PREVENTIVE BEHAVIOURS AMONG HEALTH PROMOTING PRIMARY SCHOOL CHILDREN UNDER SOIL-TRANSMITTED HELMINTHIASIS CONTROL PROGRAM IN NAKHON SI THAMMARAT PROVINCE, THAILAND

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ABSTRACT

The purpose of this cross-sectional study was to assess preventive behaviors against soil-transmitted helminthiasis (STH) among school children under STH control program and to identify factors concerning preventive behaviors of school children. Preventive behaviors against STH consist of using latrine, washing hands, washing vegetables, wearing shoes, cutting fingernail, accepting stool examination and keeping sanitary facilities clean.

The target group was 5th and 6th grade primary school children in approved schools and not approved schools, categorized by the Ministry of Public Health, in high a prevalence district in Nakhon Si Thammarat, Thailand. Data was collected in January 2004. Self-administered questionnaire was conducted to 314 cases of school children for socio-demographic factors, knowledge, attitudes and preventive behaviors (KAP). Health personnel conducted home interview questionnaires to collect the data of sanitary facilities. Self-administered questionnaires for health personnel and teachers collected information regarding activities of health education in both schools. KAP questionnaires were analyzed and categorized as good and poor, positive and negative, and proper and improper. This study was analyzed with Chi-square test.

The study found that socio-demographic factors, including grade, sex. Caretaker, family size, siblings, parents' occupation, religion, income didn't have a relationship to preventive behaviors in both schools. Activities of health education by health personnel provided a demonstration of preventive behaviors for a greater number of school children in approved schools. Regarding sanitary facilities, proper preventive behaviors had a relationship to sanitary condition involved in food preparation ($p=0.001$) and restriction in fecal fertilizer use ($p=0.041$) in approved schools only. Toilet, water disposal, water resource tended to have a relationship to preventive behaviors in approved schools.

Demonstration of preventive behaviors by health personnel was conducted more in approved schools and proper preventive behaviors were related to sanitary facilities in approved school. This study concluded that demonstrations by health personnel reinforced the use of sanitary facilities at home in approved schools under STH control program.

KEY WORDS : PREVENTIVE BEHAVIORS / SOIL-TRANSMITTED HELMINTHIASIS / PRIMARY SCHOOL CHILDREN

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LIST OF ABBREVIATION

STH	:	Soil-transmitted helminthiasis
CHV	:	Child health volunteer
KAP	:	Knowledge, attitudes and preventive behaviors (practices)
HE	:	Health education by health personnel
TE	:	Health education by teacher
HEV	:	Health education by health personnel for child health volunteer
TEV	:	Health education by teacher for child health volunteer
MOPH	:	Ministry of Public Health
MOE	:	Ministry of Education
ACIPAC	:	Asian Center of International Parasite Control

CHAPTER I
INTRODUCTION

1.1 Rationale and Justification

1.1.1 State the magnitude of problem

Soil-transmitted helminthiasis (STH) is the one of common infection disease in the world. It affects a plenty of people, especially school-aged children in the Southeast Asian countries because of a lack of information.

The types of STH consist of ascariasis (round worm), trichuriasis (whipworm) and hookworm in Thailand. In the beginning of 1980, the prevalence of STH was 54.7% in all age population (Figure 1). The prevalence of STH then has decreased gradually after implementing many kinds of programs. Among them, the most effective ones were school health promotion and mass treatment programs against STH. However the prevalence of STH still remains in all age population in Thailand 22.5% (2001) and that of school-aged children is 21.1% (2001).

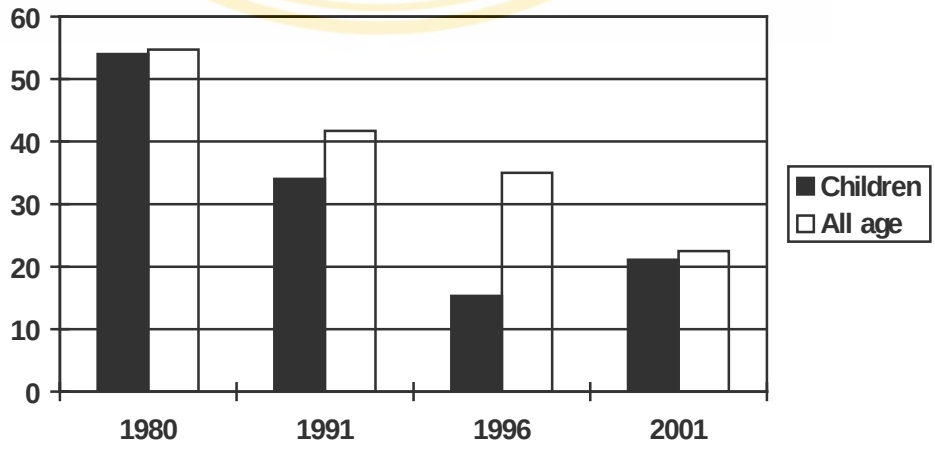


Figure 1: Prevalence of intestinal helminthiasis among primary school-aged children (5-14) in Thailand (ACIPAC, 2003)

In the southern Thailand, the prevalence of STH was extremely high in the 1980's among low economic status of southern population who had poor health knowledge or poor awareness of helminthic transmission (9). STH in the southern part of Thailand is the most prevalent infection, Hookworm infection is reported as highest prevalence and ascariasis and trichuriasis was rank in second and /or third. According to the report by Vajrasthira et al. (1984), the total prevalence of STH ranged from 84.7% to 98.8% in Nakhon Si Thammarat Province. Pruksaraj et al. (1989) reported the STH prevalence in school children of Songkhla Province was 80.0% to 92.4%. In 1990, Dulyapiree studied STH in seven southern provinces and STH was ranged from 77.1% to 90.8%. Such high prevalence has been decreasing.

Since 1980's, the Ministry of Education and the Ministry of Public Health have conducted STH control program in communities and in primary schools. The programs consisted of a countrywide survey, mass treatment in primary school children, health education, region wide control program in southern Thailand for all population, sanitary improvement, community empowerment, and decentralization of program management.

In Nakhon Si Thammarat Province. The prevalence of stool examination for STH has improved as Table 1 shows:

Table 1 Prevalence of Soil-transmitted Helminthasis in Nakhon Si Thammarat, 1997-2003 (Nakhon Si Thammarat Health Profile 2003)

Species	Prevalence (%)						
	1997	1998	1999	2000	2001	2002	2003
Hookworm	9.47	13.17	9.81	7.46	7.11	11.77	7.61
Opisthorchis	0.00	0.18	0.06	0.01	0.01	0.01	0.00
Truchuris	0.00	0.99	1.46	1.28	1.13	2.22	1.22
Ascaris	0.00	3.64	1.55	1.63	1.22	2.54	2.26
Taenia	0.00	0.01	0.61	0.75	0.68	0.01	0.41
Stool exam +ve	9.47	16.19	13.47	10.37	8.8	15.77	11.53

Source: Modified Nakhon Si Thammarat Health Profile 2003

According to table 1, the prevalence of STH has not decreased since 1997 around 10% despite of many control programs in whole Thailand. The prevalence of Hookworm in Nakhon Si Thammarat, low-income region, is still higher target rate in Five-Years National Health Development Plan, which stated to reduce prevalence of Hookworm less than 5%. Especially, the prevalence of STH including Hookworm in high-risk districts is approximately 22% in 2002.

Recently, the Ministry of Public Health has conducted the health education for school leaders for STH control because of high prevalence at the southern area in Thailand. In Nepal, Save the Children Fund has introduced, in 1989, the Child-to-Child approach to health promotion in primary schools as activity of health educations. Therefore school children became communicators of health promotions to other children, families and community, in which basic governmental health service weren't meaged or unavailable to the population. (1)

Therefore the study focus that not only School-based but also Child-to-Child and Child-to-Community approach for health promotion have important role to prevent children from STH in community.

1.1.2 State the consequences of the problem

Diseases Control Department, Ministry of Public Health and Asian Center of International Parasite Control (ACIPAC), Faculty of Tropical Medicine, Mahidol University conducted STH Control Program at high-risk district of STH in 2002 and 2003

High-risk areas

There are STH Control Program in 2 districts, Phrom Khiri and Chalerm Phrakiat

In 2002

Program objective

To set up the model of STH control activities in high prevalence area
To reduce STH prevalence not more than 10% and reduce intensity of infection

Program activities

Training of school children leaders in 38 schools
Health education
Meeting with district and sub-district health personnel, health volunteers and community leaders
Community forum in 75 villages
Stool examination

In 2003

Program objective

To evaluate STH control program in high prevalence area, Phrom Khiri and Chalerm

Phra Kiat district in 2002

Program activities

Retraining knowledge of school children leaders
Meeting with district and sub-district health personnel, health volunteers and community leaders for evaluation
Community forum in 10 high prevalence villages per district
Stool examination for one person in each family aged at least five years, 10,000 cases
Target treatment of positive stool examination for all family members aged at least two years with Albendazole 400 mg

Mentioned as above, STH Control Program has been proceeded to reduce the prevalence of STH at Phrom Khiri and Chalerm Phra Kiat district in Nakhon Si Thammarat. Consequently, the prevalence of STH has reduced approximately from 22% in 2002 to 13% in 2003 in these areas.

The result of decreased prevalence must be caused by the activities of health education by health personnel in this control program. This study tries to realize the effectiveness of health education in primary school.

1.2 Research question

In the health promoting primary school under this STH control program by Disease Control Department, Ministry of Public Health Office at Phrom Khiri and Chalerm Phra Kiat district in Nakhon Si Thammarat:

What are preventive behaviors against STH among primary school children

Which factors are related to preventive behavior against STH among primary school children?

1.3 Research objectives

1.3.1 General objectives

To assess preventive behaviors against STH among school children in health promoting school under the STH control program.

1.3.2 Specific objectives

To identify preventive behaviors against STH in approved school and not approved school.

To identify socio-demographic and socio-economic factors of school children related to preventive behaviors against STH in approved school and not approved school

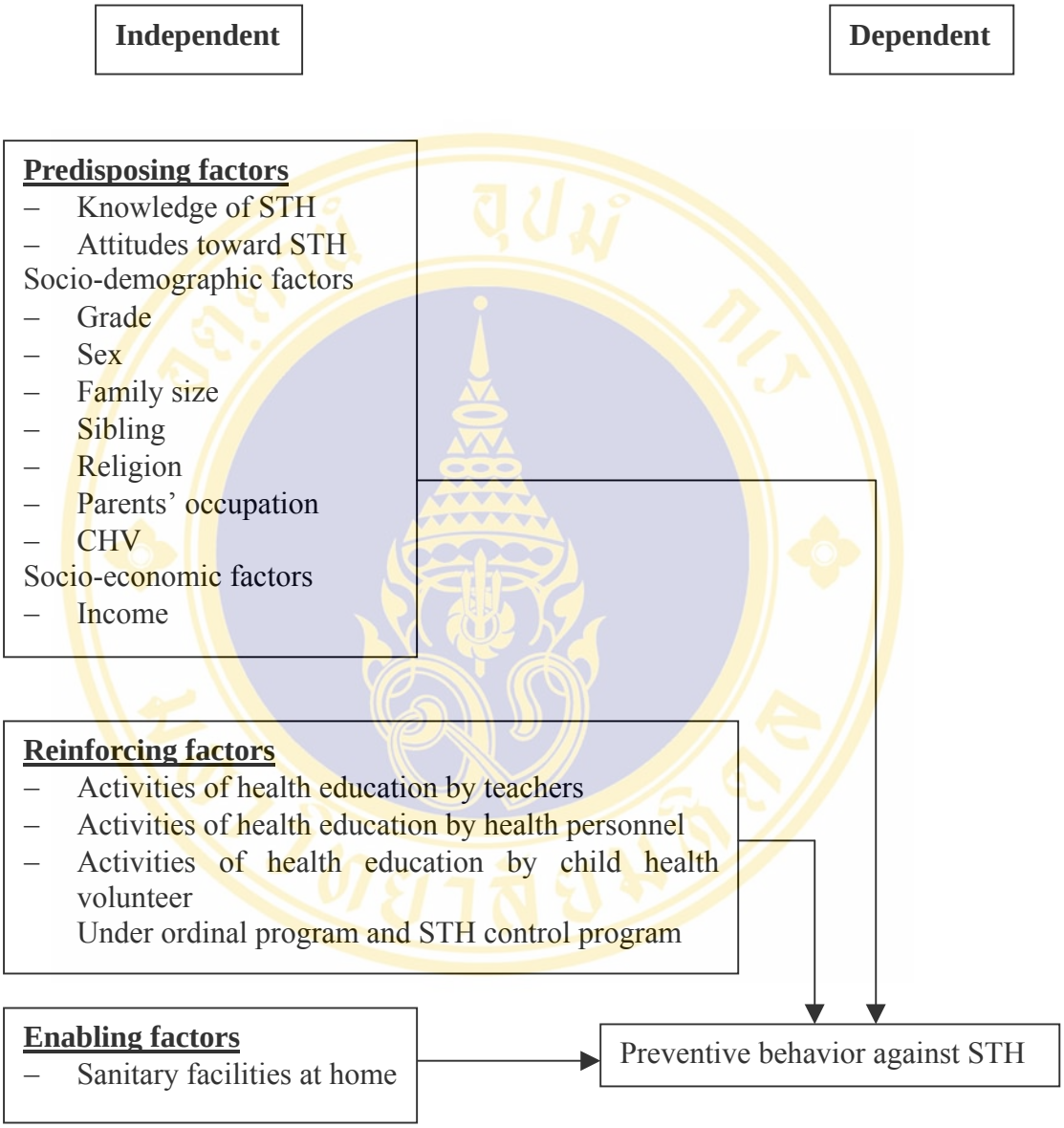
To identify knowledge and attitudes for preventive behaviors against STH among child school children in each school

To identify activities of health educations in changing preventive behaviors against STH in each school program and in STH control program

To identify sanitary facilities related to preventive behaviors against STH in each school

To explain a relationship between preventive behaviors and all factors in both schools

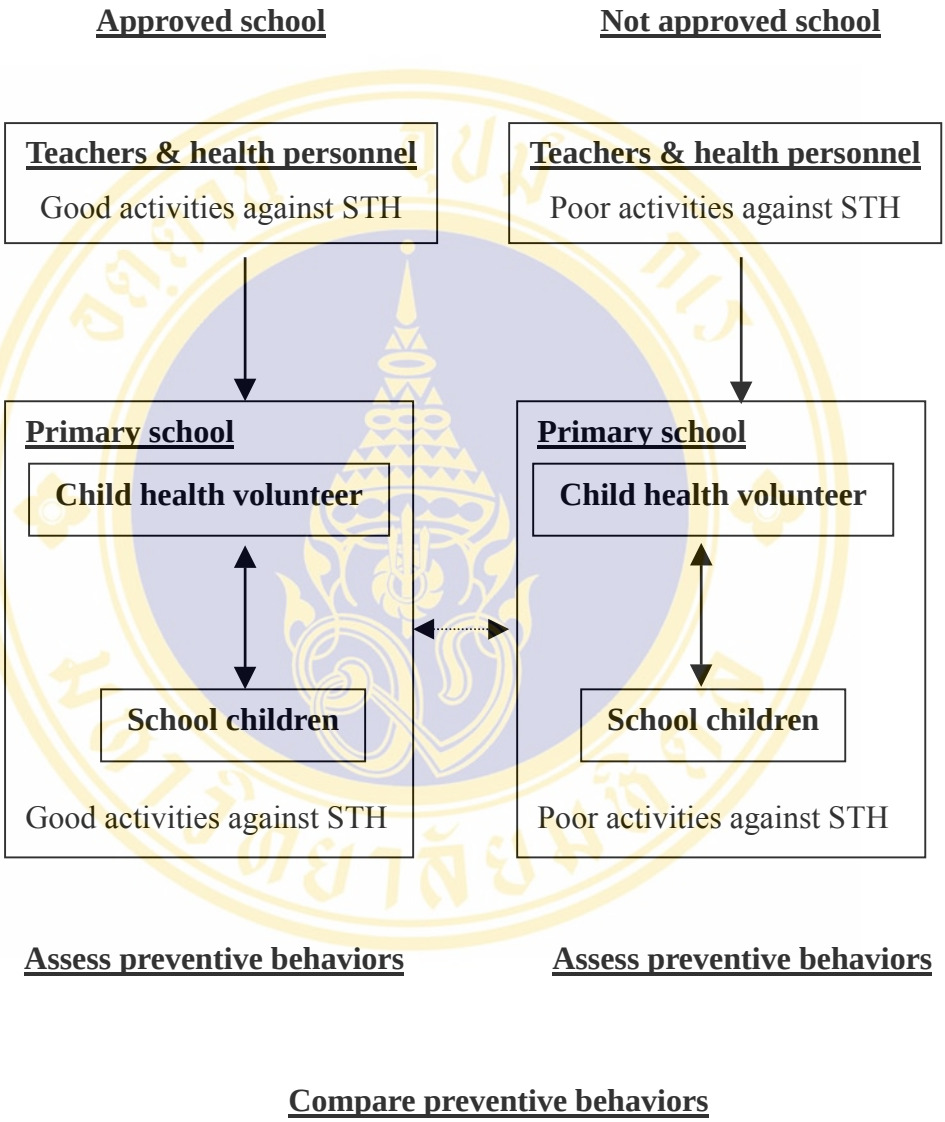
1.4 Conceptual framework



STH: Soil-transmitted helminthiasis

CHV Child health volunteer

1.5 Concept of research study



STH: Soil-transmitted helminthiasis

1.6 Operational definition of studied variables

Approved school refer to primary school proceeded activities for health education under STH control program and approved the standard by the Ministry of Public Health

Not approved school refer to primary school proceeded activities of health education under STH control program and not approved the standard by the Ministry of Public Health

Child health volunteer (CHV) refer to student at 5^{th} and 6^{th} grade in primary school, who received health training from teachers and health personnel

School children refer to student at 5^{th} and 6^{th} grade in primary school, who were provided health education by child health volunteer, teachers and health personnel

Soil-transmitted helminthasis (STH) refer to intestinal worm diseases transmitted from stool to mouth and skin, i.e. Ascariasis (round worm), Trichuriasis (whip worm) and Hookworm disease, detected with stool examination

STH control program refer to Program including activities for health education against STH at primary schools and communities in high risk areas by Disease Control Department, Ministry of Public Health office and Asian Center of International Parasite Control (ACIPAC), Faculty of Tropical Medicine, Mahidol University

Activities of health personnel refer to continuous activities for health education promoted by health personnel in primary school and the specific activities under the STH control program

Activities of teachers refer to continuous activities for health education promoted by teachers and health personnel in primary school and the specific activities under the STH control program

Activities of child health volunteer refer to continuous activities for health education promoted by teachers and health personnel in primary school and the specific activities under the STH control program

Knowledge of STH refer to state of fact to know and to understand correct information related to reducing transmission of STH, which includes species and life cycle of healminthiasis, route of infection, symptom, treatment and prevention by some specific behaviors, management of hygiene, easy treatment with low cost

Attitudes toward STH refer to expression of feeling, belief and intention to act among the subject related to STH, which includes responsibility for personal and family health, compliance with screening and treatment, confidence to change behavior, willing to share information

Preventive behavior against STH refer to habitual performance with correct methods of activities to prevent from STH, which includes using latrine, washing hand, washing vegetables, wearing shoes, cutting fingernail, acceptance of stool examination and keeping sanitary facilities for proper preventive behaviors to avoid infection of STH and to deworm among school children

Sanitary facilities refer to facilities that include toilet, water disposal, water resource for drinking and kitchen, kitchen, fecal fertilizer usage and domestic animals

1.7 Limitation of study

Weakness

The number of child health volunteer is absolutely small at class in primary school for comparison between child health volunteer and school children.

Preventive behaviors of school children may be transferred from other sources especially their mothers. Mother can be provider of health education for their

school children

Other activities by teachers and health personnel in this program can influence to school children about preventive behaviors

CHAPTER II
LITERATURE REVIEW

2.1 Soil-transmitted helminthiasis

The burden of disease caused by soil-transmitted helminthiasis (STH) and schistsome infection is enormous. More than 2000 million people are affected world wide, of whom more than 300 million suffer from associated severe morbidity; 155,000 deaths are reported annually (Crompton, 1999). These infections account for more than 40% of global burden of all tropical diseases, excluding malaria (WHO, 1999a). STH infections are widely distributed in tropical and sub-tropical areas, especially poor populations. (6)

STH consist of three kinds of species, Ascaris, Trichuris and Hookworm. These helminthic infections can cause morbidity and sometime death by affecting nutritional status, by affecting cognitive process and by causing complications that need surgical intervention. Specifically, Hookworm cause blood loss and are one of the major contributors to iron deficiency anemia, Trichuris cause reduction in fluency and memory and STH infections cause malnutrition, anemia and growth retardation as well as higher susceptibility to other infections. (6) (15)

2.2 High-risk group

School-age children are important high-risk group for STH infections because they are continuously exposed to contaminated soil and water because of lack awareness of the need for good personal hygiene. They are in a period of intense physical growth and rapid metabolism resulting nutritional needs. Therefore, when these needs are not adequately met, school-aged children are more susceptible to infections. Also STH infections reduce cognitive development and increase absenteeism from school. (6) (15) (16)

2.3 Treatment and prevention

Drug used in STH control program

The drugs used to treat the most common STH infection are effective and inexpensive. They have also been through extensive safety testing and have been used in millions of individuals with few and minor side effects. And also one treatment for STH infections (1tablet per child) costs less than 3 US cents. Therefore mass treatment for STH has been adopted in primary school long time not only in developed countries but also in developing countries. And the usefulness of repeated mass treatment for STH, particularly directed to school age children, was reported by WHO, Taiwan and Korea, as experienced in Japan in the past. (6) (9)

Prevention

Three components of a control program can interfere with the transmission cycle of STH infection. Mass treatment with drug leads to reduce morbidity of STH among school children. It reduces the risk of STH infection each other and improves environment among school children. Environmental sanitation is aimed to control transmission by reducing soil and water contamination. It is realized that sanitary latrine is a basic necessity in household and that improvement of quality of domestic water supply is important to control STH. And health education is aimed at reducing transmission and re-infection by encouraging preventive behaviors. (6) (9)

It was mentioned that school age children are high-risk group of STH infection. WHO focus efforts the role of health education in school against STH transmission. In countries where helminth infections prevail, schools provide the most effective and efficient way to reach large portion of the population, including young people, school personnel, family and community members, and to reduce and prevent re-infections. School children are the group that has the highest information rate as well as the highest worm burden which contribute greatly to contamination of environment. These efforts may be most effective when integrated into more

comprehensive approach to school health, such as in development of “health promoting school” (6) (9) (16)

2.4 Child-to-Child approach

Child-to-child is promoted as an innovative approach to basic learning and basic health care that both respects and challenges traditional attitude. It builds on a tradition of children helping each other and their families and sharing their ideas. The underlying philosophy of Child-to-Child derives from a deep commitment to Primary Health Care, to the role of children as agents, and to the promotion of partnerships for health. The principle of children as agents of change reflects faith in the power of children to spread health massages and health practices to young children, peers, families and communities. (1)

The key message from the Child-to-Child movement is that children are an exceptionally powerful force in health promotion. They are the one asset at its disposal that every school. But in order to be effective, they need to be respected and encouraged to think and to plan for themselves. (2)

It is based on the brief that children not only need to have better health but also are to give better health to others. We who work with children must help to do so. Health education planners can adopt them and introduce them into their programs both in school and with non-school-going children.(3)

School can use them as a resource: the idea will help heads to plan school based health programs and activities, teachers to introduce activities into their lessons, and children to take ideas back to their families. (3)

2.5 Knowledge, Attitudes and Practices (KAP) survey for STH

Schools have been widely promoted as a major context for the delivery of health education. This is an acknowledgement of the importance of health as integral

to the complete development of the individual; of the right to health knowledge for its own sake; and the perceived significance of the early learning of health-related knowledge, attitudes and behaviors for the present and future health of individuals and their families and communities. (4)

Community participation provides additional practical information, and assists in planning activities (for example, identifying better ways to reach non-enrolled school age children). Community members will be directly involved in implementation activities (providing class supervision during a monitoring exercise, for instance). Once the community is convinced of the importance of the helminth control activities, the long-term sustainable ability of program becomes a realistic prospect. Where resources are available, the organization of knowledge, attitudes and practices (KAP) survey may provide an important opportunity to learn about community needs and involve the community in the health activities. (6)

Most subjects aim to teach both knowledge (facts and ideas) and skills (how to do things and ways of thinking) and to develop particular attitudes. The whole school program aims to give children a package of useful knowledge and skills that give them a firm start in life. Besides teaching different types of knowledge each different subject is particularly suitable for developing particular learning and thinking skills. (2)

The KAP survey was organized by the Japanese International Cooperation Agency (JICA) in 1998 to assist in planning an appropriate health education component of a helminth control program for primary school children in Nepal. (6)

2.6 Activities of health personnel and teachers

Education combined with accessible convenient hand hygiene and peer education may result in a sustainable increase in the frequency of hand washing among elementary school children (33).

The cholera prevention campaign successfully educated respondents, but did not cause many adopt preventive behaviors. Direct interpersonal education by community-based personnel may enhance the likelihood of translating education into changes in health behaviors. Knowledge, attitudes and practices surveys conducted with case-control studies during an epidemic can be an effective method of refining education/control program (29).

School children who had positive perceptions and perceived their teachers as supportive were significantly to engage in health promoting behaviors, a supportive peer environment was not associated with positive health behaviors (32)

2.7 General approach for STH control in Thailand

According to Asian Center of International Parasite Control (ACIPAC) International Symposium on School Health on March in 2003, the prevalence of intestinal helminthiasis in school-age children is decreasing from 54.0% in 1980 to 21.1% in 2001 in Thailand. The reason is that the soil-transmitted helminthiasis was managed by school-based approach under Ministry of Public Health in Thailand. The strategies since 1980 were following (7):

1980-1992

Countrywide prevalence survey
Mass treatment in primary school children with single dose 300 mg MEBENDAZOLE once a year
Health education

1992-1997
Revise the control strategies according to categorized area
Region wide control program in southern Thailand for all population
Treatment with 400 mg ALBENDAZOLE twice a year
Health education

Sanitary improvement

1998-present
Better targeting area and high-risk group
Community empowerment
Decentralized program management

And also it declared the importance of the child initiative program as following:
Child-to child and little doctor
Child club with member budgets
Dewormimg, first aid, immunization and toilet management

2.8 Recent situation of STH in Nakhon Si Thammarat

STH still remains a public health problem in Nakhon Si Thammarat. The most common helminthes are Hookworm, Ascaris and Trichuris. In 1984, it is reported that total prevalence of STH ranged from 84.7% to 98.8% in Nakhon SiThammarat Province. Under STH control program conducted by Ministry of Public Health, the prevalence has bee decreasing since 1980's and it was achieved at 9.4% of stool examination positive. However the decreasing of prevalence of STH has been stagnant around 10% and it has been 22% at several districts in Nakhon Si Thammarat despite of control program. (8) (9)

The Disease Control Department, Ministry of Public Health has conducted STH control program at two high-risk districts in Nakhon Si Thammarat, including training of school children leaders. Because the prevalence of Hookworm was not reduced and still high level compared with other districts despite of the Five-Years National Health Development Plan. (8)

2.9 Health promoting primary school in Nakhon Si Thammarat

Ministry of Public Health put an emphasis on a new approach of health

promotion involving schools as a focal point of community health promotion in order to create understanding and collaboration among agencies and organizations, as well as developing local personnel capacity for the health promoting school.

The criteria of health promoting schools are consist of 10 elements and are scored in each element and are summed for ranking of schools. Total scores are 359 points.

School Policy
School Management Practice
School / Community Projects
Healthy School Environment
School Health Service
School Health Education
Nutrition / Food Safety
Physical Exercise, Sports and Recreation
Counseling / Social Support
Health Promotion for Staff

CHAPTER III
METHODOLOGY

3.1 Research design

This study is proceeded by cross-sectional study to assess preventive behaviors against STH with socio-demographic factors, knowledge , attitudes and sanitary facilities.

3.2 Study area

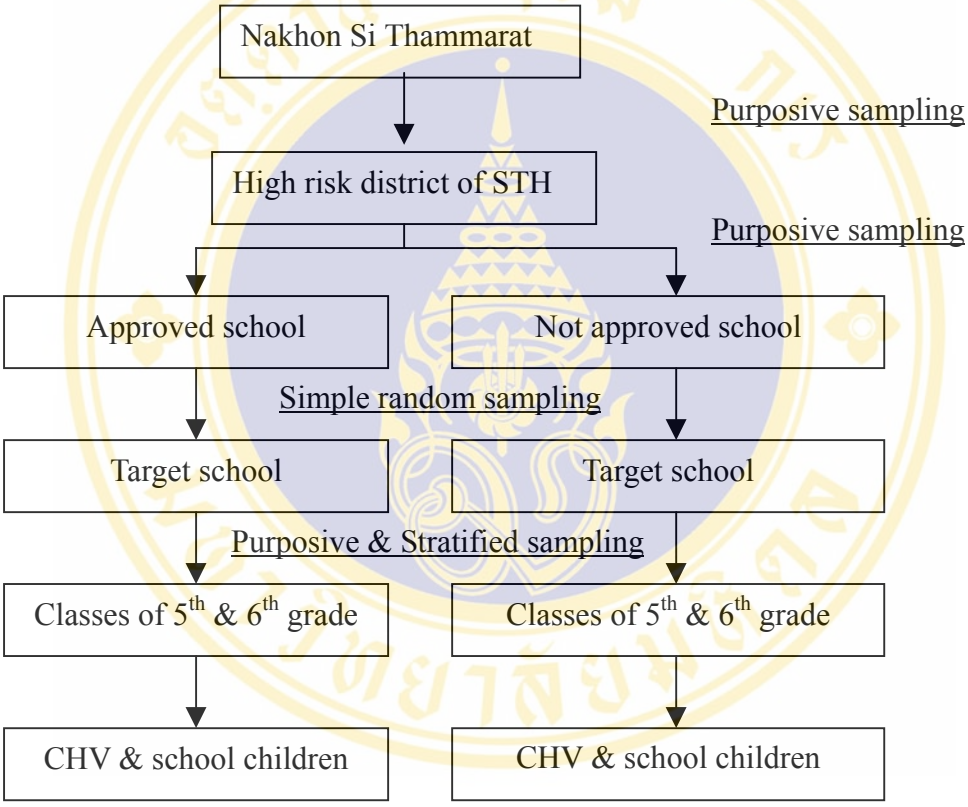
The study selected high-risk areas of STH, southern part of Thailand, Phrom Khiri district under STH Control Program by Disease Control Department, Ministry of Public Health Office in Nakhon Si Thammarat.

3.3 Study population

Target population of this study are 5^{th} and 6^{th} school children in approved school and not approved school under STH Control Program by Disease Control Department, Ministry of Public Health and Asian Center of International Parasite Control (ACIPAC).

3.4 Sampling technique

The sampling was conducted by purposive method for high-risk district in Nakhon Si Thammarat. Approved and not approved school were selected by simple random sampling and 5th and 6th grade school children were selected purposive and stratified sampling.



CHV: Child health volunteers

3.5 Sample size estimate

The design of this study is proceeded by cross-sectional study with comparing proportion of prevalence of STH among child health volunteer, school children in health promoting primary school and school children in non-health promoting primary school.

The equations of sample size estimation are following:

$$n = \frac{\left(Z_{\alpha}\sqrt{\pi f(1-\pi)} + Z_{1-\beta}\sqrt{\frac{1}{q_1}\pi_1(1-\pi_1) + \frac{1}{q_2}\pi_2(1-\pi_2)} \right)^2}{(\pi_1 - \pi_2)^2}$$

$$f = \frac{1}{q_1} + \frac{1}{q_2}$$

q1=q2=1: fraction ratio for sample between two group, if q1=q2 then q1=1 and q2=1, if case: control=1:2 then q1=1 and q2=2

Zα=1.96: fixed α at 0.05

Z(1-β)=1.28: fixed β at 0.80 for power of test

π=0.87 proportion of preventive behaviors at primary school in Nakhon Si Thammarat

π1=0.89 and π2=0.84: proportion of preventive behaviors before and after health STH control program at primary school

n = 296.9

3.6 Research instrument for data collection

This research study prepared structured interview questionnaire for mother, self-administered questionnaire for school children and health personnel and teachers.

Part I

Socio-demographic factors

In self-administered questionnaire for school children in primary school, the data including health status as following is collected

Grade
Sex
Caretaker
Family size
Siblings
Parent's occupation
Religion
CHV

Part II

Behavioral factors of school children

Knowledge of STH

In knowledge section of questionnaire, the answers are "True" or "False" in multiple choice questions. In scoring, "1" is given for collect answer and "0" is given for wrong answer.
For analysis, it is classified into two categories by above median and below median of full mark

Good: above median
Poor: below median

Attitudes toward STH

In attitudes section of questionnaire, the answers are “Agree”, “Not sure” or “Disagree”. In scoring, “2” is given for “Positive attitude”, “1” is given for “Not sure” and “0” is given for “Negative attitude” and total score is calculated.
For analysis, the level of attitudes against STH is classified into two categories by median of score for cut-off point.

Positive: above median
Negative: below median

Preventive behaviors against STH

In preventive practices section of questionnaire, the answers are “Always”, “Sometime” or “Never”. In scoring, “1” is given for “Always”, “0” is given for “sometime” and “0” is given for “Never” and total score is calculated.
For analysis, the level of preventive practice is classified into two categories as good and poor by median of score for cut-off point.

Proper: above median
Improper: below median

Part III

Activities of health educations by health personnel in primary school

In this section, the questionnaire asked activities of health educations in schools to one health personnel who are responsible for school health educations. The question requires dichotomous answers. The contents are following;

Lectures for all school children

(species, lifecycle, route of infection, symptom, severity, treatment and

prevention of STH)
Discussion among all school children
Demonstration with all school children

Lectures for CHV
(species, lifecycle, route of infection, symptom, severity, treatment and prevention of STH)
Discussion among CHV
Demonstration with CHV

Activities of health educations by teachers in primary school

As well as above, the questionnaire asked activities of health educations in schools to one health teacher who are responsible for school health educations. The question requires dichotomous answers. The contents are following;

Lectures for all school children
(species, lifecycle, route of infection, symptom, severity, treatment and prevention of STH)
Discussion among all school children
Demonstration with all school children

Lectures for CHV
(species, lifecycle, route of infection, symptom, severity, treatment and prevention of STH)
Discussion among CHV
Demonstration with CHV

Part IV

Sanitary facilities and socio-demographic factors

In the interview for mothers in households, the items as following are check up by health workers or volunteers as interviewer.

Latrine usage
Water disposal
Drinking water source
Type of kitchen
Water source of kitchen
Usage of fecal fertilizer
Domestic animals
Family income

3.7 Validity and Reliability testing

This study enquired that Authorities of KAP and STH control should revise the questionnaire validity.

The questionnaire was performed tentatively to revised among 35 school children at primary school in Chalerm Phra Kiat district and tested .reliability by SPSS. After reliability test, the questionnaire was revised for higher alpha co-efficient.

3.8 Data collection procedure

The data collection of this study was proceeded as following:

The discussion was held with community committee, teachers and school children in primary school, their families and health personnel in community for explanation of questionnaire to interviewers and teachers. Test of questionnaire was performed with 35 school children and modified questionnaire before distribution and the questionnaires were distributed to child health volunteer, school children and their mothers by researchers and interviewers. Collection of data regarding health

educations was conducted in primary school by health personnel and teacher with self-administered questionnaire.

3.9 Data analysis procedure and statistics used

Data analyzed with personal SPSS program in personal computer.

Data described simple frequent distribution such as age, education level, and occupation of mother, family income and family size. All collected data was analyzed by Chi-square test for significant difference between approved school and not approved school and significant relationship between preventive behaviors and all dependent variables in each school.

CHAPTER IV
RESULT

4.1 General information

The data collection has performed from 8th to 28th of January, 2004 for school children and their mothers and performed in 10th and 11th of February, 2004 for health teachers and health personnel

In this research study, the data collection has performed for 314 cases of school children in 5th and 6th grade with self-administered questionnaire at six primary schools, consisting of three approved schools and three not approved ones, in Phrom Khiri district, Nakhon Si Thammarat. One approved school placed in the downtown and others place in rural area. (Table 2)

The data collection has also performed 314 cases of their mothers with interview questionnaire by health workers and health volunteers at their households in community. And the study have also collected 11 cases of self-administered questionnaire of health teachers and health personnel in each school and health center (Table 2).

Table 2 Description of approved and non approved school and education takers

Name of school	Male	Female	Total	HT	HP
Approved					
Phrom Lork (PL)	54	55	109	1	1
Yo Tha Thum (YTT)	9	17	26	1	1*
Tau Tho (TT)	13	18	31	1	1*
Total	77	90	166		
Not approved					
Ban Klong Kael (BKK)	53	43	96	1	1
Serk Lek (SL)	17	19	36	1	1
Mai (M)	8	8	16	1	1
Total	78	70	148		

*: Same health personnel HT: Health teacher HP: Health personnel

The contents of variables consist of the following section.

Predisposing factors

Socio-demographic factors

Socio-economic factor

Knowledge and attitudes

Reinforcing factors

Activities of health education in primary school

Enabling factors

Sanitary facilities in household

This result section consisted of two parts. The first one was for general description and comparison of all variables between approved school and not approved school. The second one was for analysis of preventive behaviors with all variables in both schools and comparison and evaluation of preventive behaviors between both schools.

4.2 Description of socio-demographic factors surrounding school children and CHV between approved school and not approved school

According to the results on Table 3, it showed that more school children had elder and younger sibling in approved school and not approved school and over 50 % of families had one to four persons. Majority of main caretaker was mother in both schools. Regarding to father's and mother's occupation in approved school, the proportion of rubber planter was lower and that of employee/officer is higher than in approved school. It was because that the one biggest school of approved school placed in the downtown and all of not approved schools place in rural area (Table 3). Besides, nearly hundred percent of school children were Buddhism. The number of CHV was less than school children (non-CHV).

On the contrary, Regarding to father's occupation, the result showed that the proportion of planter was higher in not approved school and the proportion of employee/officer and others was higher in approved schools. As well, in mother's occupation, it showed that the proportion of planter was higher in not approved school and the proportion of merchant, employee/officer were nearly two times higher in approved schools. It was because that the one biggest school of approved school placed in the downtown and all of not approved schools place in rural area (Table 3).

According to the result on Table 3, the result described that the proportion of poor (<5000 Baht) was higher in approved school. On the contrary, the proportion of good (>=5000 Baht) was higher in not approved school. The study decided cut-off point on 5000 Baht per month (minimum wage 164 Baht per day multiplied 30 days)

According to the result on Table 3, the number of schoolchildren with good knowledge, positive attitudes and proper preventive behavior was greater than that of poor, negative and improper ones in both schools (Table 3).

Table 3 Description of socio-demographic factors surrounding school children and CHV between approved school and not approved school

Socio-demographic characteristics	Approved		Not approved	
	No.	%	No.	%
n=	166	(100.0)	148	(100.0)
Grade				
5th	92	(55.4)	70	(47.3)
6th	74	(44.6)	78	(52.7)
Sex				
Male	76	(45.8)	78	(52.7)
Female	90	(54.2)	70	(47.3)
Care taker				
Mother	123	(74.1)	109	(73.6)
Father	22	(13.3)	22	(14.9)
Grand parent / Others	20	(12.1)	17	(11.5)
Missing case	1			
Family size				
1-4 persons	88	(53.0)	77	(52.0)
5 persons =<	78	(47.0)	71	(48.0)
Elder siblings				
Have	96	(57.8)	85	(57.4)
Not have	70	(42.2)	63	(42.6)
Younger siblings				
Have	101	(60.8)	82	(55.4)
Not have	65	(39.2)	66	(44.6)

Socio-demographic characteristics	Approved		Not approved	
	No.	%	No.	%
n=	166	(100.0)	148	(100.0)
Father's occupation				
Farmer	13	(7.8)	13	(8.8)
Planter	64	(38.6)	87	(58.8)
Merchant	13	(7.8)	10	(6.8)
Employee / Officer	62	(37.3)	28	(18.9)
Others	14	(8.4)	10	(6.8)
Mother's occupation				
Farmer	15	(9.0)	15	(10.1)
Planter	59	(35.5)	82	(55.4)
Merchant	22	(13.3)	8	(5.4)
Employee / Officer	43	(25.2)	20	(13.5)
House wife / Others	27	(16.3)	23	(15.5)
Religion				
Buddhism	166	(100.0)	145	(98.0)
Islam	0	(0.0)	1	(0.7)
Christianity	0	(0.0)	2	(1.4)
CHV				
Yes	72	(43.4)	53	(35.8)
No	94	(56.6)	95	(64.2)
Income (Baht / month)				
Poor (<5000)	93	(61.2)	78	(53.1)
Good (5000 <=)	59	(38.8)	69	(46.9)

KAP evaluation	Approved		Not approved	
	No.	%	No.	%
n=	166	(100.0)	148	(100.0)
Knowledge				
Good (>=8)	97	(58.4)	88	(59.5)
Poor (=<7)	69	(41.6)	60	(40.5)
Attitudes				
Positive (>=15)	133	(81.1)	111	(75.0)
Negative (=<14)	33	(19.9)	67	(25.0)
Preventive behaviors				
Proper (>=5)	86	(51.8)	73	(49.3)
Improper (=<4)	80	(48.2)	75	(50.7)

4.3 Description of activities of health education by health personnel and teacher and number of school children under the activities in approved school and not approved school

In this study, they have conducted health educations in each school as following.

HE: Health education by health personnel for school children and CHV
TE: Health education by teacher for school children and CHV
HEV: Health education by health personnel for CHV
TEV: Health education by teacher for CHV

All schools have provided health education by health personnel and other educations have depended on school curriculum in both schools (Table 6).

Table 4 Description of activities for health education in approved school and not approved school

*: same personnel

Name of school	Type of education	Total	CHV	HT	HP
Approved					
PL	HE (1) TE (0) HEV (1) TEV (0)	109	28	1	1
YTT	HE (1) TE (1) HEV (1) TEV (1)	26	26	1	1*
TT	HE (1) TE (0) HEV (1) TEV (0)	31	18	1	1*
Total		166	72		
Not approved					
BKK	HE (1) TE (1) HEV (1) TEV (0)	96	22	1	1
SL	HE (1) TE (1) HEV (1) TEV (1)	36	15	1	1
M	HE (1) TE (1) HEV (0) TEV (1)	16	16	1	1
Total		148	53		

HT: health teacher HP: health personnel
(1): conducted (0): not conducted

Health educations consisted of lectures (species, life cycle, infection route, symptom, severity, treatment and prevention), group discussion and demonstration of preventive behaviors.

According to the result on Table 7, below,

They have conducted lectures by health personnel for school children and CHV (HE) in three approved schools and three not approved schools and all of school children received lectures. They have conducted group discussion by health personnel for school children and CHV in two approved schools and one not approved school The number of school children who received discussion is less than those who didn't received it in both school. Health personnel have provided demonstration for greater number of school children in approved school 65.7% of total number of school children received demonstration in approved school (Table 5).

They have only conducted lectures by teacher for school children and CHV (TE) in one approved school and three not approved schools. 140 school children haven't received lectures by teacher in approved school. As well, two approved schools and two not approved schools haven't provided discussion by teacher. It means that majority of school children haven't received discussion by teacher in approved school (Table 5). Teacher has provided more health educations in not approved school. Looking at the result of demonstration, the number of conducted school was lower in approved school and the proportion of school children was lower in approved school as well.

Table 5 Detail of activities of health education by teacher and health personnel and number of school children and CHV under the activities between approved school and not approved school

Health education for school children and CHV	Approved			Not approved		
	School	No.	(%)	School	No.	(%)
n=	3	166	(100.0)	3	148	(100.0)
HE						
Lectures						
Yes (1)	3	166	(100.0)	3	148	(100.0)
No (0)	0	0	(0.0)	0	0	(0.0)
Discussion						
Yes (1)	2	57	(34.3)	1	36	(24.3)
No (0)	1	109	(65.7)	2	112	(75.7)
Demonstration						
Yes (1)	1	109	(65.7)	2	52	(35.1)
No (0)	2	57	(34.3)	1	96	(64.9)
TE						
Lectures						
Yes (1)	1	26	(15.7)	3	148	(100.0)
No (0)	2	140	(84.3)	0	0	(0.0)
Discussion						
Yes (1)	1	26	(15.7)	1	16	(10.8)
No (0)	2	140	(84.3)	2	132	(89.2)
Demonstration						
Yes (1)	1	26	(15.7)	2	52	(35.1)
No (0)	2	140	(84.3)	1	96	(64.9)

4.4 Description of activities of health education for CHV by health personnel and teacher and number of CHV and school children under the activities between approved school and not approved school

This health education expected that CHV educated by health personnel and teacher would encourage each other among all of school children. The number in table included school children and CHV both.

According to the result on Table 8,

They have conducted lectures, discussion and demonstration by health personnel for CHV (HEV) in all approved schools. In two not approved schools, they haven't provided any health education for CHV and majority of school children haven't received all of health educations through CHV. It meant that health personnel have provided more lectures, discussion and demonstration for schoolchildren through CHV in approved school (Table 6).

They have conducted health lectures by teacher for CHV (TEV) in one approved school and two not approved schools. They have only conducted discussion by teacher for CHV in one not approved school. In three approved schools and two not approved schools, the majority of school children haven't been encouraged by CHV with group discussion. As well, they have only conducted demonstration by teacher for CHV in one not approved schools. In three approved schools and two not approved schools, the majority of school children haven't been encouraged by CHV with group discussion (Table 6).

Teacher has provided more lectures for CHV in not approved school. To mention school children, the proportion of all school children received lectures through CHV was two times higher in not approved school than approved school. However, 84.3% and 64.9% of school children haven't received lecture through CHV (Table 8).

The results showed that health personnel encouraged CHV more than teacher for health educations in approved school.

Table 6 Detail of activities of health education by teacher and health personnel for CHV and number of CHV under the activities between approved school and not approved school

Health education for CHV	Approved			Not approved		
	School	No.	(%)	School	No.	(%)
n=	3	166	(100.0)	3	148	(100.0)
HEV						
Lectures						
Yes (1)	3	166	(100.0)	1	36	(24.3)
No (0)	0	0	(0.0)	2	112	(75.7)
Discussion						
Yes (1)	3	166	(100.0)	1	36	(24.3)
No (0)	0	0	(0.0)	2	112	(75.7)
Demonstration						
Yes (1)	3	166	(100.0)	1	36	(24.3)
No (0)	0	0	(0.0)	2	112	(75.7)
TEV						
Lectures						
Yes (1)	1	26	(15.7)	2	52	(35.1)
No (0)	2	140	(84.3)	1	96	(64.9)
Discussion						
Yes (1)	0	0	(0.0)	1	16	(10.8)
No (0)	3	166	(100.0)	2	132	(89.2)
Demonstration						
Yes (1)	0	0	(0.0)	1	16	(10.8)
No (0)	3	166	(100.0)	2	132	(89.2)

4.5 Description of sanitary facilities between approved school and not approved school

According to the results on Table 9, majority of households had traditional toilet in house in approved school and not approved school. Talking about kitchen, over half of households used the kitchen on the ground and outside in both schools and use tap or well water for drinking and kitchen in both schools. In type of kitchen, the result showed that the proportion of on ground out of house was little higher in not approved school. It resulted from the difference between downtown and rural area. Looking at water resource for kitchen, tap water usage was higher in approved school than not approved school. This was because of difference between locations of schools as well. Besides, most of them spread wastewater onto ground in both schools. Regarding to fecal fertilizer, the number of no fertilizer usage was two times greater than that of usage in approved school and the numbers are same in not approved school. The household with domestic animals was more than without animals in approved school, however, it was nearly four times more than without animals in not approved school (Table 7).

Table 7 Description of sanitary facilities between approved school and not approved school

Sanitary facilities	Approved		Not approved	
	No.	%	No.	%
n=	166	(100.0)	148	(100.0)
Toilet				
Traditional in house	114	(68.7)	117	(79.1)
Traditional out of house	49	(29.5)	29	(19.6)
No toilet	3	(1.8)	2	(1.4)
Water disposal				
Public pipe	6	(3.6)	8	(5.4)
Septic tank	44	(26.7)	31	(21.1)
Ground / Others	115	(69.7)	108	(73.5)
Missing case	1		1	
Water resource for drinking				
Tap	76	(45.8)	58	(39.2)
Rain water	17	(10.2)	20	(13.5)
Well	65	(39.2)	55	(37.2)
Stream / Others	8	(4.8)	15	(10.1)
Kitchen				
Table	46	(28.0)	41	(27.7)
On floor in house	16	(9.8)	3	(2.0)
On ground out of house	102	(62.2)	104	(70.3)
Missing case	2			

Sanitary facilities	Approved		Not approved	
	No.	%	No.	%
n=	166	(100.0)	148	(100.0)
Water resource for kitchen				
Tap	84	(51.2)	60	(41.4)
Rain water	6	(3.7)	17	(11.7)
Well	61	(37.2)	53	(36.6)
Stream / Others	13	(7.9)	15	(10.3)
Missing case	2		3	
Fecal fertilizer				
Yes	55	(33.5)	72	(48.6)
No	109	(66.5)	76	(51.4)
Missing case	2			
Domestic animals				
Yes	95	(58.3)	115	(77.7)
No	68	(41.7)	33	(22.3)
Missing case	1			

4.6 Evaluation of preventive behaviors with socio-demographic factors in approved school and not approved school

According to the results on Table 10,

They had no significant relationship between preventive behaviors and socio-demographic factors in approved school, in regard to grade (p=0.676), sex (p=0.459), caretaker (p=0.403), family size (p=0.621), elder siblings (p=0.691), younger siblings (p=0.459), father's occupation (p=0.378), mother's occupation (p=0.577) and child health volunteer (CHV) (p=0.398). Analysis could not show the result for religion because all of case was Buddhism (Table 10).

As well as above, they had no significant relationship between preventive behaviors and socio-demographic factors in not approved school, in regard to grade (p=0.253), sex (p=0.253), care taker (p=0.862), family size (p=0.737), elder siblings (p=0.721), younger siblings (p=0.632), religion and child health volunteer (CHV) (p=0.327) (Table 8).

Regarding to father's occupations and mother's occupations, the results showed that occupation was not relate to preventive behaviors despite that they had significant difference in occupation between both schools, for example proportion of planter and employee/officer in both schools (Table 3). However, some columns were less than five in the table. Analysis could not show the result for religion because nearly hundred percent of case was Buddhism (Table 8).

They had no significant relationship between preventive behaviors and socio-economic factor in regard to income (p=0.810) in approved school. As well as above, they had no significant relationship between preventive behaviors and socio-economic factor in regard to income (p=0.553) in not approved school (Table 8). It meant that economic status was not important factor for changing preventive behaviors (Table 8).

They had no significant relationship between preventive behaviors and

knowledge (p=0.478) in approved school. As well, they had no significant relationship between preventive behaviors and attitudes (p=0.332) in approved school (Table 8).

They had no significant relationship between preventive behaviors and knowledge (p=0.254) in not approved school. As well, they had no significant relationship between preventive behaviors and attitudes (p=0.094) in not approved school (Table 8).

Regarding to results above, it could only mention that knowledge and attitudes were not related to preventive behaviors in each school. Only knowledge and attitudes were not factors to change them (Table 8).

Table 8 Evaluation of preventive behaviors with socio-demographic factors in approved school and not approved school

N.A.: not applicable

Socio-demographic characteristics	Approved			Not approved		
	Preventive behavior			Preventive behavior		
	Proper No. (%)	Improper No. (%)	Chi-sq. (p-value)	Proper No. (%)	Improper No. (%)	Chi-sq. (p-value)
n=	86	80		73	75	
Grade			0.175			1.308
5th	49 (53.3)	43 (46.7)	(0.676)	38 (54.3)	32 (45.7)	(0.253)
6th	37 (50.0)	37 (50.0)		35 (44.9)	43 (55.1)	
Sex			0.548			1.308
Male	37 (48.7)	39 (51.3)	(0.459)	35 (44.9)	43 (55.1)	(0.253)
Female	49 (54.4)	41 (45.6)		38 (54.3)	32 (45.7)	
Care taker			1.816			0.296
Mother	67 (54.5)	56 (45.5)	(0.403)	53 (48.6)	56 (51.4)	(0.862)
Father	10 (45.5)	12 (54.5)		12 (54.5)	10 (45.5)	
Grand parent / Relative	8 (40.0)	12 (60.0)		8 (47.1)	9 (52.9)	
Missing case	1					
Family size			0.245			0.113
1-4 persons	44 (50.0)	44 (50.0)	(0.621)	39 (50.6)	38 (49.4)	(0.737)
5 person =<	42 (53.8)	36 (46.2)		34 (47.9)	37 (52.1)	
Elder siblings			0.158			0.128
Yes	51 (53.1)	45 (46.9)	(0.691)	43 (50.6)	42 (49.4)	(0.721)
No	35 (50.0)	35 (50.0)		30 (47.6)	33 (52.4)	
Younger siblings			0.548			0.229
Yes	50 (49.5)	51 (50.5)	(0.459)	39 (47.6)	43 (52.4)	(0.632)
No	36 (55.4)	29 (44.6)		34 (51.5)	32 (48.5)	

Socio-demographic characteristics	Approved			Not approved		
	Preventive behavior			Preventive behavior		
	Proper No. (%)	Improper No. (%)	Chi-sq. (p-value)	Proper No. (%)	Improper No. (%)	Chi-sq. (p-value)
n=	86	80		73	75	
Father's occupation			4.209			N.A.
Farmer	6 (46.2)	7 (53.8)	(0.378)	6 (46.2)	7 (53.8)	
Planter	38 (59.4)	26 (40.6)		41(47.1)	46 (52.9)	
Merchant	8 (61.5)	5 (38.5)		7 (70.0)	3 (30.0)	
Employee / Officer	29 (46.8)	33 (53.2)		14(50.0)	14 (50.0)	
Others	5(35.7)	9 (64.3)		5 (50.0)	5 (50.0)	
Mother's occupation			2.884			N.A.
Farmer	7 (46.7)	8 (53.3)	(0.577)	8 (53.3)	7 (46.7)	
Planter	33 (55.6)	26 (44.1)		41 (50.0)	41 (50.0)	
Merchant	13 (59.1)	9 (40.9)		6 (75.0)	2 (25.0)	
Employee / Officer	18 (41.9)	25 (61.0)		9 (45.0)	11 (55.0)	
House wife / Others	15 (55.6)	12 (44.4)		9 (39.1)	14 (60.9)	
Religion			N.A.			N.A.
Buddhism	86(51.8)	80(48.2)		72 (49.7)	73 (50.3)	
Islam	0 (0.0)	0 (0.0)		1 (100.0)	0 (0.0)	
Christianity	0 (0.0)	0 (0.0)		0 (0.0)	2 (100.0)	
CHV			0.716			0.961
Yes	40 (55.6)	32 (44.4)	(0.398)	29 (54.7)	24 (45.5)	(0.327)
No	46 (48.9)	48 (51.1)		44 (46.3)	51 (53.7)	
Income			0.058			0.353
(Baht / month)			(0.810)			(0.553)
Poor(<5000)	47 (50.5)	46 (49.5)		40 (51.3)	38 (48.7)	
Good(5000 <=)	31 (52.5)	28 (47.5)		32 (46.4)	37 (53.6)	
Missing case	12	2		1		

KAP evaluation	Approved			Not approved		
	Preventive behavior			Preventive behavior		
	Proper No. (%)	Improper No. (%)	Chi-sq. p-value	Proper No. (%)	Improper No. (%)	Chi-sq. p-value
n=	86	80		73	75	
Knowledge			0.504			1.300
Good (>=8)	48 (49.5)	49 (50.5)	(0.478)	40 (45.5)	48 (54.5)	(0.254)
Poor (=<7)	38 (55.1)	31 (44.9)		33 (55.0)	27 (45.0)	
Attitudes			0.124			2.604
Positive (>=15)	68 (51.1)	65 (48.9)	(0.725)	59 (53.2)	52 (46.8)	(0.107)
Negative (=<14)	18 (52.5)	15 (45.5)		14 (37.8)	23 (62.2)	

4.7 Evaluation of preventive behaviors in school children and CHV with health educations in approved school and not approved school

According to the result on Table13,

Talking about health education by health personnel (HE), activities by health personnel related to preventive behaviors because the proportion of discussion was lower in proper behaviors and that of demonstration was higher in proper preventive behaviors group in approved school and they had relationship between proper behaviors and discussion, and demonstration. They have provided demonstration for greater number of school children in approved school than in not approved school. Besides, the number of school children with proper behaviors is greater in approved school. Performance of discussion was related to improper behaviors and demonstration was related to proper one. It meant that more demonstration by health personnel led to proper preventive behaviors in approved school. All health personnel have conducted lectures in both schools.

On other hand, Performance of discussion and demonstration by health personnel were not related to preventive behaviors in not approved school, because they had less difference about the number of school children between proper and improper groups regarding to discussion and demonstration. All school has conducted lectures by health personnel (Table 13).

Health education by teacher (TE) was not related to preventive behaviors. They had less difference about the number of school children between proper and improper group regarding to lectures, discussion and demonstration in both schools

The result as above supposes that activities of demonstration by health personnel have been provided for greater number of school children with proper behaviors in approved school than not approved school. According to comparison of health education between approved school and not approved school, activity of demonstration by health personnel was more in approved school than in approved

school and demonstration by teacher was less in not approved school (Table 5). Despite of poor activities by teacher, proper behaviors could be related to health personnel by demonstration (Table 9).

Table 9 Evaluation of preventive behaviors in school children and CHV with health educations in approved school and not approved school

Health education for school children and CHV	Approved		Not approved	
	Preventive behaviors		Preventive behaviors	
	Proper (%)	Improper (%)	Proper (%)	Improper (%)
n=	86	80	73	75
HE				
Lectures				
Yes (1)	86(51.8)	80(48.2)	73(49.3)	75(50.7)
No (0)	0	0	0	0
Discussion				
Yes (1)	22 (38.6)	35 (61.4)	16 (44.4)	20 (55.6)
No (0)	64 (58.7)	45 (41.3)	57 (50.9)	55 (49.1)
Demonstration				
Yes (1)	64 (58.7)	45 (41.3)	27 (51.9)	25 (48.1)
No (0)	22 (38.6)	35 (61.4)	46 (47.9)	50 (52.1)
TE				
Lectures				
Yes (1)	14 (53.8)	12 (46.2)	73(49.3)	75(50.7)
No (0)	72 (51.4)	68 (48.6)	0	0
Discussion				
Yes (1)	14 (53.8)	12 (46.2)	11 (68.8)	5 (31.2)
No (0)	72 (51.4)	68 (48.6)	62 (47.0)	70 (53.0)
Demonstration				
Yes (1)	14 (53.8)	12 (46.2)	27 (51.9)	25 (48.1)
No (0)	72 (51.4)	68 (48.6)	46 (47.9)	50 (52.1)

4.8 Evaluation of preventive behaviors by health educations through CHV in approved school and not approved school

According to the result on Table 14,

At beginning, concerning in health education by health personnel for CHV (HEV) in approved school, health personnel have provided lectures, discussion and demonstration for all school children and they have remarkable difference between proper and improper behaviors group. In the other hand, health personnel have provided lectures, discussion and demonstration for small number of school children in not approved school. As well, they have remarkable difference between proper and improper behaviors group. (Table 10).

Regarding to education by teacher for CHV (TEV), they have provided only lectures for CHV in approved school. On the contrary, teachers have provided lecture discussion and demonstration in not approved school, however, total number of received children was small (Table 10).

The result told that health education by health personnel through CHV was active in approved school, however, the difference of proper preventive was very small in approved school. In the other hands, health education by teacher for CHV has fewer activities in approved school (Table 14). Health activities by health personnel and teacher were less in both schools and they have remarkable difference of preventive behaviors in both schools.

Table 10 Evaluation of preventive behaviors in CHV with health educations in approved school and not approved school

Health education for CHV	Approved		Not approved	
	Preventive behaviors		Preventive behaviors	
	Proper (%)	Improper (%)	Proper (%)	Improper (%)
n=	86	80	73	75
HEV				
Lectures				
Yes (1)	86(51.8)	80(48.2)	16 (44.4)	20 (55.6)
No (0)	0	0	57 (50.9)	55 (49.1)
Discussion				
Yes (1)	86(51.8)	80(48.2)	16 (44.4)	20 (55.6)
No (0)	0	0	57 (50.9)	55 (49.1)
Demonstration				
Yes (1)	86(51.8)	80(48.2)	16 (44.4)	20 (55.6)
No (0)	0	0	57 (50.9)	55 (49.1)
TEV				
Lectures				
Yes (1)	14 (53.8)	12 (46.2)	27 (51.9)	25 (48.1)
No (0)	72 (51.4)	68 (48.6)	46 (47.9)	50 (52.1)
Discussion				
Yes (1)	0	0	11 (68.8)	5 (31.2)
No (0)	86 (51.8)	80 (48.2)	62 (47.0)	70 (53.0)
Demonstration				
Yes (1)	0	0	11 (68.8)	5 (31.2)
No (0)	86 (51.8)	80 (48.2)	62 (47.0)	70 (53.0)

4.9 Evaluation of preventive behaviors with sanitary facilities in approved school and not approved school

According to the result on Table 15,

The result showed that sanitary toilet led to proper preventive behaviors in approved school. The result in type of toilet had the tendency that the proportion of traditional one in house was higher in proper behaviors group in approved school. As well, that of traditional one out of house was higher in proper behaviors group in not approved school. However, the difference of proportion was larger in approved school. In addition to it, they had no remarkable difference in type of toiletry facility between both schools (Table 7). However, they tended to have difference between preventive behaviors and toilet only in approved school (Table 11).

The result showed that sanitary water disposal led to proper preventive behaviors in approved school. Regarding to waste water disposal, it had the tendency that septic tank use was higher in proper behaviors group and draining onto ground was in improper behaviors one. On the other hand, the difference of proportion between both groups was smaller in not approved school than in approved school. As well as above, they had no remarkable difference in water disposal facility between both schools (Table 7). However, they tended to have difference between preventive behaviors and water disposal only in approved school (Table 11).

The result showed that tap water led to proper preventive behaviors in approved school. In approved school, the proportion of tap water usage for drinking tended to be higher in proper behavior group than in improper one. On the other hand, well usage was higher in improper group. Talking about not approved school, they had no significant relationship between preventive behaviors and water for drinking. Above-mentioned results said as well, that they had no remarkable difference in water resource facility for drinking between both schools (Table 7). However, they tended to have difference between preventive behaviors and water resource for drinking only in approved school (Table 11).

The result showed that poor sanitary kitchen led to proper preventive behaviors in approved school. According to the table in approved school, it showed that the proportion of table type kitchen was over two times lower in proper group than in improper one. On the contrary, kitchen on ground out of house was higher in proper group. They had significant relationship between preventive behaviors and type of kitchen (p=0.001). In not approved school, however number of some column was less than five, they had no relationship between preventive behaviors and type of kitchen. However they tended to have difference in kitchen facility between both schools (Table 7), the result told that approved school children with kitchen on ground mention that cooking on ground was not adequate for good sanitation (Table 16).

The result showed that tap water for kitchen led to proper preventive behaviors in approved school. Talking about water resource for drinking, it showed that the proportion of tap water for kitchen was higher, and that of well usage is two times lower in proper preventive behaviors group in approved school, however one column was less than five. On the contrary, they had no significant relationship between preventive behaviors and water resource for kitchen in not approved school. Regarding to water resource facility for drinking, they had difference between both schools and approved school has better facility for it (Table 7). It meant that good sanitary facilities and its quantity were related to good preventive behaviors in approved school (Table 11).

The result showed that proper preventive behaviors led to no fecal fertilizer usage in approved school. According to table of fecal fertilizer, the proportion of fecal fertilizer usage was lower and no fecal fertilizer usage was higher in proper preventive behaviors group in approved school. They had significant relationship between preventive behaviors and fecal fertilizer usage (p=0.041). On the other hand, they had no significant relationship between preventive behaviors and fecal fertilizer usage (p=0.251) in not approved school. Besides, approved school used fecal fertilizer less than not approved school significantly (Table 7). It meant that proper preventive behaviors group didn’t use it for its risk in approved school (Table 11).

Regarding to domestic animals, they had no significant relationship between preventive behaviors and domestic animals in approved school (p=0.516) and in not approved school (p=0.091) (Table 11).

Table 11 Evaluation of preventive behaviors with sanitary facilities in approved school and not approved school

N.A.: not applicable

Sanitary facilities	Approved			Not approved		
	Preventive behavior			Preventive behavior		
	Proper No. (%)	Improper No. (%)	Chi-sq. p-value	Proper No. (%)	Improper No. (%)	Chi-sq. p-value
n=	86	80		73	75	
Toilet			N.A.			N.A.
Traditional in house	67 (58.8)	47 (41.2)		62 (53.0)	55 (47.0)	
Traditional out of house	18 (36.7)	31 (64.6)		11 (37.9)	18 (62.1)	
No toilet	1 (33.3)	2 (66.7)		0 (0.0)	2 (100.0)	
Water disposal			N.A.			N.A.
Public pipe	3 (50.0)	3 (50.0)		4 (50.0)	4 (50.0)	
Septic tank	30 (68.2)	14 (31.8)		19 (61.3)	12 (38.7)	
Ground / Others	52 (45.2)	63 (54.8)		49 (45.4)	59 (54.6)	
Missing case				1		
Water resource for drinking			N.A.			4.122 (0.249)
Tap	47 (61.8)	29 (38.2)		31 (53.4)	27 (46.6)	
Rain water	11 (64.7)	6 (35.3)		13 (65.0)	7 (35.0)	
Well	27 (41.5)	38 (58.5)		23 (41.8)	32 (58.2)	
Stream / Others	1 (12.5)	7 (87.5)		6 (40.0)	9 (60.0)	

Sanitary facilities	Approved			Not approved		
	Preventive behavior			Preventive behavior		
	Proper No. (%)	Improper No. (%)	Chi-sq. p-value	Proper No. (%)	Improper No. (%)	Chi-sq. p-value
n=	86	80		73	75	
Kitchen			13.601			N.A.
Table	13 (28.3)	33 (71.7)	(0.001)	20 (48.8)	21 (51.2)	
On floor in house	9 (56.3)	7 (43.7)		2 (66.7)	1 (33.3)	
On ground out of house	62 (60.8)	40 (39.2)		51 (49.0)	53 (51.0)	
Water resource for kitchen			N.A.			1.951 (0.583)
Tap	52 (61.9)	32 (38.1)		31 (51.7)	29 (48.3)	
Rain water	5 (83.3)	1 (16.7)		10 (58.8)	7 (41.2)	
Well	20 (32.8)	41 (67.2)		23 (43.4)	30 (56.6)	
Stream / Others	7 (53.8)	6 (46.2)		6 (40.0)	9 (60.0)	
Missing case				3		
Fecal fertilizer			4.169			1.315
Yes	22 (40.0)	33 (60.0)	(0.041)	39 (54.2)	33 (45.8)	(0.251)
No	62 (56.9)	47 (43.1)		34 (44.7)	42 (55.3)	
Domestic animals			0.422			2.854
Yes	51 (53.7)	44 (46.3)	(0.516)	61 (53.0)	54 (47.0)	(0.091)
No	33 (48.5)	35 (51.5)		12 (36.4)	21 (63.6)	

CHAPTER V
DISCUSSION

The objectives in this research study were to identify factors related to following, the first objective was to identify socio-demographic and socio-economic factors related to preventive behaviors against STH in approved school and not approved school. The second one was to identify knowledge and attitudes for changing preventive behaviors among school children in both schools. The third was to identify activities of health educations changing preventive behaviors under school program in both schools. The forth one was to identify sanitary facilities related to preventive behaviors in both schools. The final one was to identify factors related each other among all variables for preventive behaviors between both schools.

The result in Chapter IV described and discussed in detail with literature reviews. The discussion had often referred to the literatures related to preventive behaviors and diarrheal diseases for substitute of STH, and the literatures of prevalence and STH. The discussion defined preventive behaviors as the process to declining prevalence. The reason was that information for all independent variables related to preventive behaviors was scarce in previous literatures.

5.1 Socio-demographic factors

5.1.1 Grade

The result had no relationship between preventive behaviors and grade in approved school and not approved school. Talking about prevalence final outcome instead of preventive behaviors, one researcher reported that they had no difference of prevalence in six to twelve year age children in Venezela (Acosta M., et al, 2002) (36). Other one reported that the prevalence of STH among children declined rapidly from 0-9 years age group to 10-19 years age group, approximately a half time in Thailand (Waikagul J.,et al, 1993) (47). This was the opposite result on our result, however, the result from literature ranged from zero to nineteen age years old. That is why, the result had difference of prevalence among children.

5.1.2 Sex

The result described that difference of sex had no relationship to preventive behaviors in approved school and not school. One report described that they had no significant difference according sex under 15 years age children in Guana (Carme B., 2002) (39). However, insignificantly speaking, the proportion of proper behaviors tends to be higher in female than in male. The preventive behaviors change earlier in female than in male. One researcher reported that boys (male) in three to five grade wore shoes less than girls (female) significantly in Thailand (Tomono N., et al, 2003) (48). The behavioral change will appear between male and female in this period. This result is compatible with ours, however insufficiently.

5.1.3 Caretaker

The result explained that caretaker of health education for school children was not related to preventive behaviors. In approved school and not approved school, the majority of caretaker was mother and the mothers weren't related to preventive behaviors in their school children in both school. Steffens M.C., et al (1996) (40)

described that teachers held mothers were responsible for health education and mothers expected the education from teachers in Germany. Consequently, preventive behaviors and health educations were unsatisfactory in school. That is why, the relation didn't appear between preventive behaviors and caretaker in both schools. The following section, activities of health education, agued the issue again.

5.1.4 Family size

Family size wasn't related to preventive behaviors in approved school and not approved school. Large family wasn't related to proper behaviors in both schools. Though this was report about behaviors, tobacco and alcohol in teenagers, behaviors was related to family environment, such as living father and mother and mother as housewife (Challier B., et al, 2000) (49). Proper behaviors attribute to live with father and mother for school children. However, the finding could not show same tendency in both schools.

5.1.5 Elder and younger sibling

The result says that the existence of siblings was not related to preventive behaviors in approved school and not approved school. One author mentions that younger children often spend more time with older children than with adult and they admire them, copied them and do what they say (Child-to-Child Trust, 1993) (2). Actually, the Child-to-Child approach is carrying on in developed countries as well as developing countries. One report described that children could be engaged in the learning process through activities such as helping to care for younger siblings and educating children (Rao AR, 1989) (27). As well, another described that the best way to take care of young siblings was to train school children instead of their mother in Congo (Centre de Promotion, 1997) (31). In spite of these article, the result differed the descriptions

5.1.6 Father's and mother's occupation

According to Chapter IV, the proportion of planter was lower and that of employee/officer was higher in approved school than in not approved school and it was remarkably different. However, they had no significant relationship between preventive behaviors and occupation. Hirata M. et al (1997) (28) described that unhygienic environment in household of planter lead to improper preventive behaviors in school children in Thailand. As well, another author described that the high prevalence rates reflected widespread fecal contamination of environment in the plantation due to poor and congested housing and insufficient sanitary facilities in Sri Lanka (Sorensen E, 1996) (25). However, these descriptions don't conform the environment in Nakhon Si Thammarat, Thailand because most of planters were owners of plantation field.

5.1.7 Religion

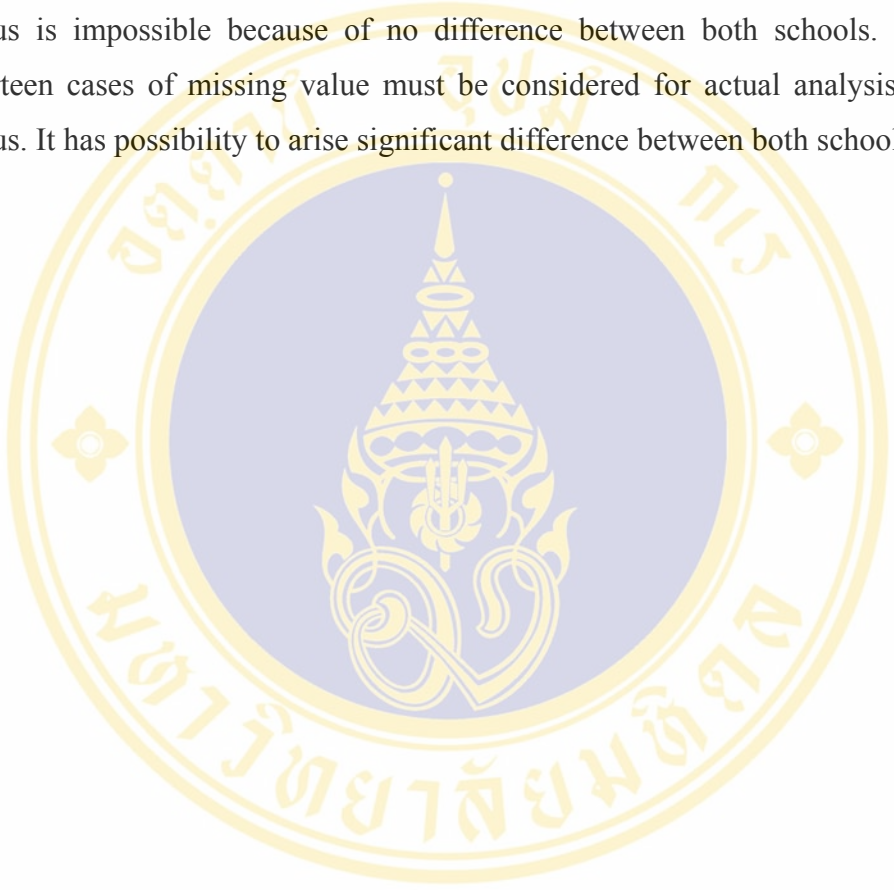
In Phrom Khiri district, nearly hundred percent of residents was Buddhist in approved school and not approved school. The review of economic status among Muslim in southern Thailand described that major problems included high birth rate, high migration, low education, low income and bad health of infant (Chongsuvivatwong V, 1990) (41). As well, another author explained that these people had less health knowledge and it lead to high prevalence of STH. However, in this area, the problem didn't arise and it was out of concerning because nearly hundred percent of residents are Buddhists.

5.2 Socio-economic factor

5.2.1 Income

According to Table 4, they had tendency that the proportion of poor income status was higher in approved school than in not approved school. However, income status had no significant relationship between preventive behaviors and income. A review for intestinal parasitic infection described that most of the STH infection were

distributed throughout poor and socio-economically deprived communities in tropics and subtropics in Malaysia (Norhayati M, 2003) (37). Poor economic status can lead to poor sanitary facilities and health education. Sorensen et al, (1996) (25) presented that widespread fecal contamination resulted from poor housing and insufficient sanitary facilities in Sri Lanka. Nevertheless, in this case, the evaluation of economic status is impossible because of no difference between both schools. Incidentally, fourteen cases of missing value must be considered for actual analysis for income status. It has possibility to arise significant difference between both schools.



5.3 Knowledge and attitudes

The result shows that quality of knowledge and attitudes in school children wasn't related to their own preventive behaviors in both schools. In both schools they have no significant relationship between preventive behaviors and knowledge ($p=0.478$) and attitudes ($p=0.725$) in approved school and knowledge ($p=0.254$) and attitudes ($p=0.107$). Depends on the curriculum in each school, one or more persons, including health personnel and teacher used to provide health educations. However, The result didn't confirm the relationship to preventive behaviors despite of health educations for knowledge and attitudes except for knowledge and attitudes about demonstration by health personnel.

The previous report for preventive behaviors of Cholera case explained that knowledge and attitudes could change by some media, however practices did not reflect their knowledge and attitudes with scoring evaluation (Quick RE, 1996) (29). However, in this case, more knowledgeable group had actually lower prevalence of Cholera. As well, other report explained that the number of patient with STH had negative relationship with knowledge score of prevention and 15-years-old age group marked highest score (Gai L, 1995) (26). Other report repeated that information about infection route of STH could prevent from re-infection among female (Siharath K, 2000) (23).

They could not confirm the preventive behavioral change by knowledge and attitudes in Cholera case, however, the prevalence of STH actually changed by providing knowledge in STH case. Though above-mentioned fact tells that Cholera and STH, and preventive behaviors and prevalence are different, preventive behaviors should be on process of declining prevalence.

The finding of activities of health education will mention in terms of education skill in next section

5.4 Activities of health education

5.4.1 Activities of health education by health personnel and teacher

The result said that health education by health personnel can encourage school children powerfully and only demonstration with school children could be related to their preventive behaviors in health education. In addition to it, the population of target school children should be large for health education. According to Table 5, the majority of school children has provided demonstration by health personnel and has proper preventive behaviors in approved school. On the other hand, the majority of school children haven't provided group discussion in approved school, however, they have proper attitudes more than not approved school. It is because that this population belongs to same school and received same health education. The finding supposed that lectures or demonstration lead to proper attitudes among school children. This result attributed to educational skill and curriculum by one health personnel or one health center.

However, in this case, they have provided only lectures and demonstration except for discussion in this approved school. One researcher reported that education combined with accessible convenient hand hygiene might result in a sustainable increase in the frequency of hand washing among primary school children (Early E et al, 1998) (33). It means that the frequency of hand wash increases in more sustainable with wand wipe and peer education, than with wipe hand or education alone. In the case of wipe hand alone, the frequency doesn't change among school children in long period. With peer education only, the frequency decreases after six month. As well, one report suggested that health promotion practitioners needed to consider school children's perception of school environment, teachers' and peers' support and their health behaviors (McLellan L, et al, 1999) (32). Another report suggested that interpersonal education was better than mass media education for preventing Cholera (Quick RE, et al, 1996) (29). It described the difference between lectures and peer education. That is why they needed to conduct group discussion among school children in this approved school.

The discussion as above concluded that demonstration by health personnel can be effective in approved school and group discussion among school children should combine with demonstration for changing preventive behaviors in primary school.

The result said that teachers should motivate for health education program because health education by teacher have kept inactive in approved school and not approved school despite of its possibility and importance for changing behaviors. Table 5 showed that only demonstration by teacher has conducted more in not approved school than approved school. In spite of this activities, It could not perform efficacy and efficiently for preventive behaviors among school children in not approved school. As well, the number of school children who received health education was absolutely small in lectures, discussion and demonstration in both schools, except for lectures in not approved school. The result led that the motivation for preventing STH was very low among teachers in both schools.

One article described that school children who had positive perceptions regarding their school environment and perceived their teachers as supportive were significantly more likely to engage in health promoting behaviors (Early E et al, 1998) (33). In the other words, if teachers participated in health education with school children and supported their activities in school, the preventive behaviors would change more than before. As mentioned above, interpersonal educations, such as discussion and demonstration, were more suitable than one-way education like lectures. However, another researcher reported the effectiveness of audiovisual media, such as videotape and comic book, for preventive behaviors against schistosomiasis (Yuan L., et al, 2000) (17).

5.4.2 Activities of health education for CHV by health personnel and teacher

The result said that health education for CHV by health personnel has conducted completely under STH control program in approved school and it haven't conducted in majority of not approved school.

Only focusing not approved school, lectures, discussion and demonstration through CHV has small activities preventive behaviors. In previous section, the finding has already mentioned that demonstration and discussion can transfer from health personnel to school children and could enhance preventive behaviors (Early E et al, 1998) (McLellan L, et al, 1999) (32). That is why, health education through CHV should have effect to transfer knowledge and attitudes for preventive behaviors.

Actually numerous studies have confirmed that children is easily motivated and have the desire to transfer their knowledge to others (Rao.AR, 1989) (27). As well, studies have recognized that Child-to-Child approach aims not only to teach children, typical scholastic discipline, but also to train them in hygiene, health and disease prevention so they could apply what they learn in the community with their families and friends (Centre de Promotion, 1997) (31). This is undeniable facts actual situation. However some report described that school children who had positive perceptions and perceived their teachers as supportive were significantly to engage in health promoting behaviors, a supportive peer environment was not associated with positive health behaviors (McLellan L, et al, 1999) (32). It can disturb to transfer KAP to other school children.

According to health education for CHV by teacher, approach for CHV by teacher is extremely poorer than by health personnel in approved school. Concerning with lectures, they have provided more activity for school children through CHV. In spite of the result, preventive behaviors could not be related in not approved school.

The education for CHV have conducted insufficiently and inactively by teacher and the degree of influence was less powerful than health personnel for health education.

5.5 Sanitary facilities

5.5.1 Toilet

The school children in approved school had proper preventive behaviors than those who in not approved school under good toiletry facility. It was already mentioned that they had no significant difference in toilet facility between both schools. All school children had same opportunity and toiletry facility to perform their behaviors in household. However, they had tend to have relationship between behaviors and toilet in only approved school. It meant that schoolchildren in approved school performed behaviors properly than school children in not approved school. Hosain GM. et al, (2003) (20) explained that sanitary latrine use led to declining prevalence STH after intervention in Bangladesh. As well, they said that not using latrine and soap were identified as risk factors for infection of helminthes in Kenya (Olson A, 2001) (46). In Thailand, the STH control program has conducted the implementation of sanitation, including increasing the number of latrines with health educations. The prevalence of STH declined after this program (Muennoo C, 1997) (24). In the other words, sanitary latrine use led to low prevalence through proper preventive behaviors. In addition to it, proper preventive behaviors must follow establishing sanitary toilet.

5.5.2 Water disposal

The school children in approved school had proper preventive behaviors than those who in not approved school under good sanitary water disposal facility. They have lived in same environment in terms of water disposal. However, the result confirmed that school children in approved school tend to have relationship between proper behaviors and sanitary water disposal. More households in approved school established septic tank for water disposal. It led to proper preventive behaviors. According to the report by Adeyaba OA, et al, (2002) (21), the high degree of contamination of solid waste dumpsites with parasitic agent was observed in the study. Bergstrom K, et al, (1981) (34), washing water from vegetables caused to

spread egg of helminthes and salmonella on to ground. As well, other researcher pointed that in adequate sewage system became the source of fecal contamination to neighborhoods in Brazil (Schulz S, et al, 1992) (44). Though water disposal facility in itself doesn't contribute to emphasize and encourage school children to behave properly, it accompanied with toiletry facility. That is why, school children behaved properly in good water disposal facility in approved school.

5.5.3 Water resource for drinking and kitchen

The school children in approved school had proper preventive behaviors than those who in not approved school, regarding to water resource facility for drinking and kitchen. Besides, more established water resource for kitchen enable to behave properly in approved school because they tend to have difference in resource for drinking between both schools. School children in approved had more proper resource for kitchen in approved school. Looking at the result, tap water use was more and well and stream use was less in approved school than in not approved school. Among school children in approved school, existence of good water resource made them use the good facility and made them behave properly as well.

Talking about schistosomiasis, other helminthiasis from river or lake water, the frequency of river water contact decreased more in house hold with high piped water than low piped one (Noda S, et al, 19997) (19). Wim van der Hoek, et all, (2001) (50) recommended that safe use of pipe irrigation water seemed possible if household could pump seepage water to large storage thank in their house and have contenuos water supply for sanitation and hygiene. It have already established at target district in Nakhon Si Thammarat. As well, another researcher suggested that the amount and quality of rinsing water used were found to be important determinantin the reduction of bacterial contaminations on hand (Hoque BA, 2003) (38). It was very important to use enough amount of safe water in feasible. And It led to proper preventive behaviors.

5.5.4 Kitchen

Looking at the result, the household had nearly same number of kitchen on ground outside in both schools (Table 7). In spite of it, school children in approved school behave properly in this environment (Table 11). It suggested one assumption that they had good knowledge of risk for STH, they realized the poor environment in kitchen and it led proper preventive behaviors. According to the report by Waikagul J, (1993) (47), the higher contamination site of Ascaris eggs were bush, well/water container and shaded area and lower ones are tree and house floor dust in Nakhon Si Thammarat. Preventive health education have taught the life cycle of STH, route of infection and prevention in curriculum, therefore, they behaved properly in poor kitchen facility.

5.5.5 Fecal fertilizer

In approved school, school children paid more attention for the risk of fecal fertilizer. More households with proper behaviors have used less fecal fertilizer significantly in approved school than in not approved school. In addition to it, the result described that household with fecal fertilizer paid more attention for the risk of infection with proper behaviors in not approved school. It meant that people in urban area don't use fecal fertilizer for the risk and people in farming area use it with proper behaviors. Bergstrom K, (1981) (34) mentioned the risk of fecal fertilizer that sewage sludge with Ascaris eggs spread had infectious risk until 15 weeks and could enter the body with vegetables. The health education have provided this information into school children and recommended to avoid fecal fertilizer use. However, It depends on occupation and economic status. The people who must use fertilizer in their status must have proper behaviors.

5.5.6 Domestic animals

In both schools, they didn't pay attention for breeding domestic animals. They had no significant relation between proper behaviors and animals. The health

education in school have provided lecture about lifecycle and infection route of STH in both school. One report paid the caution that the keeping pigs was correlated with an increased yard contamination (Schulz S, 1992) (44). Other researcher described that hookworm could infect into a plenty of animals including dogs and cat and could spread it breeding people (Beveridge I, 2002) (35). It means that the household with animals should behave properly in terms of prevention.

CHAPTER VI
CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The cross sectional study conducted on 314 cases of school children in approved school and not approved school and their mothers in Nakhon Si Thammarat, Thailand, on January 2004. These schools provided school children with STH control program by Ministry of Public Health in 2002 and 2003. Target group was school children including child health volunteers in 5th and 6th grade. The study collected data in schools with self-administered questionnaire for school children and interview questionnaire for their mothers in households.

The study defined preventive behaviors against soil-transmitted helminthiasis (STH) as dependent variable. As well, it defined socio-demographic and socio-economic factors, knowledge and attitudes, health education by health personnel and teacher, and sanitary facilities as independent variables. The scores categorized knowledge, attitudes and preventive behaviors into good and poor, positive and negative, and proper and improper.

The analysis applied Chi-square test for all variables in this study. In the first step for evaluation, the description and analysis confirmed the difference of environment surrounding school children between approved school and not approved school. The second step was to confirm the relationship between preventive behaviors and all independent variables in each school. The final step was to compare the results in each school and to identify the factors related to preventive behaviors among school children.

Regarding to evaluation of socio-demographic and socio-economic factors, however they have occupational difference, such as less planter and more

employee/officer in approved school, between both schools, Occupation of parents was not related to preventive behaviors.

Knowledge and attitudes was not related to preventive behaviors.

Concerning with health education, health personnel have provided more demonstration for school children in approved school and it led to more proper preventive behaviors. As well, teachers have provided more demonstration for school children in not approved school, however, it had no relationship to proper behavior. Besides, teachers in not approved school have provided lectures for CHV, the result could not show the relationship to preventive behaviors among school children.

In same environments regarding to toilet, water disposal and water resource for drinking, school children in approved school tend to have proper preventive behaviors than children in not approved school. On the contrary, poor kitchen facility on ground in outside reinforced proper behaviors in approved school. Good water resource for kitchen reinforced proper behavior in approved school. In approved school, school children with proper behaviors didn't use it significantly. From another point of view, school children using fecal fertilizer tended to have proper preventive behaviors in approved school. Existence of domestic animals was not related to preventive behaviors.

The conclusion told that demonstration by health personnel is most powerful factor for changing preventive behaviors and sanitary facilities reinforced the effect by demonstration in approved school.

6.2 Recommendation

This study recommends that a health education by health personnel, especially demonstration is useful method for preventive behaviors against STH under sanitary facilities in Nakhon Si Thammarat.

This study selected purposive sampling to compare the approved school and not approved school in regard to health promotion under Ministry of Public Health at Phrom Khiri district in Nakhon Si Thammarat.

Shortage of assessed primary school limited to select adequate number of school children for comparison, because some school had over a hundred of school children in 5th and 6th grade and other school had only fifteen in the grade.

One large school had different environment compared with other schools in rural area and the change of health education program in the large school influenced into data analysis extremely.

Ministry of education recommended that any school had 25 child health volunteers. That is why it was happened that all 5th and 6th school children were child health volunteers in small schools.

Health workers and volunteers had to be trained for interview with questionnaire because some interviewer asked lead-questions for collect answers according to my observation.

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APPENDIX

Questionnaire

Introduction

I'm Dr. Katsuyuki TSUKAMOTO from Japan. I have participated in The Master of Primary Health Care Management degree program in Mahidol University, Bangkok since last June. During this program, I had much interested in health education and promotion related to soil-transmitted helminthasis and decided to make it my topic of thesis. Now I need to collect information about health education and promotion in primary schools. Would you give me your cooperation to collect the information of them?

In regarding with answered information, I keep promises strictly as following:

1. I will use the information answered by you in this questionnaire only for this research study or other academic papers.
2. I will keep the information answered by you in confidence and never confess it for other purpose.
3. You can refuse to answer this questionnaire by any reason. This is not compulsory questionnaire for you

How to answer:

1. This is not your examination.
2. Please read questions carefully and understand contents
3. Please check only one answer on a number or a box with '√ ', except for No, 7
4. Some questions ask you to fulfill the number and words. Please put it down carefully and correctly.

If you can understand my objectives and can agree with me, please sign your complete name below.

Signature……

Thank for your agreement!

Questionnaire for school children

1. School name: _____
2. Name: _____

3. Age: ____ years
4. Grade: ____ grade
5. Sex: ☐ male ☐ female

6. Family you live with (check all of them):
   ☐ father ☐ mother ☐ grand parents ☐ relatives
   ☐ others _____
7. Who takes care of you mainly? (check one as main person)
   ☐ father ☐ mother ☐ grand parents ☐ relatives
   ☐ others _____
8. Do you have brothers or sisters?
   Elder brother and/or sister_____ persons
   Younger brother and/or sister _____ persons
9. What is your father's occupation?
   ☐ farmer(rice) ☐ planter ☐ merchant ☐ employee
   ☐ govern. officer ☐ others
10. What is your mother's occupation?
    ☐ farmer (rice) ☐ planter ☐ merchant ☐ employee
    ☐ govern. Officer ☐ house wife ☐ others
11. Religion: ☐ Buddhism ☐ Islam ☐ Christianity
    ☐ others

12. Are you child health volunteer? ☐ yes ☐ no

Knowledge

1. Where does round worm live in body?
   ฉ foot ฉ intestine ฉ lung
2. Which worm can enter into foot?
   ฉ whipworm ฉ roundworm ฉ hookworm
3. Which are the eggs from roundworm passed out by?
   ฉ stool ฉ urine ฉ sputum
4. How long do most worm eggs take over to become infectious larva?
   ฉ one hour ฉ one day ฉ one week
5. Which stool is more dangerous fresh for STH infection?
   ฉ fresh stool ฉ old stool ฉ disinfected stool
6. What is hookworm transmitted by?
   ฉ touching skin ฉ touching stool ฉ touching blood
7. What is best method to find STH infection?
   ฉ examine sputum ฉ examine stool ฉ examine blood
8. Which symptom is hookworm infection?
   ฉ itching and tracheal inflammation ฉ abdominal pain
   ฉ severe diarrhea
9. Which is symptom of roundworm?
   ฉ abdominal discomfort ฉ foot itching ฉ anal itching
10. Which symptom is dangerous on whipworm infection?
    ฉ stomach ach ฉ bloody diarrhea ฉ no appetite
11. What do you do when you may have round worm
    ฉ keeping your body clean ฉ buying medicine
    ฉ meeting doctor and stool examination
12. What does defecation on soil mean?
    ฉ good method for deworming ฉ good fertilizer for plant
    ฉ transmission of worm eggs
13. How do you prevent roundworm infection?
    ฉ wash hand before eating ฉ avoid eating raw fish
    ฉ wear shoes
14. How does whipworm enter into body?

ฉ eat fresh vegetable ฉ eat raw fish ฉ eat raw meat

15. What is good behavior to prevent hookworm infection?

ฉ eat uncooked food ฉ play without wearing shoes

ฉ keep latrine clean

Attitudes

	agree	not sure	disagree
1. Eating washed vegetables can prevent STH infection.			
2. STH cannot transmit from person to person.			
3. Everyone can be easily infected with STH.			
4. Everyone can become an agent of STH if they are infected with STH and don't treat it.			
5. STH is not dangerous because it is only a common disease.			
6. It is better to examine stool for STH at the same time among family members.			
7. Wearing shoes can prevent STH infection.			
8. Washing foot after playing with bear foot cannot prevent STH infection.			
9. Cutting fingernail only once per month can prevent STH infection.			
10. Clean latrine cannot prevent transmission of STH			
11. Prevention of STH is the responsibility of every family member.			
12. Eating cooked food can prevent STH infection.			

Preventive behaviors

1. Do you use a latrine in your house?

ฉ always ฉ sometime ฉ never

2. Do you bury your feces when you cannot find latrine in the field?

ฉ always ฉ sometime ฉ never

3. Do you wash your hands after defecation?

ฉ always ฉ sometime ฉ never

4. Do you wash your hand before eating?

ฉ always ฉ sometime ฉ never

5. Do you play in the ground without wearing shoes?

ฉ always ฉ sometime ฉ never

6. Do you wash your feet when you play without shoes?

ฉ always ฉ sometime ฉ never

7. Do you have short and clean fingernails?

ฉ always ฉ sometime ฉ never

8. When you can access stool examination for STH, do you always comply?

ฉ always ฉ sometime ฉ never

9. Have you helped keep a latrine clean at home?

ฉ always ฉ sometime ฉ never

10. Have you kept the house surroundings clean?

ฉ always ฉ sometime ฉ never

Questionnaire for mothers

Sanitary facilities

1. Type of toilet:
   ฺ traditional one in house ฺ traditional one out of house ฺ pit latrine
   ฺ no toilet
2. Water disposal:
   ฺ to septic tank in house ฺ to septic tank out of house ฺ to canal
   ฺ to ground ฺ others
3. Water resource for drinking (check one for main source):
   ฺ tap water ฺ rain water ฺ well water ฺ stream water
   ฺ others
4. Type of kitchen:
   ฺ table type ฺ on floor in house ฺ on ground in house
   ฺ on ground out of house ฺ others _____
5. Water source for kitchen (check one for main source):
   ฺ tap water ฺ rain water ฺ well water ฺ stream water
   ฺ others _____
6. Usage of fecal fertilizer: ฺ yes ฺ no
7. Domestic animal: ฺ yes ฺ no
   If yes, what kinds?
   ฺ cow ฺ pig ฺ chicken ฺ others _____
8. Where do you breed it? ฺ under house ฺ around house ฺ in shed
   ฺ others _____
9. Income _____ Baht per month or _____ Baht per year

Questionnaire for health teachers and health personnel

I am: □ health teacher □ health personnel

My responsible school is: ..... primary school

1. Have you provided **regular health education programs (curriculum)** against soil-transmitted helminthiasis (STH) for school children last year?

   □ yes □ no (go to No. 5)

If yes,

2. Where have you provided school children with the programs?

   □ at primary school □ in community □ both

3. How many times have you provided the programs for school children?

   At primary school: ……times every month, or …….times in last year

   In community: ……times every month, or …….times in last year

4. What kind of health educations has been conducted in the programs?

   □ kinds and life cycle of helminths

   □ route of infections

   □ sign and symptom of infections

   □ severelity of infections

   □ treatment for STH

   □ prevention of STH

   □ demonstration and practice of preventive methods

   (i.e. washing hand, cutting nail)

   □ group discussion for prevention of STH

   □ others .....

5. Have you provided **additional programs** against STH for **child health volunteers** at primary school last year?

   □ yes □ no (go to No. 8)

If yes,

6. How many times have you provided it for child health volunteers?

   At primary school: ……times every month, or …….times in last year

   In community: ……times every month, or …….times in last year

7. What kind of additional health educations has been contained in the programs?

   □ kinds and life cycle of helminths

   □ route of infections

   □ sign and symptom of infections

   □ severelity of infections

   □ treatment for STH

   □ prevention of STH

   □ demonstration and practice of preventive methods (i.e. washing hand, cutting nail)

   □ group discussion for prevention of STH

   □ others .....

8. Have you provided school children with curriculum of **leaning activities for child-center approach against STH** under Ministry of Education and Public Health last year?

   □ yes □ no (go to No. 10)

If yes,

9. What kind of learning activities has been conducted?

   □ reading-made lesson about STH

   □ situation facing for problem detection

   □ brainstorming

   □ knowledge searching from various sources

   □ cooperative learning among school children

   □ project plan for solution

   □ role playing

   □ preparing teaching materials

□ practice for detecting STH

□ others.....

10. How many times have you held community forum against STH last year?

(for health personnel)

……times every month, or …….times in last year

Thank you very much!

BIOGRAPHY

NAME	Katsuyuki Tsukamoto
DATE OF BIRTH	June 20, 1967
PLACE OF BIRTH	Shizuoka Prefecture, Japan
INSTITUTION ATTENDED	Hamamatsu University School of Medicine 1986-1992 Medical Doctor
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