



Effectiveness of Health Education Media (Handbook and VCD) for OV Preventing on Primary School Students

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Abstract

This quasi-experimental research was aimed to study the effectiveness of a handbook and a VCD as the educational tools for liver fluke prevention among primary school students in 4 schools in Phu Wieng district, Khon Kaen province, Thailand. The samples of 152 subjects were divided into two groups; the first experimental group included 82 subjects who received health education about liver fluke prevention using a handbook and the second experimental group included 70 subjects who received health education about liver fluke prevention using a VCD. Data were collected by using questionnaires and analyzed by the STATA program. The statistics for the descriptive data included percentage, distribution, arithmetic mean and standard deviation. Comparisons between and within groups were made using paired sample t-test and independent sample t-test. The results showed that after implementation, both experimental groups had significantly higher mean score in 3 factors namely knowledge, attitude and perceived susceptibility ($p < 0.001$), while perceived benefit and perceived barrier in first experimental group had significantly higher mean score than before ($p < 0.001$) as well as perceived severity in the second group had significantly higher mean score than before ($p < 0.001$). In both group, liver fluke prevention practice had significantly higher mean score than before ($p < 0.05$ and $p < 0.005$, respectively). In addition, the difference in mean score between the first and second experimental groups was not significant except perceived susceptibility and perceived benefit ($p < 0.001$) but both were at a high score level. Both groups of students agreed that both media handbook and VCD were useful. For using the handbook, students needed to read and clearly understand and for using the VCD, they needed assistance from a teacher. The examination for parasites found that there were 18 infections, including 14 for liver flukes (11.48 percent) and a few other parasites. This research suggests that both

media were effective to behavior change on liver fluke prevention. Therefore, these media should be published and further used for liver fluke prevention.

Key words: effectiveness, liver fluke, hand book, VCD, primary school students

1. Introduction

Opisthorchis viverrini is an important health problem in Thailand and Southeast Asia. A common name of Southeast Asian liver fluke is a trematode parasite that attacks the area of the bile duct. *O. viverrini* infection predisposes for cholangiocarcinoma, a cancer of the gall bladder and/or its ducts. *O. viverrini* is found mainly endemic in Southeast Asian countries; northeast of Thailand, Laos, Vietnam and Cambodia. Currently, more than 600 million people are at risk of infection with these trematodes (1-3).

Infection with these food-borne parasites is prevalent in areas where uncooked cyprinoid fish are a staple of the diet. Due to poor sanitation practices and inadequate sewerage infrastructure, people infected with *O. viverrini* and *C. sinensis* pass parasite eggs in their faeces into natural water reservoirs, where the parasite eggs are eaten by intermediate host snails, for example aquatic snails of the genus *Bithynia*, the first intermediate host of *O. viverrini*. After hatching, free swimming parasites, called cercariae, are released from the infected snails. Cercariae then locate their next intermediate host, cyprinoid fishes, encyst in the fins, skin and muscles of the fish, and become metacercariae. The metacercariae are infective to humans and other fish-eating mammals (2). *O. viverrini* is

the only liver fluke that has been proved to be associated with cholangiocarcinoma (CCA) and cancer of the bile ducts (3-5).

Cholangiocarcinoma is a cancer of the tissue of the bile duct both inside and outside the liver. Cholangiocarcinoma outside of the liver is possible along the length of the intestine. Most (more than 60%) are found at the bile duct outside the liver. Patients of cholangiocarcinoma are mostly of age 45-65. The ratio of male to female is 3:1. The symptoms of the patients who visit the doctor are in 2 main groups. The first group is with yellowish body and eyes amount to 70%. The patients are yellowish and may have a high temperature with big liver and stomach. The second group is without a yellowish body and eyes but a record of constipation of a month or year long (6).

Cholangiocarcinoma is a cancer that causes high fatality and has a poor prognosis. The patients who come to the doctors are those at the last phase and lose their lives not long after the diagnosis. There is still no method of treatment by chemotherapy or x-ray. Nowadays there is treatment by operation only in the case that all infected tissue can be cut out, where reports show that the patient can survive for a short period (6).

The main strategies for liver fluke control comprise of three interrelated

approaches, namely stool examinations and treatment of positive cases with praziquantel, health education for a promotion of cooked fish consumption to prevent infection, and the improvement of hygienic defecation for the interruption of disease transmission. Between 1984 and 1987, the positive rate of liver fluke infection was 63.6%. In 1988, the positive rate went down to 35.6%. Following the region wide control program started in 1989, the annual positive rates had subsequently decreased to 9.4% in the year 2001. The prevalence rate was remarkably high in the North and moderately high in the Northeast, while the prevalence in the Central region was considerably low and there was no evidence of disease transmission in the South (7).

Survey research was conducted in 1,077 persons by interviewing and using the questionnaires. The majority subjects were local public health volunteers (31.37%), public health officers (18.72%), television workers (14.38%), local heads of sub-districts (12.31%), doctors and nurses (9.18%), newspaper workers (5.72), internet workers (5.37%), and others (12.95%). Results showed that 55.11% of the population had a good level of liver fluke knowledge concerning the mode of disease transmission and 79.72% of the population had a good level of prevention and control knowledge with regards to defecation and consumption. The attitude and practice in liver fluke prevention and control were also at a good level with a positive awareness, participation and satisfaction at 72.1% and

60.83%, respectively. However, improvement is required regarding personal hygiene specifically with hygienic defecation and consumption of undercooked fish (8).

Protection is the best method, which requires a low budget and is most worthwhile, considering the effects which cause great suffering, financial loss and loss of people, leading to a run-down of society and the country.

Education about food, knowledge and understanding in prevention are the methods to restore energy to the development of the nation. At the primary school age in particular, proper behavior may lead to strong and healthy adults, which help the development of the country.

Study of media is the best method to stimulate interest. From the past to the present, handbooks are considered to be good teaching media and are still very popular because they are easy to use, convenient and can be used on every occasion. There may be limitations of electricity, but books only need literacy.

Another alternative is the VCD, which is popular for education, be easy to use, can include pictures and colors as well as sound to make them easy to understand. Media for teaching must be constructed and developed to meet the needs of the target group, particularly for liver fluke, which is the most serious disease in the northeast. Media must impress, provide knowledge and understanding, change personal concepts and correct knowledge, and modify health

behavior for the prevention of liver fluke especially at school age.

The research group concerns the importance and necessity of study and research about the effectiveness of educational media for liver fluke prevention between VCD and handbook for primary school age students to motivate them in changing their health behavior. This may lead to cholangiocarcinoma protection, promote health of people and give them a long life, reduce medicine uses and better uses of medical facilities of the country.

The objectives of this research were to compare knowledge, attitude and practice of students, whom were educated on liver fluke prevention via VCD and handbook. This work also conducted educational aids on liver fluke prevention both in VCD and handbook for primary school students.

2. Materials and Methods

2.1 Population and sample groups

The population of study was from primary school students in Phu Wieng district, Khon Kaen, Thailand. Sample groups were from 4 schools; Koke Sahakorn School, Non-Sombool Prachasarn School, Ban Han School and Huay-San School. There were 152 subjects and was divided into 2 groups. The first group was Ban Han School and Non-Sombool Prachasarn School with 82 subjects, who received the health education by using a handbook for liver fluke prevention and the second group, was Huay-san School and Koke Sahakorn School with 70 subjects, who received the health education by using a VCD.

2.2 Research design

Quasi experimental research was conducted with 2 groups. The first group received the liver fluke prevention handbook and the second group received the liver fluke prevention VCD. Data were collected by using a questionnaire for pre-test and post-test.

2.3 Research tools

Tools for data collection were quantitative questionnaire, which were developed by researchers based on documents and related researches with 6 parts. Part 1 included questions on personal data such as sex, age, classroom level, school, parents' occupation, house lavatory and own shoes. Part 2 was to evaluate on liver fluke knowledge, which correct answer had 1 point and incorrect answer had 0 point. Part 3 had attitude questionnaire about liver fluke prevention using Likert's rating scale by adjusting score into 3 levels. Part 4 had questionnaire about perceived severity, perceived susceptibility, perceived benefits and perceived obstacles from liver fluke amounting to 15 questions. Part 5 was to evaluate behavioral practice on liver fluke prevention by using multiple choice questions. Correct answer received 1 point and incorrect answer received 0 point. Part 6 was to determine required educational aids, consisting of 5 questions to choose yes or no, and the other 5 questions to choose the right answer from the given choices.

2.4 Reliability of the instrument

The test of reliability of the instrument was conducted with 30 students in Nong

Pakwan School and the trustworthiness by the alpha – coefficient by Cornbach in the level of significance of the whole questionnaire more than 0.75 was accepted. The test of discriminate value of knowledge by using Kuder-Richardson (KR 20) method to complete knowledge questionnaire reliability value of 0.2.-0.8 was accepted.

2.5 Data collection

The data were collected by using the following steps. First step was to get official permission from the officer of Phu Wieng district health station, Khon Kaen. Second step was to explain the objectives of the research and procedure to five primary schools in the high prevalence area of liver fluke by a simple random sampling; one school for trying out the questionnaire, two schools for giving health education by using a hand book on liver fluke prevention, and another two schools for giving health education by using VCD on liver fluke prevention. The third step was to collect data by using questionnaire for pre-test before intervention and post-test after intervention for comparison of mean score and significant difference test. First group intervention was conducted by distributing hand books, which were concluded by researchers during health education in 2 schools (Huayson School and Kok Sahakorn School) with 82 students. Second group intervention was carried out by conducting health education by using a VCD in 2 schools with 70 students in Ban Han School and Non- Somboon Prachasan School.

2.6 Data analysis

After gathered the information, researchers inspected the completeness and correctness of the received questionnaires and data were analyzed by using STATA program for frequency distribution, mean, standard deviation and paired t-test between pre-test and post-test including using independent t-test compare between group 1 and group 2.

3. Results and Discussion

3.1 General data analysis

The sample group included 152 students and divided in 2 groups. The first group of 82 students used the handbook and the second group of 70 students used the VCD. It was found that the majority of population was male. Forty-three males in the handbook group (52.44%) and 54.29% males in the VCD group. Most students were age 11 or 10 years old. There were 34 students (41.46%) and 22 students (31.43%) at the age 11 years old in the handbook using group and the VCD group, respectively. The handbook group was the students of Ban Han School (37 students or 45.12%) and Non-sombool Prachasarn School (45 students or 54.88%). The VCD using group was the students of Koke Sahakorn School (21 students or 30.00%) and Huay-San School (49 students or 70.00%).

Parents of students in the handbook group mostly were employees (41 people or 50%) and farmers (30 people or 36.55%), while those of the VCD group were also farmers (27 people or 38.57%) and employees (26 people or 37.14%). Most students, who used the handbook, had a

lavatory at home (79 people or 96.34%). Most students in the other group, who used the VCD, also had a lavatory at home (68 people or 97.14%). Most students had shoes; 78 students or 95.12% in the handbook group and 68 people or 97.14% in the VCD group.

3.2 The comparison score of knowledge about liver fluke prevention between pretest and posttest for the sample groups

3.2.1 The liver fluke prevention knowledge score between pretest and posttest of the sample group who used the handbook increased from pretest score of 5.89 (SD. 1.85) to posttest score of 6.80 (SD. 1.44). The change in scores between posttest and pretest had statistical significance ($P < 0.001$; 95% CI: 0.50 to 1.32).

Students of the VCD group had average score increased from 6.09 (SD. 1.72) of pretest to 7.93 of posttest (SD. 1.92), which were statistically significant ($P < 0.001$; 95% CI: 1.25 to 2.44).

3.2.2 The average liver fluke prevention knowledge pretest scores for the VCD using and handbook using groups were at 6.09 (SD. 1.72) and 5.89 (SD. 1.85), respectively. The average score in the VCD using group was higher than the handbook using group by 0.195. There was no statistical difference ($P = 0.75$; 95% CI: 0.77 to 0.38).

For the posttest results, the VCD users had an average score of 7.93 (SD. 1.92), while the handbook users had an average score of 6.80 (SD. 1.44), higher by 1.12. However, there was no statistical difference ($P = 1.00$; 95% CI: -1.66 to -0.58).

3.3 The comparison score of attitude toward liver fluke prevention between pretest and posttest in the sample groups

3.3.1 Concerning liver fluke prevention attitude, the handbook using group had an average pretest score of 31.85 (SD. 3.34), while they gained higher scores of posttest than pretest at 33.22 (SD > 1.69). Comparing the score between pretest and posttest, there was a statistically significant difference ($P < 0.001$; 95% CI: 0.71 to 2.03).

The VCD using group gained average pretest score of 31.77 (SD. 3.38), while their average posttest score was higher than the pretest at 33.44 (SD. 1.72). The difference was statistically significant ($P < 0.001$; 95% CI: 0.86 to 2.48).

3.3.2 Comparing the liver fluke prevention attitude between the handbook and the VCD using groups, the pretest average scores were 31.85 (SD. 3.34) and 31.77 (SD > 3.38) for handbook and VCD using groups, respectively. The difference of 0.08 was not statistically significant ($P = 0.44$; 95% CI: -0.99 to 1.16).

For the posttest results, the average scores were 33.44 (SD. 1.72) and 33.22 (SD. 1.69) for the VCD and handbook using groups, respectively, with a difference of 0.22, which was not statistically significant ($P = 0.79$; 95% CI: -0.77 to 0.32).

3.4 The comparison of perceived severity score about liver fluke prevention between pretest and posttest in the sample groups

3.4.1 In the handbook using group, the average **perceived severity** score was 9.76 (SD. 1.35) for the pretest while the posttest

average score was higher at 9.97 (SD. 0.99). There was no statistically significant difference ($P= 0.13$; 95% CI: -0.15 to 0.57).

In the VCD using group, the average pretest score was 10.00 (SD. 1.25), while the posttest average score was higher at 12.47 (SD. 1.64). There was no statistically significant difference ($P<0.001$; 95% CI: 2.07 to 2.84).

3.4.2 A comparison of **perceived severity** to liver fluke prevention in the handbook using and VCD using groups was made.

For pretest, the handbook using group had an average score of 9.77 (SD. 1.35), while the VCD using group had an average score of 10.00 (SD. 1.25), which was higher by 0.23. There was no statistical significance ($P= 0.86$; 95% CI: -0.65 to 0.19).

For posttest, the handbook using group had an average score of 9.98 (SD. 0.99), while the VCD using group had an average score of 12.47 (SD. 1.64), which was higher by 2.50. There was no statistically significant difference ($P= 1.00$; 95% CI: -2.92 to -2.07).

3.5 The comparison of perceived susceptibility score of liver fluke between pretest and posttest in the sample groups

3.5.1 The average **perceived susceptibility score** for liver fluke in the handbook using group was 9.57 (SD. 2.11) for the pretest score. For posttest, the score increased to be 10.29 (SD. 1.22). There was a statistically significant difference between pretest and posttest ($P<0.001$; 95% CI: 0.30 to 1.14).

In the VCD using group, the pretest score was 10.00 (SD. 1.80). For posttest, the score decreased to be 7.54 (SD. 1.34). However, there was no statistically significant difference ($P= <0.001$; 95% CI: -2.93 to -1.99).

3.5.2 **Perceived susceptibility** liver fluke was evaluated in pretest and posttest in the handbook using and VCD using groups.

For pretest, the handbook using group had an average score of 9.57 (SD. 2.11), while the VCD using group had an average score of 10.00 (SD. 1.80), which was higher by 0.43. However, there was no statistically significant difference ($P= 0.91$; 95% CI: -1.06 to 0.21).

For posttest, the handbook using group had an average score of 10.29 (SD. 1.22), while the VCD using group had an average score of 7.54 (SD. 1.34), which was higher than the handbook using group by 2.75. The difference was statistically significant ($P<0.001$; 95% CI: 2.34 to 3.16).

3.6 The comparison of perceived benefit score about liver fluke prevention practice between pretest and posttest in the sample groups

3.6.1 **Perceived benefit** average score about liver fluke prevention practice in the handbook using group gave the pretest score of 7.94 (SD. 1.39), while the posttest score had increased to be 8.73 (SD. 0.47). There was statistical significance ($P<0.001$; 95% CI: 0.49 to 1.09).

In the VCD using group, the average pretest score was 7.67 (SD. 1.47), while the

posttest score had decreased to be 8.21 (SD. 1.09). A comparison found statistical significance ($P < 0.005$; 95% CI: 0.11 to 0.97).

3.6.2 For pretest, the VCD using group had a higher average score at 7.94 (SD. 1.40) concerning perception about liver fluke prevention practice, while the handbook using group had 7.67 (SD. 1.47), a difference of 0.43. There was no statistically significant difference ($P = 0.13$; 95% CI: -0.19 to 0.73).

For posttest, the handbook using group had an average score of 8.73 (SD. 0.47), while the VCD using group had an average score of 8.21 (SD. 1.47), which was higher than the handbook using group by 0.52. There was a statistically significant difference between pretest and posttest ($P < 0.001$; 95% CI: 0.26 to 0.78).

3.7 The comparison of perceived problem and barrier to liver fluke prevention between pretest and posttest in sample groups

3.7.1 The **perceived problem and barrier** to liver fluke prevention average pretest score was 9.27 (SD. 2.01), while the posttest score had increased to be 10.04 (SD. 1.31). Comparing the score between pretest and posttest, statistical significance was found ($P < 0.001$; 95% CI: 0.36 to 1.17).

In the VCD using group, the pretest score was 8.97 (SD. 1.99). The posttest score had increased to be 9.80 (SD. 1.66). Scores between pretest and posttest were statistically significant ($P < 0.005$; 95% CI: 0.34 to 1.32).

3.7.2 The **perceived problem and barrier** to liver fluke prevention between

pretest and posttest in the handbook using group gave a pretest score of 9.27 (SD. 2.01), while the VCD using group gained an average pretest score of 8.97 (SD. 1.99), which was lower than the handbook using group by 0.43. After comparing the scores, no statistically significant difference was found ($P = 0.18$; 95% CI: -0.35 to 0.94).

For posttest, the handbook using group gained an average score of 10.04 (SD. 1.31), while the VCD using group gained an average score of 9.80 (SD. 1.66), which was lower than the handbook using group by 0.24. Comparison showed no statistically significant difference ($P = 0.16$; 95% CI: -0.24 to 0.71).

3.8 The comparison of behavioral practice score in liver fluke prevention between pretest and posttest in sample groups

The behavioral practice in liver fluke prevention in the handbook using group had an average pretest score at 23.13 (SD. 3.99), while posttest the score had increased to be 23.88 (SD. 2.63). After comparing the scores, no statistically significant difference was found ($P = 0.053$; 95% CI: -0.17 to 1.65).

In the VCD using group, the pretest score was 22.67 (SD. 3.79) and the posttest score had increased to be 26.29 (SD. 2.51). There was a statistically significant difference in the scores ($P < 0.005$; 95% CI: 2.58 to 4.65).

The behavioral practice in liver fluke prevention in the handbook using group had a pretest score of 23.13 (SD. 3.99), while in the VCD using group the average score was 22.67 (SD. 3.79), which was less than

the handbook using group by 0.46. After comparing scores, no statistically significant difference was found ($P= 0.23$; 95% CI: -0.79 to 1.72).

For pretest, the handbook using group had an average score of 23.88 (SD. 2.63), while the VCD using group had an average score of 26.29 (SD. 2.15), which was higher than the handbook using group by 0.41. After comparing the scores, no statistically significant difference was found ($P= 1.00$; 95% CI: -3.19 to -1.63).

3.9 The comparison of requirements about liver fluke prevention educational aids between pretest and posttest in the sample groups

Considering experience about receiving liver fluke prevention information, it was found that the students gained most knowledge from health personnel teaching in schools. The handbook using group had 42 such subjects (51.22%) and the VCD using group had 40 subjects (57.14%). The handbook using group agreed that they gained more knowledge from reading handbooks with 26 subjects (31.71%), while the VCD using group agreed that they gained more knowledge from teachers at 31 subjects (44.29%). The students from the 2 sample groups were satisfied with educational aid (56 subjects or 80%). The handbook using group of 20 subjects (60.98%) and the VCD using group of 49 subjects (70%) agreed that the greatest benefit from educational aids was the gained knowledge. The handbook using group of 39 subjects (47.56%) and the VCD

using group of 34 subjects (48.57%) agreed that they gained knowledge of practice on liver fluke prevention.

3.10 Results of parasite diagnosis

Result of parasite diagnosis found that 18 students (11.84%) had parasites. The types of parasite mostly found were liver flukes, strongiloids and hookworms in that order.

3.11 Recommendation for further uses.

1) The health education by using a handbook for liver prevention should distribute to students and can be taken to their homes for reading at their available time. The handbook should also be available in libraries.

2) The health education by using VCD needs more available VCD players and need teachers' helps.

3) The examination for parasites found that there were 18 infections including 14 for liver fluke (11.48) and a few other parasites. It is very important and necessary to continue increasing knowledge, attitude, and perception of all students, leading to change their prevention behavior parallel to medicine curative as well as good hygiene.

3.12 Recommendations for further studies

1) There should be a research study with interventions about liver fluke prevention in schools.

2) There should be development in schools about how to diagnose liver flukes by students.

3) A variety of stimulating educational aids should be developed.

4) There should increase concern among students, communities and stake holders on liver fluke prevention.

5) There should be promotion and cooperation about liver fluke prevention by changing habits of eating and daily life.

3.13 Discussion

After implementation, it was found that knowledge, attitude and perception having higher mean score with significantly difference than before implementation in both group 1 and group 2, were probably due to handbook and VCD tools that provided knowledge on cause, symptom and how to prevent liver fluke including pictures of liver fluke prevention, which could increase knowledge, attitude, perception and practice, as well as students had opportunities to ask questions and expressed their opinions on liver fluke prevention.

In addition, the difference in mean score between the group 1 and group 2 after implementation was not significant, except on the perceived susceptibility in the group 1 students who used handbooks, because students need to read clearly to understand and take more time. In the group 2, VCD made students enjoy, aroused and stimulated them to fear parasites and lead to have good attitude and behavior on parasite prevention. However, students in both groups agreed that both media types were useful.

Students had changed their behaviors for liver fluke prevention with significant mean score than before in both groups. The

group 2 was significant at $p < 0.005$ and the group 1 was significant at $p < 0.05$, but no significant difference between the group 1 and group 2. Therefore, it can be concluded that health education by VCD was more attractive because it was colorful, movement and excitement.

Results of this research was relevant to other studies, which found that VCD for demonstration of nasogastric intubation made medical students self-improved on their procedural skills of nasogastric intubation after viewing the VCD. Application of this method to other basic procedures may be useful (9). On the other hand, handbook is effective media, which can provide information to enhance the teaching and learning experience of students. It can also provide a skill (10). The study of cystic fibrosis handbook for teachers found that the handbook could increase teachers' knowledge on cystic fibrosis and support communication among nurses, parents and teachers (11). Therefore, both media would be distributed on liver fluke prevention. In addition, stool examination found that students (11.84%) had parasites. The types of parasites mostly found were liver flukes, strongiloids and hookworms. Relevant study by Warunee and colleagues (12) found that in their study, 12.6% of students were infected with one or more of 10 intestinal parasite species. In these infected subjects, 214 (11.1%) were single infection, whereas 28 (1.5%) were multiple infections. The most frequent parasite was *Blastocystis hominis* (6.2%).

Other parasites were *Giardia lamblia* (1.7%), *Entamoeba coli* (1.5%), *Endolimax nana* (1.0%), *Entamoeba histolytica* (0.3%), Hookworm (0.3%), *Trichuris trichiura* (< 0.1%), *Taenia* spp. (< 0.1%), *Strongyloides stercoralis* (< 0.1%), and liver fluke or small intestinal fluke (*Opisthorchis* eggs) (< 0.1%) (12).

4. Conclusion

The comparison of the effectiveness of health education aids for liver fluke prevention between handbook and VCD in primary school students was quasi-experimental research. The research was a comparative study of educational aids by handbook and VCD in 4 primary schools in Phu Wieng district, Khon Kaen amounting to 152 students, divided into 2 groups. The first group was Ban Han School and Non-sombool Prachasarn School, which received health education by handbook of liver fluke prevention and the second group was Huay-san School and Koke Sahakorn School with 70 subjects, which received a health education VCD. Data collection was by questionnaires between pretest and posttest. Results showed that after implementation, both experimental groups had significant higher mean score than before. On the other hand, no difference between group 1 and group 2, but both groups had the same high score levels.

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