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# **A comparison of using the local herbs as Mosquito Repellents to Develop Small Muscles of pre-school children and parents in Banbua Sub-district, Mueang District, Buriram Province**

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**Abstract**---The present study was quasi-experimental research. It aimed to compare the use of the locally available herbs as mosquito repellents to develop the small muscles of pre-school children and parents. The samples were 72 individuals divided into a control group of 36 and an experimental group of 36. The research instrument was a Developmental Surveillance and Promotion Manual (DSPM) of the Ministry of Public Health. Statistics used in data analysis were percentage, mean, standard deviation, and t-test. The research findings revealed that a comparison of using the mosquito repellents derived from the locally available herbs showed that the average after the experiment was higher than the one before the experiment at a statistical significance of 0.05 ( $P < 0.05$ ). The recommendations were made that there should be more time for the research. Moreover, the further research should cover all communities of Banbua Sub-district with more participation from all relevant organizations.

**Keywords**---Local wisdom, Local herbs to repel, Development of small muscles, Pre-school children.

**Introduction**

According to WHO, there are on average of 390 million people infected with the dengue fever worldwide. The death rate is 2.5% a year. The disease was reported at least in 129 countries, a majority of which were in Asia. The cases had more than eight times increased in the past two decades. WHO aimed to reduce the mortality rate from the dengue fever by up to 50% and the infection rate by 25% in 2020. However, the Covid-19 pandemic creates an immense pressure on the health care system across the world, particularly the Asian countries where an

access to the Covid-19 vaccine remains low. As for Thailand, it was found that in 2020 there were 71,293 cases of this fever, and 51 deaths, mostly found in the age groups of 5-14 and 15-34-years old people. Bangkok was the place where the cases are most prevalent. "The death rate in Thailand is not that high; however, the outcome from illness is extensive. At present, the death rate in each country has considerably reduced. Previously, the death rate was high up to 20%. Now in some countries, it was only at 1-2 %," said Dr. Usa, adding that the reason why the death rate in Thailand was low was because Thailand had learned, understood and had been well prepared to deal with the disease. Besides, with good infrastructure, patients could have a quick access to the medication.

To declare the success, ASEAN had set the 15<sup>th</sup> of June as the Day of the Dengue Fever. Still, an awareness campaign on its perils and impact is not so successful. Having realized that the dengue fever is not given so much attention as other diseases, the group called International Society for Neglected Tropical Disease based in England had declared the 15<sup>th</sup> of June 'the World Dengue Day'. The aim was to encourage all academics and experts from various continents to work together to cope with the spread of the disease. The group expected to make it the official date within 2023 (<https://www.bbc.com/thai/thailand-57479000>).

Concerning the dengue fever in Thailand from the first of January to 26 December, 2021, there were 9,798 cases, meaning 14.75 per 100,000 population. There were six deaths or 0.01 per 100,000 population. The ratio of male and female was 1:1.13. The cases were found most in the age group of 15-24 years (22.67%), followed by the age group of 10-14 years (18.24%), and 25-34 (14.78%), respectively. Geographically, the cases were highest in the north (23.34 per 100,000 population). In central Thailand, the ratio was 17.73 per 100,000 population, in the south the ratio was 9.29 per 100,000 population and in northeast, it was 9.28 per 100,000 population. The province with the highest cases was Maehongson. The ratio was 182.26 per 100,000 population. The dengue situation in Health Area 9 from 1<sup>st</sup> of January to 25<sup>th</sup> of December, 2021, it was found that there were 671 cases; the ratio was 9.90 per 100,000 population. There was one death, the death rate was 0.15. The ratio of female and male was 1:1.03. The cases were found most among the groups of 10-14 years of age with the illness ratio of 35.59 per 100,000 population, followed by the groups of 5-9 years of age with the ratio of 33.86 and the groups of 0-4 years of age with the ratio of 16.39 per 100,000 population, respectively as showed in Figure 1. When compared the cases in 2021 with the median value five years ago (2016 - 2020), no cases of any abnormality were found. The cases were lower than the median as shown in Figure 2. Surin was the province that was found the highest cases, that was, 31.56 per 100,000 population, followed by Nakorn Ratchasima Province with 5.63 per 100,000 population, Buriram Province with 3.07 per 100,000 population and Chaiyaphoom Province with 2.81 per 100,000 population as showed in Table 1. Considering the cases at the district level, Khwaosinarin District in Surin Province had the highest rate (145.29 per 100,000 population), followed by Sikoraphoom District (125.94 per 100,000 population), and Phanomdongrak District (44.73 per 100,000 population), respectively. More details were illustrated in Table 2. The recommendations were as follows: 1) observance should be more focused on young children in child care centers and students. If the case was found, inquiry had to be made and controlled as the

measurement 0.37; 2) an index of *Aedes aegypti* larvae in water had to be controlled in conformity with the set standard (HI≤5, CI=0); 3) the effective campaigns in controlling the dengue fever should be promoted; and 4) the general public should be made aware of controlling the dengue fever (<http://odpc9.ddc.moph.go.th/hot/64-situation-52.pdf>). Based on the data obtained, researchers realized the significance of solving the problems caused by the dengue fever in children by using locally available herbs to dispel mosquitoes.

### **Objective**

The objective of this study was to compare the use of locally available herbs to dispel mosquitoes in order to increase small muscle development of pre-school children and parents.

### **Research Hypothesis**

1. Is it practical to modernize the local wisdom?
2. After the use of locally available herbs as mosquito repellents to increase the fine motor development, the pre-school children have a better development than before the experiment.

### **Materials and Research Methodology**

The present work was quasi-experimental research. The total population used in the study was 866 persons: 433 children, and 433 parents. The sample groups were selected by the purposively sampling with their willingness. They were 36 children aged between 3-6, and 36 parents aged between 20-70. All data were kept confidential and were deleted after one year of the research completed. The data collection was carried out from June, 2017- June, 2018. The research stages were as follows.

1. A formal letter was sent to relevant persons before the research was conducted.
2. A survey was conducted on problems and the plan was made to solve the problems.
3. Rationale and literary reviews were written.
4. Innovative works were administered on the subjects.
5. Supervision and follow-up were made after one month, three months and six months.
6. Evaluation was made.
7. The research was concluded.

### **Materials**

The researchers developed the mosquito repellents from the locally available herbs to increase the fine motor development of pre-school children and their parents. The mosquito repellent candles were made from one kilogram of local sticky red clay, one kilogram of local lemongrass, and one kilogram of local bergamot skins. Moreover, three paper boxes were used.

## Research Instruments

1. General information including age, sex, and occupations.
2. Developmental Surveillance and Promotion Manual (DSPM), Ministry of Public Health. There were 61 items on fine motor development, receptive language, expressive language, personal and social development, and 18 items on the development of small muscles. This is the standardized and acknowledged manual in Thailand.

## Results

The research found that the samples were 36 pre-school children and 36 parents. The research aimed to compare the use of locally available herbs and the fine motor development of pre-school children and parents. Details are demonstrated in Table 1.

Table 1  
Percentage of a development of local wisdom by using locally available herbs to increase a fine motor development of pre-school children and parents of Banbua Sub-district in Mueang District, Buriram Province (n=72)

	Number (person)	Percentage
Sex		
Male	35	48.61
Female	37	51.39
Age		
3-6 years	36	50.00
40 – 65 years	36	50.00
Occupations		
Students	36	50
Farmers	27	37.50
Traders	9	12.50

From Table 1, The sample groups consisted of 35 men (48.61%) and 37 women (51.39%). There were 36 children aged between 3-6 (50%) and 36 parents aged between 40-65 (50%). Their occupations were as follows: 36 students (50%), 27 farmers (37.50%), and 9 traders (12.50%).

The result of comparing pre-school children's development in all aspects and use of locally available herbs to repels mosquitoes to increase a fine motor development of pre-school children and parents of Banbua Sub-district in Mueang District, Buriram Province is shown in Table 2.

Table 2

A comparison of pre-school children's development and use of locally available herbs to repel mosquitoes for increasing a fine motor (tiny muscle) development of pre-school children and parents of Banbua Sub-district in Mueang District, Buriram Province (n=72)

Statistics	Overall development of pre-school children				Results of using local wisdom/products			
	Control group		Experimental group		Results before experiment		Results after experiment	
	before	After	Before	After	Control group	Experiment group	Control group	Experimental group
$\bar{X}$	53.28	55.14	53.92	60.89	13.33	13.11	13.47	17.86
SD	1.35	2.04	1.44	0.31	1.195	1.282	1.230	0.351
t-test	5.93		11.81					
sig	0.000*		0.000*		Sig 0.000* $P < 0.05$			

A comparison in table 2 showed the use of the mosquito repellents from locally available herbs and the fine motor development of pre-school children and parents. The average of pre-school children's development in all aspects of the control group before experiment was 53.28 items ( $\bar{X}$ =53.28, SD= 1.35). The average of overall development of the same subjects after experiment was 53.92 items ( $\bar{X}$ =53.92, SD = 1.44). Considering a comparison of the use of the local herbs and the fine motor development of the subjects, the post-experimental average was higher than the average before the experiment at 0.05 ( $P < 0.05$ ).

## Discussion

The present study was a quasi-experimental research. The aim was to compare the use of locally available herbs as mosquito repellents and the development of small muscles of pre-school children and parents. The samples of 72 were divided into a control group and an experimental group. The instrument used was Developmental Surveillance and Promotion Manual (DSPM) of the Ministry of Public Health. Statistics used were percentage, mean, standard deviation, and t-test.

The results found that the average of pre-school children's development of a control group before the experiment was equivalent to 53.28 items ( $\bar{X}$ =53.28, SD= 1.35), and the average of the same after the experiment was equivalent to 53.92 items ( $\bar{X}$ =53.92, SD = 1.44). When comparing the use of the local available herbs as mosquito repellents to develop the small muscles of the pre-school children and their parents of Banbua Sub-district in Mueang District,

Buriram Province both before and after the experiment, the average after the experiment was higher than before at 0.05 ( $P < 0.05$ ). The result was in accordance with the study of Kraiwong (2017) on the ability to use small muscles to organize creative activities of pre-school children of Ban Huaykapi School. The research found that the pre-school children supported with the creative artistic activity from recycled materials had better small muscles after the experiment in the fourth week in both overall and individual aspects. In the aspect of using scissors, t-score was 0.57. In the aspect of inventing things from reused materials, t-score was 0.43. In the aspect of free drawing, t-score was 0.71. In the aspect of holding things, t-score was 0.71. In the aspect of writing their own names, t-score was 0.43. The t-score of the overall aspects was 2.86. It showed that the pre-school children had higher ability to use small muscles than before the experiment. Similarly, Chueboka (2020) conducted a study on a development of ability to use small muscles of the pre-school children through creative artistic activities. Her study found that after three weeks of organizing creative artistic activities, an ability to use small muscles of the target group had a higher average than before (50%). Before the experiment, the score of an ability was 34%, and after the creative activities. Moreover, the score in using the muscles was 84%. The results found was in accordance with the study of Sawadphon (2018), who examined the experience management to develop small muscles of the children in early age of Wat Banko School in Sisomdet District, Roi-et Province. The study found that the average score of the subjects after the activities was higher than before at a statistical significance of 0.01. The research mentioned was similar to the one done by Senleemeen and Tasaro (2021) concerning the development of an ability to use the small muscles by using the creative activities according to Gesell's concepts for intellectually impaired children. Both researchers found that the scores after learning through the creative artistic activities according to Gesell's concepts were higher than before. Manorat et al. (2017) who studied the development of small muscles of the young children by using the creative activities found that the development of small muscles of the subjects was higher with a statistical significance of .01. In addition to the studies above, there were many other works that showed the similar results. Yimwilai and Wongwitchayut (2021) explored the development of skills in using the fingers of the early age children by using the creative activities. They found that overall scores of all children in using their hands increased from one to six. Considering the entire class, it was found that the percentage of the class progress equaled 40.5. Similarly, Nantamas (2017) studied the development of small muscles of early age children of Wat Bandonyo by shaping the mud clay. She found that after the experiment, children had better small muscles than before. The finding was in line with the study by Kumma (2018) who found that the development of small muscles of the pre-school children in terms of muscular strength, agility in using muscles, flexibility, coordination and relation between the hands and eyes was better with a statistical significance of .01. A similar result was also found by Phoomratanapaisan (2018) who conducted a study on a development of tiny muscles through a training set on various shapes. The results of study were found that the children had a better development of small muscles after having a training set on various shapes and figures. A conclusion based on the study could be that children who were given a training set on different shapes had a better development of small muscles.

### Recommendations for Research Application

1. Time periods should be lengthened and follow-up should be undertaken every six months.
2. Further research should be more extensive to cover all Banbua Sub-district.
3. Local relevant agencies should be more involved in the research.

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