The Effects of Planned Instruction on Mother’s Knowledge, Health Beliefs and Number of Children Receiving Immunization in Sikhothtaboung District, Vientiane, Lao P.D.R.*

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Abstract:
Purpose: To study the effects of planned instruction on mother’s knowledge, health beliefs, and number of children receiving immunization for diphtheria, pertussis, neonatal tetanus, and polio.

Design: Quasi-experimental research, a two group pre-test post-test design.

Methods: The study subjects were mothers living in Sikhothtaboung District, 30 mothers from Viengkham, Chansavang, and Nongteng Villages as an experimental group, and 30 mothers from Nongneo, Nalao, and Thongpong Villages as a control group. The experimental group received planned instruction and handbooks while the control group did not. Data were collected using a questionnaire, asking about mothers’ knowledge and health beliefs regarding diphtheria, pertussis, neonatal tetanus, and polio, before the intervention and at the first time they took their children for DTP and Polio vaccination. Data analysis included means and standard deviations of knowledge and health belief scores about diphtheria, pertussis, neonatal tetanus, and polio. The difference in knowledge and health belief scores after intervention between the 2 groups was analyzed by independent t-tests. The difference in the number of mothers bringing their children for vaccination in the 2 sample groups was analyzed by Fisher’s exact test.

Main findings: Results of this study showed that the mother’s knowledge and health beliefs after intervention between groups were significantly different (p < .05), but the number of children receiving immunization between groups were not significantly difference.

Conclusion and recommendations: In accordance with the results of this study, the planned intervention conducted in this study may provide a hospital or other health service unit with guidance for promoting mother’s knowledge and health belief about diphtheria, pertussis, neonatal tetanus, and polio. As such it could encourage more mothers to vaccinate their children. Further research should be conducted on encouraging mothers to take children for vaccinations, and on the influences of providing social support for expenses, and travel.

Keywords: child immunization, knowledge, health belief, Lao’s child healthcare
Introduction

Infectious disease is a very serious problem in Lao PDR, it is a major cause of illness, and death at all ages. In particular, however, it affects newborns and children under 5 years old. These groups often have problems with diseases that can be avoided, particularly by vaccination against diphtheria, pertussis, neonatal tetanus, and polio. Children who have these diseases may be affected physically for example, delayed growth or even die as a result of the disease.

Many infectious diseases can be prevented by the use of vaccinations such as DTP and OPV. Yet this still causes problems in Laos. Vaccinations have not been distributed throughout the country due to poor health knowledge, and health belief problems. The WHO and UNICEF reports on vaccination of Lao children under 5 years old between 2000 and 2005 indicated that the immunization rate of DTP in children was 40-55%, and OPV was 46-57%. Meanwhile, polio claimed only 1 child, in 2005.

Therefore, the Ministry of Health, Laos, plans to promote vaccinations on preventing diseases that cause mortality and morbidity of children under 5 years old to get sick and die throughout the country. The National Immunization Program (NIP) aims to provide free immunization to help all children aged 0-5 years in Laos. However, vaccination coverage for all children age 0-5 is difficult because of inadequate knowledge and inadequate health awareness of mothers. Even though children in this group are already targeted for vaccinations under a national scheme (NIP) they are still infected, particularly in the remote areas.

Previous research on knowledge and perception of mothers with children less than 2 years of age concerning immunization status found that the knowledge of mothers regarding the prevention offered by inoculation was significantly higher in those who completed inoculation than in those who did not complete inoculation. This report was similar to a study which found that children had incomplete standard immunization due to inadequate knowledge and parental awareness concerning disease prevention. It can be seen from the number of first vaccination which was high, since the mothers had to visit the health centers for postpartum check up at 6 weeks after giving birth. However, the second and third booster vaccinations were gradually decreased.

The concept of the health belief model (HBM) suggests that a change in behavior of an individual, regarding disease protection, depends on 1) perceived susceptibility to get that disease, 2) perceived severity of disease, 3) perceived benefits of prevention against the disease, and 4) perceived barriers. Therefore, the chance of a mother taking her child for vaccination depends on her beliefs concerning the seriousness of the disease, risk of getting the disease, and individual circumstances and problems faced by the mother. Individual belief depends on individual knowledge. To help mothers understand, interventions need to be concerned about belief.

Whenever a person perceives the risk and seriousness of diseases, that person will change his/her health belief and practice. Indeed, there have been studies on the effects of planned instruction on mother’s knowledge, health belief, and obtainment of measles immunization for their children. The results revealed that the group receiving education on disease had a higher score of health belief than the group that did not receive instruction; the result was statistically significant. Therefore, this research intends to investigate effects of planned instruction on mother’s knowledge, health beliefs and number of children who receive vaccination for diphtheria, pertussis, neonatal tetanus, and polio. It is designed to promote and encourage mother’s protection behavior against disease.

Research objectives

1. To compare the knowledge of DTP (diphtheria, pertussis, neonatal tetanus) and polio and health belief between the mothers who received the planned instruction and those who received the usual health education.
2. To compare the number of children receiving DTP and Polio vaccines from first to third injection (for diphtheria, pertussis, neonatal tetanus, and polio) between the mothers who received the planned instruction and those who received the usual health education.

**Research hypothesis**

1. Score of knowledge on diphtheria, pertussis, neonatal tetanus, and polio and score of health beliefs of mothers in the experimental group will be higher than the control group.

2. Number of children receiving DTP and Polio vaccines (for diphtheria, pertussis, neonatal tetanus, and polio) will be higher in the experimental group than control group.

**Materials and method**

The population of this research was mothers who had given birth within the 4-5 weeks before the date of data collection. The setting was 6 villages: Viengkham, Chansavang, Nongteng, Nongneo, Nalao, and Thongpong villages which were the responsibility of Chansavang village hospital, and Nongneo Village Hospitals Vientiane capital, Lao P .D.R. The researcher randomly selected one village hospital to be the experimental groups. Another was the control group. The sample was recruited based on inclusion criteria, which were: 1) mothers post delivery 4-5 weeks, 2) healthy, 3) had an education to at least grade IV and reading eligibility, 4) had healthy children who could receive vaccines during the age of 6-7 weeks old.

The sample size was determined by a central limit theorem which stated that when a group is bigger than or equal to 30 people, the sample mean will be approximately normal. Inferential statistics were used, therefore, to analyze groups of 30 paired of samples'. Sixty mothers were recruited, 30 mothers from Viengkham, Chansavang, and Nongteng Villages were in the experimental group, and 30 mothers from Nongneo, Nalao, and Thongpong Villages were in the control group.

**The two types of research instruments**

1. The intervention instrument was a video and handbooks on diphtheria, pertussis, neonatal tetanus, and polio. The materials were deemed to have a suitable content and language by an expert and were used initially with 10 mothers to test for understanding and context appropriateness. It was then improved according to feedback, before being used in the study.

2. Questionnaire

2.1 One questionnaire investigated knowledge about diphtheria, pertussis, neonatal tetanus, and polio and consisted of 20 items; each item had 3 answer choices. The scoring was 1 point for a correct answer and 0 for a wrong answer. After validation by an expert, it was tested with 20 mothers and the reliability coefficient was calculated in accordance with the formula of Kuder-Richardson (K.R. 20). The reliability coefficient was .60

2.2 A second questionnaire investigated mother’s health beliefs regarding diphtheria, pertussis, neonatal tetanus, and polio. This questionnaire consisted of 4 dimensions: perceived susceptibility to get the disease, perceived severity of disease, perceived benefits of prevention of the disease, and perceived barriers to prevention of the disease. This questionnaire consisted of 36 items: each item had 3 possible answers, scaled from agreement to disagreement. Scoring was rated as 3, 2, 1, in order. These questions were used initially with 20 mothers. Cronbach’s alpha coefficient was .81.

**Data collection**

Upon ethical approval from Mahidol University Institutional Review Board (IRB) Panel C (Nursing), and IRB from the National Institute of public health, Lao PDR, data collection was performed at the subjects’ homes. After the health care providers at village hospitals informed the potential participants about this project, mothers who met inclusion criteria were approached and asked if they were willing to participate in the study. The potential participants were informed that their
participation was voluntary and confidential. The objectives and data collection procedure were explained and the participants in both groups completed the pre-test questionnaire.

**Experimental group:** One day after selection, 30 mothers in the experimental group watched the video (as a visual aid) and had an open-floor discussion, lead by the investigator, in order to facilitate questions and exchange their point views. Then, they were given handbooks. When the child was 6-7 weeks old and had been vaccinated, mothers answered the post-test questionnaire concerning their knowledge of diphtheria, pertussis, neonatal tetanus, and polio. When the child was 11-15 weeks old, vaccination was repeated during the child’s follow-up appointment for their second or third vaccination.

**Control group:** When the sample in the control group brought their children to receive vaccination at 6-7 weeks old, the mothers completed the post-test questionnaire on their knowledge and health beliefs about diphtheria, pertussis, neonatal tetanus, and polio. They were then given handbooks.

**Data analysis**

Demographic data were analyzed with frequency and percentage and the demographic data of both groups was compared by chi-square test. The scores of knowledge and health beliefs about diphtheria, pertussis, neonatal tetanus, and polio from both groups were analyzed into means and standard deviation. The comparison of difference in mean knowledge and health belief scores between both groups after intervention was analyzed by independent t-tests. Analysis of the difference in number of mothers bringing their children in for vaccination between both groups was performed using Fisher’s exact test.

**Results**

1. Characteristic of the sample

Of the mothers in the experimental group, 60% were aged between 21-30 years. In total, 70% has graduated from secondary school, 46.7% were housewives, 56.7% had an income between 500.000-1.000.000 kip (about 4,000 baths), 56.7% had only 1 child, 53.3% were nuclear family, and 56.7% had never received information about vaccinations.

Of the mothers in the control group 66.7% were aged between 21 and 30. In total, 63.4% had graduated from secondary school and 36.7% were housewives, 46.7% had an income between 500.000-1.000.000 kip (about 4,000 baths), 53.3% had only 1 child, 56.7 lived in an extended family, and 50% had never received information about vaccinations. Comparison between the experimental group and control groups found that both had similar demographics ($\chi^2 = 0.19 - 0.44$, p > .05)

2. The comparison of pre-test between experimental and control groups of mean scores on knowledge of diphtheria, pertussis, neonatal tetanus, and polio and health belief scores by independent t-test, found that there was no significant difference in knowledge of diseases and health beliefs ($t = 0.27$, p > .05, $t = 1.52$, p > .05). After intervention, the comparison of mean scores on knowledge between both groups showed a significant difference ($t = 4.34$, p < .05), and the comparison of health beliefs mean scores between both groups also displayed a significant difference ($t = 1.85$, p < .05) as seen in table 1.
3. A comparison between the experimental and control group as to whether or not the child was taken to have vaccination against diphtheria, pertussis, neonatal tetanus, and polio, was conducted when the child was supposed to attend the first, second and third vaccinations.

When considering the number of children receiving first and second vaccinations against diphtheria, pertussis, neonatal tetanus, and polio, it was evident that the group of mothers who received planned instruction (the experimental group) all brought their children to receive the vaccinations according to schedule. In the control group (those who received usual health education), 2 mothers did not bring their children to the health center in accordance with the vaccination schedule.

The number of children, who received third vaccinations against diphtheria, pertussis, neonatal tetanus, and polio, showed that the group of mothers who received planned instruction all brought their children to receive vaccinations according to the planned schedule. Whereas, 3 mothers in the control group did not bring their children for vaccination according to the schedule. In comparison of the two groups, the number of children receiving vaccination was not significantly different (Fisher’s exact test = 0.119) (table 2).

Table 1 Comparison of the difference in average scores regarding knowledge of diphtheria, pertussis, neonatal tetanus, and polio; and health belief of mothers before and after intervention.

<table>
<thead>
<tr>
<th>Group</th>
<th>Before experiment</th>
<th>After experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
<td>SD</td>
</tr>
<tr>
<td>Knowledge of disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental group (n=30)</td>
<td>11.07</td>
<td>2.29</td>
</tr>
<tr>
<td>Control group (n=30)</td>
<td>11.23</td>
<td>2.40</td>
</tr>
<tr>
<td>Health belief</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental group (n=30)</td>
<td>89.70</td>
<td>11.72</td>
</tr>
<tr>
<td>Control group (n=30)</td>
<td>93.90</td>
<td>9.43</td>
</tr>
</tbody>
</table>

Table 2 The number children receiving vaccination against diphtheria, pertussis, neonatal tetanus, and polio in the control and experimental groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Received vaccine</th>
<th>Didn’t receive vaccine</th>
<th>Total</th>
<th>Fisher’s exact test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>30</td>
<td>0</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>27</td>
<td>3</td>
<td>30</td>
<td>0.119</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>3</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>
Discussions

This study found that the participants in the experimental group attended vaccinations more, and had improved knowledge of diseases and health beliefs that were higher than those in the control group.

1. Comparison between the experimental and control group of the knowledge of diphtheria, pertussis, neonatal tetanus, and polio and health belief of mothers after intervention.

The experimental group received useful planned instruction about diphtheria, pertussis, neonatal tetanus, and polio and a pamphlet to allow self education at home. This program enhanced the mother’s knowledge on the risks of infection and its intensity, and the benefits of preventing diseases by bringing their children in for every vaccination, according to the schedule given by the National Immunization Program (NIP).

In this study, the researcher used a video as the educational media because it stimulated learning process through pictures, color, and sound at the same time. The viewers were able to follow the flow of the topic and become enchanted by the movements, as well as interested in the subject. Moreover, video was also convenient, showing the process in detail and could be displayed repeatedly when viewers did not understand the message, while providing consistent information to the viewers. More importantly, using video as an educational media allowed students or viewers to experience feelings as close to real as possible, which enhanced the learning ability.

While teaching, the interaction between the researcher and the participants in the experimental group enhanced the learning process, clearly a good relationship between the two was extremely beneficial to mothers’ learning. In this learning process, the group was divided into small groups of 3-4 people, totaling 10 people, and into an individual approach, totaling of 20 people. This was due to the inconvenience of traveling experienced by some participants. In each teaching session, the researchers begin by building a relationship between mothers and researchers through explanation. The researchers also opened the sessions for mothers to ask questions after viewing the video, to aid their better understanding of the issues.

In this study, after viewing the video, the researchers provided mothers with a pamphlet that contains the same information as that seen in the video. This was for mothers to enhance their knowledge and review the issues in their own homes, which provided them with long-lasting knowledge about the diseases and vaccinations. Therefore, in the 1-2 weeks after receiving planned instruction, mothers in the experimental group had a higher mean score in knowledge about the diseases and in health beliefs than before they had participated in the educational program (Table 1). On the other hand, the control group, which did not receive planned instruction via video and pamphlet, scored the same as pre-test.

Accordingly, it can be concluded that a planned instruction training video allows mothers to have higher scores in knowledge and in health belief regarding prevention of the mentioned diseases. The difference is statistically significant (p = .001). These findings are consistent with a study on mothers of asthma children, mother’s knowledge and preventive behavior of asthma in children who were at risk for asthma which found improvements after attending an educational program utilizing video. The scores revealed that there was statistically significant higher improvement of the intervention group than the control group, both immediately and 4 weeks after the intervention (p < .001 and p < .001, respectively). Moreover, another study explored the effect an instructional videotape had upon self care behavior among mothers of children with asthma, it was found that the mean score in self care behavior in the participants who received an instructional videotape was significantly higher than before the experiment.

Health beliefs can be changed due to changing the perception of health and diseases. The interventions related to health, susceptibility and severity of diseases
providing to participants may integrate to their previous knowledge and lead to behavioral change. Changsee’s study on the effects of providing knowledge about infection from work on health beliefs and protection behavior of rescue volunteers at Srakaew Province, Thailand showed that the health belief scores were higher than before the intervention, at a statistically significant level of .01. A study by Savangdecharuk on the effects of teaching mothers about health, health beliefs and the importance of bringing children in for measles vaccinations showed that the health beliefs of mothers in the intervention and control groups were statically significantly different at .05. These previous studies support the result of this study that planned instruction can improve mothers’ knowledge and health beliefs.

2. Comparison between the intervention and control groups of the number of children who received 1-3 vaccines for diphtheria, pertussis, neonatal tetanus, and polio.

It was found that the number of children brought in to receive the diphtheria, pertussis, neonatal tetanus, and polio vaccines was not statistically different (p > .05) when comparing between the intervention and control groups. This can be explained by several reasons. When compared the scores of knowledge and health beliefs for the mothers in the intervention and control groups before the intervention, the mean score of the knowledge of diseases was at an average level ($\bar{X} = 11.07$ and 11.23, from a total possible score of 20). The score of health beliefs were at a high level ($\bar{X} = 89.70$ and 93.90, from a total score of 108). This equates to a high tendency to bring the child in for vaccination in both groups. This is because one week before the researcher implemented the program, which was at the end of June 2009; there was a program run by Japanese volunteers working together with public health officials from the capital and intended to improve the health conditions for mothers and children in Srikotabong, Vientiane, Lao P.D.R. The health officers at the health center and volunteers in the community had a campaign to encourage pregnant mothers to receive the tetanus vaccine and DTP, and polio vaccines for children. This intended to achieve the goals of the Ministry of Health, which state that at least 90% of children under the age of 1 should receive DTP, and polio vaccines. The NIP arranged mobile vaccinations twice a year, in June and December, during office hours, while the mobile unit is vaccinating, they educated people on the advantages of vaccination. In addition to this, health center officers coordinated with volunteers in communities to survey the numbers of children who missed vaccination.

One week after failing to attend, a volunteer from the community will remind the mother, at home, to bring the child forward for DTP and polio vaccination at a health center convenient for them. With the factors described above, this explained why mothers in the 2 groups had average scores on knowledge and high scores on health belief before the intervention; and non significant difference in these two groups regarding the number of vaccination for children.

In the control group, there were three mothers that did not bring their child in for vaccination over the 4 weeks. The researcher enquired into the mother’s reasons. Two out of three said they did not have time: one was working, and the other was busy merchandising. The last one said she lived far away from the health center and had transportation problems. In addition, her husband worked in another town and could not bring the child on the appointment day.

Suggestions in how to use the study

Based on this research, the researcher suggests applying this research in order to encourage mothers to bring their children in for vaccination and complete the vaccination schedule in accordance with the National Immunization Program, (NIP).
1. **Practice of nursing care**

1.1 Central hospitals, community hospitals, and health centers service should use this vaccination teaching program to improve knowledge and health belief of mothers. The program may encourage more mothers to bring their children in for vaccinations. This program can be provided to teach mothers before they undergo labor, or to pregnant women attending a follow-up appointment. In areas where the teaching is not convenient, the information can be done by distributing the brochures on DTP, and polio for the mothers to take back home.

1.2 There should be a mobile unit to visit and provide education and vaccination services to children who live far from the health centers services, in order to reduce the barriers in taking the children for immunization.

1.3 The vaccination campaign to promote the knowledge and beliefs of the mothers and to motivate the mothers to bring the child to receive the vaccine should be established.

2. **Research**

2.1 There should be additional study in larger groups. The research should include people who live in remote areas or far from the health centers, in order to make the study results generalized.

2.2 There should be research on other factors that will influence the mother to bringing the child in for vaccination, such as the support from the community, the mother’s experiences in bringing the child to the health centers, stress condition, or mother’s concerns, and traveling allowance.

2.3 This research study should be replicated, since the immunization rates of the children was confounded with the presence of a group of volunteers in the NIP program for promoting vaccination.

**References**

3. National Center for Laboratory and Epidemiology. Number of cases, deaths and cumulative number of symptom / diseases surveillance report. Lao P.D.R: Ministry of Health; 2006.