วยในหมู่บ้าน			

ข้อคำถาม	ทำเป็นประจำ	ทำเป็นบางครั้ง	ไม่เคยทำ
5. ท่านร่วมกิจกรรมรณรงค์ป้องกันและควบคุมโรคไข้เลือดออก ที่จัดขึ้นในหมู่บ้านหรือชุมชน			
6. ท่านเสนอแนะวิธีการแก้ไขปัญหาไข้เลือดออกแก่เพื่อนบ้านหรือชุมชน			
7. ท่านให้ความร่วมมือกับเจ้าหน้าที่ในการเผยแพร่ข่าวสารที่เป็นประโยชน์เกี่ยวกับโรคไข้เลือดออก			
8. ท่านร่วมสำรวจและทำลายแหล่งเพาะพันธุ์ยุงลายและกำจัดลูกน้ำยุงลายภายในหมู่บ้าน			
9. ท่านร่วมสำรวจและทำลายแหล่งเพาะพันธุ์ยุงลายและกำจัดลูกน้ำยุงลายภายในโรงเรียน			
10. ท่านได้แนะนำเพื่อนบ้านที่มีอาการไข้สูง ปวดศรีษะ ซึม และมีจุดเลือดออกที่ผิวหนัง แขน ขา ให้รีบไปรับการรักษาที่สถานีอนามัย หรือโรงพยาบาล			

ส่วนที่ 4 แบบสัมภาษณ์เกี่ยวกับพฤติกรรมการป้องกันโรคไข้เลือดออก

คำชี้แจง โปรดทำเครื่องหมาย ✓ ลงใน ( ) ตามความเป็นจริง

1. ท่านป้องกันยุงกัด เวลานอนในตอนกลางวันอย่างไร (ตอบได้มากกว่า 1 ข้อ)

( ) 1. ไม่มีการป้องกัน ( ) 2. ทายากันยุง

( ) 3. จุดยากันยุง ( ) 4. ฉีดยากันยุง

( ) 5. ใช้มุ้งครอบ ( ) 6. ติดมุ้งลวด

( ) 7. เปิดพัดลม ( ) 8. อื่นๆระบุ .....

2. ท่านป้องกันไม่ให้มีลูกน้ำในภาชนะเก็บน้ำดื่ม (ตอบได้มากกว่า 1 ข้อ)

( ) 1. ใช้ฝาปิดทุกใบ ( ) 2. ใช้ฝาปิดบางใบ

( ) 3. เปลี่ยนถ่ายน้ำทุกสัปดาห์ ( ) 4. เปลี่ยนถ่ายน้ำนานๆ ครั้ง

( ) 5. ใส่ทรายอะเบทอย่างน้อย 3 เดือนครั้ง ( ) 6. ใส่ทรายอะเบทนานๆ ครั้ง

( ) 7. ไม่ได้ทำอะไรเลย ( ) 8. อื่นๆระบุ .....

3. ท่านป้องกันไม่ให้มีลูกน้ำในภาชนะเก็บน้ำใช้ (ตอบได้มากกว่า 1 ข้อ)

( ) 1. ใช้ฝาปิดทุกใบ ( ) 2. ใช้ฝาปิดบางใบ

( ) 3. ขัดล้างและถ่ายน้ำทุกสัปดาห์ ( ) 4. ขัดล้างและถ่ายน้ำนานๆ ครั้ง

( ) 5. ใส่ปลากินลูกน้ำไว้สม่ำเสมอ ( ) 6. ใส่ปลากินลูกน้ำนานๆ ครั้ง

( ) 7. ใส่ทรายอะเบทอย่างน้อย 3 เดือนครั้ง ( ) 8. ใส่ทรายอะเบทนานๆ ครั้ง

( ) 9. ไม่ได้ทำอะไรเลย ( ) 10. อื่นๆระบุ .....

4. ท่านป้องกันไม่ให้มีลูกน้ำในภาชนะเก็บน้ำในห้องน้ำหรือห้องส้วม (ตอบได้มากกว่า 1 ข้อ)

( ) 1. ใช้ฝาปิดทุกใบ ( ) 2. ใช้ฝาปิดบางใบ

( ) 3. ขัดล้างและถ่ายน้ำทุกสัปดาห์ ( ) 4. ขัดล้างและถ่ายน้ำนานๆ ครั้ง

( ) 5. ใส่ปลากินลูกน้ำไว้สม่ำเสมอ ( ) 6. ใส่ปลากินลูกน้ำนานๆ ครั้ง

( ) 7. ใส่ทรายอะเบทอย่างน้อย 3 เดือนครั้ง ( ) 8. ใส่ทรายอะเบทนานๆ ครั้ง

( ) 9. ไม่ได้ทำอะไรเลย ( ) 10. อื่นๆระบุ .....

5. ท่านป้องกันไม่ให้มีลูกน้ำในจานรองขาตู้กับข้าว (ตอบได้มากกว่า 1 ข้อ)

( ) 1. ใส่น้ำส้มสายชู ( ) 2. ใส่เกลือแกง

( ) 3. ใส่น้ำมันเครื่อง ( ) 4. ใส่ยากันมด

( ) 5. ใส่ชัน ( ) 6. ใส่ทรายอะเบท (ทีมีฟอส)

( ) 7. ใส่ผงซักฟอก ( ) 8. ใส่น้ำเดือด

( ) 9. ไม่มีการป้องกัน ( ) 10. ไม่มีตู้กับข้าวหรือจานรองขาตู้

( ) 11. อื่นๆระบุ .....

6. ท่านป้องกันไม่ให้มีลูกน้ำในแจกันดอกไม้สดหรือแจกันพลู (ตอบได้มากกว่า 1 ข้อ)

( ) 1. ขัดล้างและถ่ายน้ำทุกสัปดาห์ ( ) 2. ขัดล้างและถ่ายน้ำนานๆ ครั้ง

( ) 3. ใส่ปลากินลูกน้ำไว้สม่ำเสมอ ( ) 4. ใส่ปลากินลูกน้ำนานๆ ครั้ง

( ) 5. ใส่ทรายอะเบทอย่างน้อย 3 เดือนครั้ง ( ) 6. ใส่ทรายอะเบทนานๆ ครั้ง

( ) 7. ปิดปากแจกันด้วยกระดาษทิชชู,สำลี ( ) 8. ไม่ได้ทำอะไรเลย

( ) 9. ไม่มีแจกัน ( ) 10. อื่นๆระบุ .....

7. ท่านป้องกันไม่ให้มีลูกน้ำในจานรองกระถางต้นไม้ (ตอบได้มากกว่า 1 ข้อ)

( ) 1. ขัดล้างและถ่ายน้ำทุกสัปดาห์ ( ) 2. ขัดล้างและถ่ายน้ำนานๆ ครั้ง

( ) 3. ใส่ปลากินลูกน้ำไว้สม่ำเสมอ ( ) 4. ใส่ปลากินลูกน้ำนานๆ ครั้ง

( ) 5. ใส่ทรายอะเบทอย่างน้อย 3 เดือนครั้ง ( ) 6. ใส่ทรายอะเบทนานๆ ครั้ง

( ) 7. ใส่ทรายก่อสร้าง ( ) 8. ไม่ได้ทำอะไรเลย

( ) 9. ไม่มีกระถางหรือจานรองกระถาง ( ) 10. อื่นๆระบุ .....

8. ท่านป้องกันไม่ให้มีลูกน้ำในภาชนะใส่น้ำให้สัตว์เลี้ยงภายในบ้าน (ตอบได้มากกว่า 1 ข้อ)

( ) 1. ขัดล้างและถ่ายน้ำทุกสัปดาห์ ( ) 2. ขัดล้างและถ่ายน้ำนานๆ ครั้ง

( ) 3. ไม่ได้ทำอะไรเลย ( ) 4. ไม่มีภาชนะใส่น้ำให้สัตว์เลี้ยง

( ) 5. อื่นๆระบุ .....

9. บ้านของท่านมีเศษภาชนะที่ไม่ได้ใช้ เช่น กระป๋อง กะลา ขวดน้ำ แก้วน้ำ ยางรถยนต์ หรือภาชนะอื่นๆ ที่สามารถขังน้ำได้ ท่านได้กำจัดอย่างไร (ตอบได้มากกว่า 1 ข้อ)

( ) 1. เผา ฝัง ทุกสัปดาห์ ( ) 2. เผา ฝัง นานๆ ครั้ง

( ) 3. ใส่ถังขยะประจำหมู่บ้าน ( ) 4. ไม่ได้ทำอะไรเลย

( ) 5. ไม่มีเศษภาชนะที่ขังน้ำได้ ( ) 6. อื่นๆระบุ .....

ข้อมูลผู้ให้สัมภาษณ์

1. เพศ ( ) 1. ชาย ( ) 2. หญิง

2. อายุ ..... ปี (จำนวนปีเต็ม)

3. การศึกษา

( ) 1. ไม่ได้เรียน ( ) 5. ระดับอนุปริญญา

( ) 2. ระดับประถม ( ) 6. ระดับปริญญาตรีหรือเทียบเท่า

( ) 3. ระดับมัธยมต้น ( ) 7. สูงกว่าระดับปริญญาตรี

( ) 4. ระดับมัธยมปลาย ( ) 8. อื่นๆ ระบุ ……..

4. อาชีพ

( ) 1. ไม่ได้ทำงาน ( ) 5. เกษตรกร (ทำนา ทำสวน ทำไร่ เลี้ยงสัตว์)

( ) 2. นักเรียน / นักศึกษา ( ) 6. ค้าขาย

( ) 3. พ่อบ้าน / แม่บ้าน ( ) 7. รับราชการ / รัฐวิสาหกิจ

( ) 4. รับจ้างทั่วไป ( ) 8. อื่นๆระบุ ……

5. จำนวนสมาชิกในครอบครัว ……. คน

6. มีผู้ป่วยโรคไข้เลือดออกในช่วงเดือนพฤษภาคม – กันยายน 2545 ที่ผ่านมาในบ้านของท่าน

( ) 1. ไม่มี

( ) 2. มีและได้รับการรักษาอาการทุเลา ระบุเดือนที่ป่วย ……..

( ) 3. มีและตายด้วยโรคไข้เลือดออก ระบุเดือนที่ป่วย/ตาย ……

วันที่สัมภาษณ์ ……

ผู้สัมภาษณ์ …….

เลขที่แบบสัมภาษณ์ □ □ □

แบบสัมภาษณ์เจ้าหน้าที่สาธารณสุขระดับตำบล

การประเมินผลแผนงานควบคุมป้องกันโรคไข้เลือดออก จังหวัดนครนายก

ข้าพเจ้า นายสัญญา กิตติสุนทโรภาศ นักศึกษาปริญญาโท สาขาบริหารสาธารณสุข คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดล ได้รับอนุมัติให้ทำวิทยานิพนธ์เรื่อง การประเมินผลแผนงานควบคุมป้องกันโรคไข้เลือดออก จังหวัดนครนายก โดยมีวัตถุประสงค์เพื่อประเมินการปฏิบัติงานการเฝ้าระวังโรคไข้เลือดออกของเจ้าหน้าที่สาธารณสุข ระดับตำบล ในพื้นที่ที่มีการเก็บรวบรวมข้อมูลของหัวหน้าครัวเรือน ตามแผนปฏิบัติการควบคุมโรคไข้เลือดออก จังหวัดนครนายก ปีงบประมาณ 2545 ซึ่งแบบสัมภาษณ์ ประกอบด้วย 3 ส่วน ดังนี้

ส่วนที่ 1 แบบสัมภาษณ์เกี่ยวกับข้อมูลทั่วไป

ส่วนที่ 2 แบบสัมภาษณ์เกี่ยวกับการดำเนินงานควบคุมป้องกันโรคไข้เลือดออก

ส่วนที่ 3 แบบเก็บข้อมูลผลการดำเนินงานควบคุมป้องกันโรคไข้เลือดออก

คำชี้แจงการตอบแบบสัมภาษณ์

ผู้ตอบแบบสัมภาษณ์ ได้แก่ เจ้าหน้าที่สถานีอนามัย ที่รับผิดชอบงานป้องกันควบคุมโรคไข้เลือดออก ตามพื้นที่ที่ได้รับการสุ่มตัวอย่างของหัวหน้าครัวเรือน และต้องปฏิบัติงานอยู่ในพื้นที่ตลอดปีงบประมาณ 2545

การวิจัยครั้งนี้ ได้คำนึงถึงสิทธิมนุษยชน ผู้ตอบแบบสัมภาษณ์เข้าร่วมวิจัยด้วยความสมัครใจ มีสิทธิบอกเลิกการเข้าร่วมวิจัยเมื่อใดก็ได้ ดังนั้นกรุณาตอบแบบสัมภาษณ์ตามความเป็นจริง ซึ่งคำตอบของท่านจะถูกเก็บเป็นความลับและจะนำเสนอผลงานวิจัยในภาพรวมเท่านั้น ไม่มีผลกระทบต่อการปฏิบัติงานของท่านแต่อย่างไร ทั้งนี้เพื่อผู้วิจัยจะนำผลที่ได้ไปใช้ในการศึกษาและพัฒนางานควบคุมป้องกันโรคไข้เลือดออก ของจังหวัดนครนายก ต่อไป

ขอขอบพระคุณที่ท่านให้ความร่วมมือในการตอบแบบสัมภาษณ์ครั้งนี้

สัญญา กิตติสุนทโรภาศ
นักศึกษาหลักสูตรวิทยาศาสตรมหาบัณฑิต (สาธารณสุขศาสตร์)
สาขาบริหารสาธารณสุข คณะสาธารณสุขศาสตร์ มหาวิทยาลัยมหิดล

ส่วนที่ 1 แบบสัมภาษณ์เกี่ยวกับข้อมูลทั่วไป

คำชี้แจง โปรดกรอกข้อมูลและทำเครื่องหมาย ✓ ลงใน ( ) ตามความเป็นจริง

1. เพศ ( ) 1. ชาย ( ) 2. หญิง

2. อายุ …… ปี (จำนวนปีเต็ม)

3. สถานภาพสมรส

( ) 1. โสด ( ) 2. คู่

( ) 3. หม้าย / หย่า / แยก

4. การศึกษา

( ) 1. ระดับต่ำกว่าปริญญาตรี

( ) 2. ระดับปริญญาตรีหรือเทียบเท่า

( ) 3. ระดับสูงกว่าปริญญาตรี

5. ตำแหน่งปัจจุบัน

( ) 1. เจ้าหน้าที่บริหารงานสาธารณสุข

( ) 2. นักวิชาการสาธารณสุข

( ) 3. พยาบาลวิชาชีพ

( ) 4. เจ้าพนักงานสาธารณสุขชุมชน

( ) 5. พยาบาลเทคนิค

( ) 6. ทันตาภิบาล

6. อายุราชการ …….. ปี (จำนวนปีเต็ม)

7. ระยะเวลาในการปฏิบัติงานที่สถานีอนามัยแห่งนี้ …… ปี (นับถึง 30 กันยายน 2545)

ส่วนที่ 2 แบบสัมภาษณ์เกี่ยวกับการดำเนินงานควบคุมป้องกันโรคไข้เลือดออก

คำชี้แจง โปรดทำเครื่องหมาย ✓ ลงใน ☐ ตามความเป็นจริง

ลำดับ	การดำเนินงาน	ทำเป็นประจำ	ทำเป็นบางครั้ง	ไม่เคยทำ
ในปีงบประมาณ 2545 ท่านปฏิบัติดังต่อไปนี้หรือไม่				
1	ท่านปฏิบัติตามขั้นตอนของแผนปฏิบัติการควบคุมป้องกันโรคไข้เลือดออก			
2	ท่านกำหนดพื้นที่เสี่ยงตามแนวทางการดำเนินงานของงานระบาดวิทยา			
3	ท่านจัดทำมาตรการควบคุมโรคไข้เลือดออกตามระดับพื้นที่เสี่ยง ตามแผนควบคุมการระบาดโรคไข้เลือดออก			
4	ท่านมีการให้ความรู้เรื่องโรคไข้เลือดออกแก่ประชาชนขณะเยี่ยมบ้านอย่างน้อยเดือนละครั้ง			
5	ท่านให้ความรู้เรื่องโรคไข้เลือดออกแก่ประชาชน ผ่านหอกระจายข่าวในชุมชนอย่างน้อยเดือนละครั้ง			
6	ท่านมีการเผยแพร่สื่อเช่นแผ่นพับ โปสเตอร์เรื่องโรคไข้เลือดออกแก่ประชาชนในชุมชนอย่างน้อยเดือนละครั้ง			
7	ท่านให้ความรู้เรื่องโรคไข้เลือดออก โดยการให้สุขศึกษาในโรงเรียนอย่างน้อยเดือนละครั้ง			
8	ท่านขอความร่วมมือจากองค์การบริหารส่วนท้องถิ่น ในการป้องกันโรคไข้เลือดออก เมื่อมีการประชุมองค์การบริหารส่วนท้องถิ่น			
9	ท่านขอความร่วมมือจากผู้นำชุมชนในการป้องกันไข้เลือดออก เมื่อมีการประชุมผู้นำชุมชน			

ลำดับ	การดำเนินงาน	ทำเป็นประจำ	ทำเป็นบางครั้ง	ไม่เคยทำ
10	ท่านให้คำแนะนำประชาชนในการป้องกันยุงกัด เช่นนอนในมุ้งตอนกลางวัน หรือฉีดยากันยุง ทุกครั้งที่ออกเยี่ยมบ้าน			
11	ท่านให้คำแนะนำประชาชนในการปิดฝาภาชนะน้ำดื่ม น้ำใช้ การเปลี่ยนน้ำในภาชนะ และมีการติดตามตรวจสอบอย่างน้อยเดือนละครั้ง			
12	ท่านให้คำแนะนำประชาชนให้ใส่ทรายอะเบท หรือน้ำส้มสายชู หรือเกลือแกง ลงในจานรองขาตู้กับข้าว และมีการติดตามตรวจสอบอย่างน้อยเดือนละครั้ง			
13	ท่านให้คำแนะนำประชาชนให้ใส่ทรายอะเบท หรือเปลี่ยนน้ำในแจกันดอกไม้ จานรองกระถางต้นไม้ ภาชนะใส่น้ำให้สัตว์เลี้ยง และมีการติดตามตรวจสอบอย่างน้อยเดือนละครั้ง			
14	ท่านให้คำแนะนำประชาชนในการทำลายสิ่งของเหลือใช้ ขยะ ภาชนะขังน้ำ และมีการติดตามตรวจสอบอย่างน้อยเดือนละครั้ง			
15	ท่านแนะนำให้ประชาชนใช้ ปลาหางนกยูง ปลากัด ในการกินลูกน้ำ และมีการติดตามตรวจสอบอย่างน้อยเดือนละครั้ง			
16	ท่านแนะนำ และเผยแพร่ให้ประชาชนใช้ทรายอะเบท ในการกำจัดลูกน้ำยุง ทุกครั้งที่ออกเยี่ยมบ้าน			
17	ท่านแนะให้ประชาชนพ่นสเปรย์กำจัดยุง ทุกครั้งที่ออกเยี่ยมบ้าน			
18	ท่านร่วมพ่นหมอกควันเมื่อมีการะบาดของโรคเกิดขึ้นในพื้นที่ หรือเมื่อมีการรณรงค์			

ลำดับ	การดำเนินงาน	ทำเป็นประจำ	ทำเป็นบางครั้ง	ไม่เคยทำ
19	ท่านแจ้งให้ประชาชนในเขตรับผิดชอบทราบเมื่อมีผู้ป่วยโรคไข้เลือดออกในหมู่บ้าน หรือหมู่บ้านข้างเคียง เพื่อให้ป้องกันมากขึ้น			
20	ท่านร่วมสำรวจลูกน้ำเมื่อมีการรณรงค์ ทั้ง 4 ครั้ง ตามแผนป้องกันควบคุมโรคไข้เลือดออกของจังหวัด			
21	ท่านมีการบันทึกประวัติผู้ป่วยที่ได้รับการวินิจฉัยถูกต้องจากแพทย์ว่าเป็นโรคไข้เลือดออกทุกราย			
22	ท่านมีการติดตามการวินิจฉัยจากแพทย์ หลังจากมีการส่งต่อผู้ป่วย ที่สงสัยว่าเป็นไข้เลือดออกไปโรงพยาบาลทุกราย			
23	ท่านมีการทบทวนข้อมูลโรคไข้เลือดออก เพื่อกำหนดพื้นที่เสี่ยงในปีต่อไป			
24	ท่านวิเคราะห์และประเมินผลโรคไข้เลือดออกทุกเดือน ก่อนและหลังช่วงระยะเวลาระบาด			
25	ท่านทำรายงานค่า HI , CI 4 ครั้ง / ปี			

ส่วนที่ 3 แบบเก็บข้อมูลผลการดำเนินงานควบคุมป้องกันโรคไข้เลือดออก
คำชี้แจง โปรดกรอกข้อมูลลงในช่องว่างตามความเป็นจริง

1. ค่าดัชนีความชุกชุมของลูกน้ำยุงลาย ที่สุ่มสำรวจในพื้นที่ของสถานีอนามัยท่าน

	ค่า HI	ค่า CI
ครั้งที่ 1 (4 – 8 มี.ค. 45)	……..	……..
ครั้งที่ 2 (27 – 31 พ.ค. 45)	……..	……..
ครั้งที่ 3 (26 – 30 ส.ค. 45)	……..	……..
ครั้งที่ 4 (25 – 29 พ.ย. 45)	……..	……..

2. จำนวนผู้ป่วยโรคไข้เลือดออก ทุกกลุ่มอายุ (ต.ค. 44 – ก.ย.45) ในพื้นที่ของสถานีอนามัยท่าน

จำนวนผู้ป่วย ……. ราย อัตราป่วย ……
จำนวนผู้ป่วยตาย …… ราย อัตราป่วยตาย ……..

แบบสำรวจเพื่อการประเมินผลลูกน้ำยุงลายในบ้าน

อำเภอ ..... ตำบล ..... หมู่ที่ ..... บ้านเลขที่ ..... ผลการสำรวจ ( ) 1.พบลูกน้ำ ( ) 2.ไม่พบลูกน้ำ

ภาชนะเก็บน้ำที่สำรวจ	จำนวนภาชนะที่สำรวจ (ทำเครื่องหมาย ✓ ต่อ 1 ภาชนะที่สำรวจ)	จำนวนภาชนะที่พบลูกน้ำ (ทำเครื่องหมาย ✓ ต่อ 1 ภาชนะที่พบลูกน้ำ)	รวมจำนวนภาชนะที่สำรวจทั้งหมด (ชิ้น)	รวมจำนวนภาชนะที่พบลูกน้ำ (ชิ้น)	ค่าดัชนี	
					HI	CI
1. น้ำดื่ม						
2. อ่างเก็บน้ำในห้องน้ำหรือห้องส้วม						
3. โอ่งน้ำใช้ ท่อซีเมนต์เก็บน้ำ อ่างบัว อ่างน้ำล้างเท้า						
4. แจกันดอกไม้สด แก้วน้ำบูชาพระ แจกัน แก้วน้ำที่ศาลพระภูมิ						
5. จานรองขาตู้กันมด						
6. จานรองกระถางต้นไม้						
7. เศษวัสดุบริเวณรอบๆ บ้าน เช่น โอ่ง ไห ยางรถยนต์ ถุงพลาสติก ขวด กระป๋อง กะลา ฯลฯ						

ลงชื่อ ..... ผู้สำรวจ

วันที่ .....

BIOGRAPHY

NAME	Mr.Sanya Kittisoontaropas
DATE OF BIRTH	27 February 1969
PLACE OF BIRTH	Nakhonnayok, Thailand
INSTTUTES ATIENDED	Sawanpacharak Nursing College, 1987 - 1991 Certificate in Nursing Science.
POSITION & OFFICE	1991 – 1992, Banna Hospital, Nakhonnayok 1993 – Present, Nakhonnayok Provincial Health Office. Position : Health Academic Officer.