



Assessing the impact of educational campaigns on pork-borne parasitic diseases in Hoa Binh, Vietnam

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Introduction

Food safety is one of the most pressing issues of people in Vietnam (The World Bank et al. 2016). A growing area of food safety concern is animal-source foods, which are necessary for meeting the nutritional needs of Vietnamese people, particularly women and children (Adesogan et al. 2020). The main animal source-food in Vietnamese diets is pork. Pork products are mostly produced by smallholders and sold in traditional wet markets. However, fresh pork is highly susceptible to microbiological contamination, presenting health and economic burdens (Dang-Xuan et al. 2017).

Compared to foodborne biological hazards, infectious diseases caused by food-borne parasites have received little attention. Yet, *Taenia solium*

(pork tapeworm), ranked the number one food-borne parasite of greatest global concern, can cause human cysticercosis and a variety of clinical conditions including epilepsy (FAO and WHO 2014). *Trichinella spiralis* (pork worm), ranked seventh, can cause diarrhea, muscle pain and fever in humans. Some characteristics of animal production and food consumption habits in Vietnam may promote disease transmission, including close proximity of humans to intensive livestock systems and consumption of raw animal products (Carrique-Mas and Bryant 2013).

Pig production is an important livelihood activity for ethnic minorities in Vietnam. Both indigenous breeds and wild pigs have traditionally been kept under intensive animal management (Muth et al. 2017). While the threat of emerging viral pathogens has received significant international attention, the burden

of endemic diseases such as parasitic diseases remains largely neglected. The ‘Safer indigenous pork and healthier ethnic minorities in Vietnam’ project (January 2018–June 2020) was developed to assess and reduce the burden of parasitic pig-borne disease (PPBDs)—namely cysticercosis and trichinellosis—within ethnic minority communities in Vietnam.

The project was funded by the German Federal Ministry of Economic Cooperation and Development (BMZ) and implemented by the International Livestock Research Institute (ILRI), Institute of Veterinary Research (NIVR), Hanoi University of Public Health (HUPH) and Frier Universität Berlin. This brief reports on progress made toward the objective of improving the knowledge, attitudes and practices of indigenous pig farmers and pork consumers on the management of PPBDs.

Summary

- A cross-sectional study was conducted to evaluate the impact of an educational intervention for parasitic pig-borne disease (PPBD) prevention in Hoa Binh, Vietnam.
- Interventions to improve knowledge of PPBD included training of trainers, distribution of posters and community loudspeaker campaigns.
- Findings show loudspeaker campaigns using existing community infrastructure were helpful in reaching a wide audience.
- Only modest improvements in the intervention groups were documented, suggesting more frequent exposure over longer time periods could help sustain positive changes.

Methodology

Study site

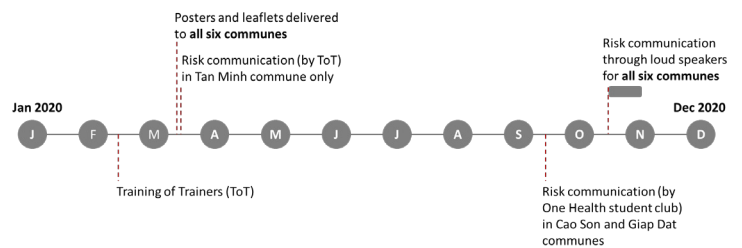
The project is piloted in Hoa Binh, a mountainous province in the northwest of Vietnam. Ethnic minorities account for around 74% of the province’s population. Specifically, the project worked in Cao Son, Tan Minh, Doan Ket, Trung Thanh, Giap Dat and Muong Chieng communes of Da Bac district. Hoa Binh has the highest proportion of indigenous pigs among the northern provinces.

First, the project assessed health risks related to PPBDs. Confirmatory testing in pigs and humans indicated low human exposure to PPBDs; however, a household survey revealed risky pig management, high consumption of risky foods and poor knowledge of zoonoses. Based on these findings, the research team sought to raise community awareness on the nature and risks of PPBDs. A variety of educational strategies were implemented (Figure 1), including:

- Training of trainers for local health staff and animal health staff in Da Bac district (12–14 February 2020).

- Participants included six health staff, six veterinarians, three slaughterhouse workers) and members from the sub-Department of Health and District Health Center.
- Risk communication for local people in Tan Minh commune (6–7 March 2020). The local trainers (observed by the research group) delivered a training to 90 participants (95% were women).
- Developed and delivered risk communication posters and leaflets in each of the six studied communes (6–7 March 2020). A total of 25 posters and 600 leaflets were delivered.
- Risk communication for ethnic minority groups in Cao Son and Giap Dat communes (14–15 September 2020). This included providing information on both PPBDs, visualization of risky food, route of transmission and prevention, and contacts for further advice. This training was conducted by the One Health student club.
- Risk communication through loudspeakers for communities in six communes (12 October–1 November 2020). Messages on PPBDs (e.g., route of transmission, prevention, etc.) were communicated twice a day two times a week, which was expected to reach 40% of the community.

Figure 1. Overview of the educational campaign



Evaluation

To evaluate the impact of the awareness campaigns in Hoa Binh, a cross-sectional study of the population’s knowledge, attitudes and practices related to PPBDs was conducted in early November 2020. Participants were randomly selected from three communes from the intervention group and three neighboring communes from the control group. The six districts were comparable in human population, with the awareness campaign group having a higher pig population (Table 1). The sample size calculation used a 95% confidence level and concluded on 300 households selected across the six communes.

Table 1. Number of human and pig populations in the study regions

	Total human population	Total pig population
Awareness campaign (Cao Son Tan Minh and Giap Dat)	10,296	2,681
No awareness campaign (Dong Chun, Tu Ly and Hien Luong)	13,718	1,164

Results

A total of 304 community members responded to the survey. The majority of respondents were women (79%) and between the ages of 30 and 45 (37%). Nearly half of all respondents earned less than three million VND annually (50%). Most participants (97%) identified as a member of an ethnic minority group. A large proportion of people in both groups worked as farmers (70% in control and 72% in intervention). The control group had a higher proportion of women, proportionally more people with secondary school or higher education and slightly higher socio-economic status (e.g. income) compared to the intervention group. These differences were statistically significant. Both groups also differed in ethnicity composition (Table 2).

Table 2. Selected demographics of surveyed community members

	Control (n=152)		Treatment (n=152)	
	n	%	N	%
Gender				
Women	135	88.82	105	69.08
Men	17	11.18	47	30.92
Age				
<30	19	12.50	33	21.71
30–45	48	31.58	65	42.76
46–60	53	34.87	33	21.71
>60	32	21.05	21	13.82
Income				
<3 million	66	43.42	85	55.92
4–10 million	77	50.66	57	37.50
>10 million	9	5.92	10	6.58
Ethnicity				
Kinh	8	5.26	0	0.00
Tày	47	30.92	98	64.47
Dao	19	12.50	22	14.47
Muong	76	50.00	30	19.74
Another ethnic group	2	1.32	2	1.32
Education				
Did not go to school	5	3.29	13	8.55
Primary school	24	15.79	48	31.58
Secondary school	83	54.61	63	41.45
High School	33	21.71	24	15.79
Higher	7	4.61	4	2.63

Change in awareness and knowledge

Around a third of respondents reported hearing about *Taenia solium* (38%), cysticercosis (28%), or *Trichinella* (28%). Importantly, the proportion of people who heard about *Taenia solium* and *Trichinella* was slightly higher in the treatment group compared to the control group. However, this finding was not statistically significant. Between the two groups, there were important

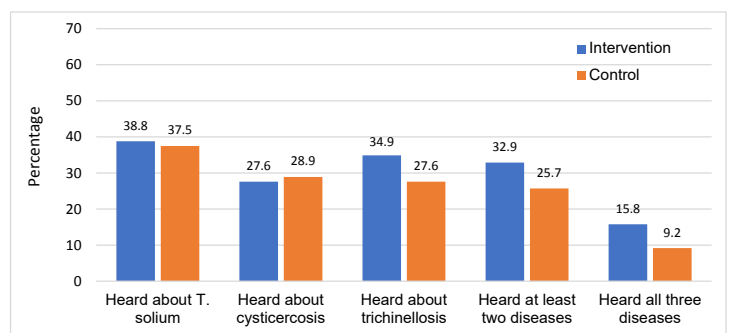
differences in sources of information, knowledge of diseases and information sharing.

Among the 116 participants (38%) that have heard of *Taenia solium*, information sources included medical staff of village/commune (59%), radio speaker (56%), other ways (50%), friends/relatives (40%), social network (30%), women’s union or farmers’ union meetings (27%), commune vet (16%), and/or flyers/posters (10%). The proportion of people in the treatment group that heard about the disease through radio speaker (69%) was significantly higher than the control group (42%) ($p < 0.05$). Furthermore, the proportion of people correctly identifying all three symptoms of *Taenia solium* was significantly higher in the treatment group (21%) than the control group (12%) ($p < 0.05$), suggesting the awareness campaign may have been effective in improving disease knowledge.

Among the respondents that heard about cysticercosis and/or *Trichinella*, radio speaker was the primary source of information. The difference between the control group and treatment group in terms of awareness gained from loudspeakers was also statistically significant. There was no difference in the knowledge of disease symptoms for cysticercosis and *Trichinella* between groups. When asked whether people talked about these diseases, the proportion of people sharing disease information with relatives was significantly higher in the treatment group (42%) compared to the control group (24%) ($p < 0.05$).

Between the two groups, there were similar perceptions around health risks of PPBDs. This included some misperceptions. For example, most people ‘agreed’ or ‘totally agreed’ that healthy pigs cannot transmit disease to humans. However, most perceived correctly (agreed or totally agreed) that having cysticercosis can have long-term health consequences. Furthermore, respondents had similar attitudes regarding actions to reduce PPBDs—most agreed handwashing and avoiding raw pork is important or very important. While not statistically significant, slightly more respondents in the intervention group (79%) ‘agreed’ or ‘totally agreed’ that eating raw or undercooked pork can harm human health compared to the control group (68%).

Figure 2. Awareness of parasitic pork-borne diseases



Discussion

This study assessed the effects of an educational campaign about food-borne parasitic diseases in Hoa Binh, Vietnam. The results revealed that awareness of parasitic diseases among the treatment group was slightly higher compared to the control group. However, this finding was not statistically significant. Importantly, the proportion of people correctly identifying all three symptoms of *Taenia solium* was significantly higher in the treatment group (21%) than the control group (12%), suggesting the campaign had some impact on knowledge of diseases. Given the limited duration of the awareness campaign, any detectable positive effect should be celebrated. Furthermore, this finding provides confidence that a more comprehensive campaign could generate a larger benefit.

The sources of information used by respondents provided a helpful reference point for designing future educational campaigns in Hoa Binh and other socio-economically similar areas. The treatment group heard about parasitic diseases more often than the control group through loudspeakers, suggesting the important role of loudspeakers in communicating health information. Medical staff and friends/relatives were also considered to be important sources of information.

Caution needs to be taken when interpreting the findings. The difference in knowledge of disease symptoms could be due to the treatment group already having this pre-existing knowledge. Indeed, there were some demographic differences between the two groups (e.g., ethnicity and educational level). Gathering additional feedback from respondents, particularly around content and local language, would also be useful for improving the delivery of the PPBDs awareness campaigns.

Recommendations

- The findings confirmed the continuous need for interventions about parasitic pork-borne disease prevention, considering only about one-third of the community members were aware of one of the three parasitic diseases.
- Loudspeaker campaigns using existing community infrastructure can play an important role in communicating health information reaching a wider audiences.
- As only modest improvements in the intervention groups were documented more frequent exposure to campaign messages and over an extended period of time could expect to observe stronger positive changes in PPBD knowledge, behaviors and practices.

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Photo credit

ILRI/Chi Nguyen

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This work received financial support from the German Federal Ministry for Economic Cooperation and Development (BMZ) commissioned and administered through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Fund for International Agricultural Research (FIA), grant number: 81219445. Co-funds were provided by the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) and the Australian Centre for International Agricultural Research (ACIAR). We would like to acknowledge the support of the National Institute of Animal Sciences for their support of the Ban pig value chain.

ILRI thanks all donors and organizations which globally support its work through their contributions to the [CGIAR Trust Fund](#).



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