

## Education Strategies for Preventing Zoonotic Disease Transmission Among Breeders, Traders, and Slaughter House Workers

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### Abstract

Previous studies have shown that animal care in rural areas generally did not meet hygiene standards, which could lead to increased zoonotic disease transmission. This research aimed to investigate how knowledge, attitude, and practice in the prevention of zoonotic disease transmission among animal breeders, traders, and slaughter house workers changed through intervention in the form of training.

We used a pre–post-test design with 32 subjects consisting of breeders, traders, and slaughter house workers during the traditional “kurban” period in the Sawangan Sub district, Depok, West Java. Data were collected using quantitative methods that asked targeted participants to fill out questionnaires. There was an increase in knowledge in preventing disease transmission in all groups (breeders, 53.4%; traders, 31.7%; and slaughter house workers, 32.1%). In addition, attitudes toward the prevention of transmitting zoonotic diseases also increased in all groups (breeders, 23.75%; traders, 8.1%; and slaughter house workers, 9.9%). These changes in behavior can lead to modifications in practice during “kurban” to reduce zoonotic disease transmission.

Improvements in knowledge, attitude, and practice among breeders, traders, and slaughter house workers for the prevention of transmitting zoonotic diseases can be accomplished by minimal intervention and training.

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### Introduction

Zoonotic diseases are transmitted from animals to humans or from humans to animals.<sup>1</sup> They can be classified as 1) viral, including rabies, yellow fever, HIV/AIDS, and smallpox; 2) bacterial, including tuberculosis, brucellosis, and anthrax; and 3) parasitic diseases, including cysticercosis, toxoplasmosis, and leishmaniasis.<sup>2</sup> Infection can occur directly either by consuming uncooked meat or from being bitten by animals; or indirectly, through exposure to contaminated soil, water, air, or foods.<sup>3</sup>

Zoonotic diseases can cause deaths and severe economic loss and is a global health problem. Approximately 55,000 people die because of rabies in Asia and Africa.<sup>4</sup> More than

50,000 cases of brucellosis were reported in 2003 across 8 cities along the southeastern coast of the Mediterranean Sea.<sup>4</sup> The total cost of overcoming cysticercosis/ taeniasis in India is around \$150 (USD) per year. In Tibet, the total loss of human and animals because of echinococcosis is around US\$3.47 per person per year.<sup>4</sup>

Breeders, farmers, veterinary physicians, and slaughter house workers have a higher risk of infection because they are direct contact with animals. According to a WHO report, of the 911 million under privilege people in the world, around 411 million people are livestock breeders.<sup>4</sup> However, very few of these workers are aware of the concerns and proper practices to limit their exposure and risk for infection.<sup>3</sup> A study conducted by Monroe<sup>5</sup> in Ghana found that despite knowledge of the deadly effects of anthrax, 96% of animal breeders and slaughter house workers admitted that they consumed animals that died from anthrax as long as the meat was cooked with certain herbal plants. Otupiri<sup>6</sup> add that workers in slaughter houses in Ghana did not use safety tools, and there was no

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facility to wash their bodies after working.

In Indonesia, the government recently acknowledged the public health concern of zoonotic diseases. The general directorate for livestock decree classified strategically transmittable animal diseases into 11 groups, with 2 more added recently by an animal health expert committee. Jusmaldi<sup>7</sup> reported that the prevalence of *Fasciola hepatica* in livestock in Samarinda was 44.44%. *Harian Pelita* local daily published that in Garut, there were liver flatworms found in some “kurban” animals (October 2013).

“Kurban” is a type of Muslim worship frequently performed in Indonesia. During the month when “kurban” is performed, cow, goat, and lamb trade increases, which results in the emergence of temporary animal sheds and the appearance of seasonal livestock traders. Generally, these temporary animal sheds do not meet appropriate cleanliness standards. Moreover, the traded livestock are not washed properly, and animal dung frequently remains attached to animals’ bodies. In addition, trading places are located beside food stores or homes, along sidewalks, and on the road. Remarkably, most traders do not know that diseases could be transmissible through livestock, or they believe that diseases that infected livestock were unable to infect humans.

It has been found that public knowledge of these issues also remains low. Some societies did not use personal protective equipment (APD) when slaughtering. Environmental and self-cleanliness are inadequate because blood from the slaughtering process is not treated properly, and self-cleanliness often involves washing hands without soap and no flowing water.

Therefore, additional research is necessary to better understand the knowledge, perception, and attitude of breeders toward preventing transmitting zoonotic diseases. This will help to develop best practices to train workers and increase awareness of the risks associated with preventing and transmitting zoonotic diseases. Training is provided by a combination of interactive methods. These methods include lectures, discussions, films, and supervision. After training, participants are asked to create action plans (RTL) that demonstrate them practicing these safety measures to their immediate families and societies to spread information and knowledge. The tools used in

this training are modules, posters, leaflets, flip and pocket books, and CD films.

## Materials and methods

### Research time and location

Training and research was conducted in Sawangan, Depok, West Java between August and November 2014. The location was selected based on data from the Agriculture and Fishery Department, Local Government Depok, and based on observations in the previous study findings that there were seasonal animal “kurban” traders located in Depok, particularly in the Sawangan subdistrict.

### Sample and design

This research used a pre–post-test design. It consisted of two activities. The first, training interventions and the second conducting measurements before and after training to determine targets’ knowledge, attitude, and practice. The study population included all breeders, traders, and slaughterhouse workers for “kurban” in the Sawangan subdistrict, Depok, Central Java. Research sample was obtained by implementing purposive sampling technique, based on certain criteria. Sample were divided into three groups: breeders, traders, and slaughter house workers. Each group contained 10–12 people. The total target was 32 people.

### Data collection

Data were collected by asking targeted participants to fill out questionnaires with a set of questions about knowledge of and attitude toward “kurban” procedures and zoonotic diseases. The questionnaires were classified into three forms that were adjusted for each target group. After collecting data, the next step is to see the change of knowledge, attitude’s score before and after the training, then do a statistical analysis to find out whether the change is significant or not. These results are explained descriptively.

## Results

### Participants’ background

A total number of 32 participants completed the training program, including 10 breeders, 11 traders, and 11 slaughter house workers. Of these, most participants (60.8%)

were >40 years of age. The youngest participant was a breeder aged 28 years, and the oldest was a slaughter house worker aged 62 years. Among the participants, 73.6% graduated from senior high school and Diploma3/ Bachelor. With respect to occupation, approximately 31.25% of total participants were breeders. These characteristics have been presented in Table 1.

		Breeders (%)	Traders (%)	Slaughterhouse workers (%)
<b>Age</b>	Average (years)	43.80	40.09	44.5
	Range (years)	28–54	30–52	32–62
	<40 years of age	2 (18.2)	6 (54.5)	5 (45.5)
	≥40 years of age	8 (81.8)	5 (45.5)	6 (54.5)
<b>Education</b>	Elementary school	3 (27.3)	1 (9.1)	1 (9.1)
	Junior high school	1 (9.1)	2 (18.2)	-
	Senior high school	3 (27.3)	5 (45.5)	5 (45.5)
	Bachelor degree	3 (27.3)	2 (18.2)	5 (45.5)
<b>Occupation</b>	Religious leaders	-	-	1 (9.1)
	Teachers	-	-	2 (18.2)
	Employees	1 (9.1)	-	2 (18.2)
	Civil servants	-	1 (9.1)	4 (36.3)
	Entrepreneurs	1 (9.1)	2 (18.2)	2 (18.2)
	Laborers	1 (9.1)	3 (27.3)	-
	Breeders	5 (45.5)	5 (45.5)	-
	Physicians	2 (18.2)	-	-

**Table 1.** Demographic characteristic of breeders, traders, and slaughter house workers.

### Knowledge, attitude, and behavior changes

Following training, there was an increase in knowledge regarding zoonotic diseases among breeders, traders, and slaughter house workers (Fig. 1). Before training, average results of the pre-test were at approximately 17.40 for breeders, 20.64 for traders, and 22.91 for slaughter house workers. After training (post-test), there was an increase in knowledge for each group, by approximately 9.3 points for breeders, 7.27 for traders, and 6.63 for slaughter house workers. From Tables 2–4, it can be seen that all p-values are <0.05, which means training lead to an average increase in each targeted groups' knowledge (breeders, traders, and slaughter house workers).

Knowledge	Average score	Score gap	Minimum–maximum score	P-value (5%)
Pre-test	17.4	9.3	9–26	0.005
Post-test	26.1		21–28	

**Table 2.** Increase in breeders' knowledge about "kurban" procedures in the prevention of zoonotic diseases.

Knowledge	Average score	Score gap	Minimum–maximum score	P-value (5%)
Pre-test	22.91	7.27	16–28	0.011
Post-test	30.18		21–36	

**Table 3.** The increase in traders' knowledge about "kurban" procedures in the prevention of zoonotic diseases.

Knowledge	Average score	Score gap	Minimum–maximum score	P-value (5%)
Pre-test	20.64	6.63	17–25	0.004
Post-test	27.27		21–33	

**Table 4.** The increase in slaughter house worker's knowledge about "kurban" procedures in the prevention of zoonotic diseases.

In addition to knowledge, attitude of regarding the management of sacrificial animals in the prevention of zoonotic also changed following training (Fig. 2). Before training, average pre-test results were 8.0 for breeders, 8.91 for traders, and 10.9 for slaughter house workers, but after training there was a slight improvement in each group's attitude.

From Table 5, it can be seen that p-values are <0.05 for breeders, which means training support noticeably increases average score in breeders' attitude. For traders and slaughter house workers (Table 6 and 7), p-values were > 0.05, indicating that training does not provide the support to lead to a significant increase in average attitude scores. This is because the attitude of traders and slaughter house workers were high before training; therefore, additional training could not substantially improve their attitudes toward "kurban" procedures in the prevention of zoonotic diseases.

Attitude	Average Score	Score Gap	Minimum–Maximum Score	P-value (5%)
Pre-test	8.0	1.9	6–11	0.007
Post-test	9.9		8–11	

**Table 5.** The improvement in breeders' attitude toward "kurban" procedures in the prevention of zoonotic diseases.

Attitude	Average score	Score gap	Minimum–maximum score	P-value (5%)
Pre-test	8.91	0.73	6–11	0.130
Post-test	9.64		8–11	

**Table 6.** The improvement in traders’ attitude toward “kurban” procedures in the prevention of zoonotic diseases.

Attitude	Average score	Score gap	Minimum–maximum score	P-value (5%)
Pre-test	10.09	1.00	8–11	0.062
Post-test	11.09		9–12	

**Table 7.** The improvement in slaughter house workers’ attitude toward “kurban” procedures in the prevention of zoonotic diseases.

From Table 8, the mean pre-test scores for breeders’ and traders’ behavior were 13.6 for breeders and 14.6 for traders. To determine the effect of training and supervising on targeted knowledge and attitude, the formula below was applied:

**Training intervention effect**

$$\frac{\text{Average post-test} - \text{Average Pre-test}}{\text{Average Pre-test}} \times 100\%$$

The outcome of these results demonstrates the following:

There was an increase in breeder’s knowledge by 53.4%, along with increased knowledge in traders (31.7%) and slaughter house workers (32.1%) regarding the prevention of transmitted zoonotic diseases. There was an improvement in breeders’ attitude by 23.75%, along with increased attitude in traders (8.1%) and slaughter house workers (9.9%) toward the prevention of transmitting zoonotic diseases.

Group	Average score	Minimum–maximum score	Standard Deviation
Breeders	13.6	9–17	2.392
Traders	14.6	11–16	1.501

**Table 8.** Practice pre-test score and breeders’ and traders’ behavior toward “kurban” procedures in the prevention of zoonotic diseases.

In addition to changes before and after the tests, differences in opinions and attitudes

also were assessed through direct observation before and during the festival of Eid. By comparing average test scores between the pre- and post-tests, substantial improvement in knowledge, attitude, and practice existed for each targeted group (improvement in the range of 8%–54% after training). However, some targeted groups admitted that they already were familiar with the procedures of preventing zoonotic disease transmission during “kurban,” but they did not believe that animal diseases could infect humans.

**Discussion**

Zoonoses cannot be restricted without a complete, multidisciplinary approach that includes health education and community contribution as well. Numerous other diseases are there, which may be transmitted to human beings through contamination during production, processing and handling of food products of animal origin.<sup>8</sup> This research revealed the improvement of knowledge, attitude and practice of breeder, trader, and slaughter house worker about the prevention of zoonoses transmission through intervention in the form of training. A research in India showed most of the butchers were familiar only with Rabies, proper awareness has to be created regarding identification of carcasses with different diseases (Anthrax, Tuberculosis, Brucellosis etc.). Therefore, there is need to impart training for the butchers regarding the hygienic practices.<sup>8</sup>

Zoonotic disease awareness training is a valuable program to the workers. In the current study, training was successful in increasing knowledge, attitude and practice of breeder, trader, and slaughter worker house about the prevention of zoonotic disease transmission. A study by Steneroden KK, et al proved that training was modestly successful in transferring short-term knowledge to animal shelter workers. To understand and evaluate the effectiveness of training completely, observable or measureable behaviours had been compared before and after training.<sup>9</sup>

There were some study recommends developing coordinated, thorough and effective training programs for the small scale breeders to enlighten them to ensure fewer risks of zoonotic diseases. Improvement of knowledge and awareness among the livestock farmers can

minimize the potential risk factors and encourage good farm management practices to prevent zoonoses among the livestock farmers.<sup>10</sup> However, much can be done by education, and in particular by increasing the awareness of different health professionals, and facilitating communication and collaboration between veterinary, public health and agricultural personnel.<sup>11</sup>

The success of the training program is due to cooperation between the Bogor Agricultural University (IPB), Team from veterinary and medical fields and an active role from the local Department of Agriculture and Fishery Sub Department Livestock and Animal Health Depok. In addition to supporting the training program, other sources assisted in creating information and sharing media for people in the targeted groups. These media become tools for spreading the information further in the society.

On the other hand, based on direct observations, some “kurban” animal traders were reluctant to spread information regarding the prevention of zoonotic diseases because it may negatively affect demand for their “kurban.” These are challenges to further prevent disease transmission in these societies.

### Conclusions

Following training exercises, all three target groups demonstrated increased knowledge and attitudes about the prevention of transmitting zoonotic diseases. These changes have the potential to lead to modifications in practice and behavior among breeders, traders, and slaughter house workers toward best practices in preventing zoonotic disease transmission during “kurban.”

### Recommendation

1. Government agencies, particularly the Agriculture and Fishery Department, and Health Department, are required to pay attention toward “kurban” animal breeders, considering that there are many breeders who still lack the necessary knowledge and attitude toward preventing zoonotic disease transmission. In addition, seasonal “kurban” traders who emerge every year before and during the festival of Eid should get proper attention.

2. Considering slaughter house workers, Mosque prosperity council (DKM- Dewan Kemakmuran Mesjid), who have a big potential to promote the prevention of zoonotic disease transmission, it is necessary to have regular training for such individuals.

There is still much support needed from government and private institutions in educating and empowering breeders, traders, and slaughter house workers to carry out the necessary procedures to prevent zoonotic disease transmission during “kurban.”

### Declaration of Interest

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