



Prevention of Ancylostomiasis Transmission in Livestock and Stockmen with Good Hygiene Behavior and Cage Sanitation

Meiningtiyas Indriyanti¹, Sayono Sayono¹, Wahyu Handoyo^{1,2}, Tri Dewi Kristini^{1,3}, Didik Sumanto^{1*}

¹Faculty of Public Health, Universitas Muhammadiyah Semarang, Indonesia

²Public Health Center of Semarang, Central Java Province, Indonesia

³Health Office of Central Java Province, Indonesia

Abstract

Introduction: Livestock farming is a vulnerable area for the transmission of zoonotic diseases. Good cage management affects the health of livestock and workers. Furthermore, clean and healthy farm conditions help to maintain the health of the people living around the farm. This study was centered on the early detection of worm infections in livestock.

Methods: This exploratory study was conducted on a village farm containing 52 cows with 20 workers. Helminthiasis screening was performed with the saturated NaCl flotation technique via laboratory testing.

Results: It was found that one cow was infected with hookworm, and all the workers were in healthy condition.

Conclusion: Transmission of ancylostomiasis can be prevented by maintaining cage sanitation and worker hygiene behavior.

Keywords: Ancylostoma, Livestock, Animal husbandry, Zoonosis, Cage sanitation

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Introduction

Public health cannot be realized independently since it is related to environmental health and the health of livestock within residential areas (1). Good sanitary conditions in residential environments, supported by healthy living behavior that is always maintained, are important in preventing illness in society (2,3). The public must always increase their understanding of the relationship between environmental sanitation, livestock health, and public health, as stated in the One Health concept (4).

Indonesia, as an agricultural country, has a population in which the majority of people work as farmers (5). The lives of farmers in rural areas cannot be separated from livestock ownership, especially those that support farming work (6). The lives of people in rural areas are relatively simple, with a basic understanding of sanitation that has been passed down from generation to generation. Livestock management is also carried out naturally, without the touch of modern technology. Livestock still live together with the community. Livestock pens are also often found in residential areas (7).

People who have good sanitation knowledge are also better at raising livestock (8-10). The livestock pen is separated from the residential house, even though the distance is not too far. The position of the livestock pen attached to the residence worsens the sanitary condition of

the house (11). Managing livestock pens that are separate from residential homes requires special personnel (12). Workers are needed who can clean the pens every day and feed the livestock regularly. Cage sanitation and the hygiene behavior of livestock workers must always be taken into account to avoid various possible transmissions of zoonotic diseases from the livestock they manage (13). Monitoring the sanitation of livestock pens and the hygiene behavior of workers on self-managed farms in the community is highly important to pay attention to so as not to have an impact on public health.

Methods

Research Design and Location

This survey-based study was carried out on a cattle farm in Banyumeneng Village, Mranggen District, Demak Regency, Central Java province, Indonesia.

Sample and Material Testing

The research sample consisted of 52 cattle and 20 livestock workers. All the livestock workers were survey respondents. The test material was fresh cow feces taken from each cow in the morning.

Laboratory Testing

Laboratory tests were carried out at the Epidemiology and



Tropical Disease Laboratory, Muhammadiyah University, Semarang. The cow feces were tested for parasite content using the flotation method with saturated NaCl. A total of 5 g of feces was put into a 16 × 150 mm test tube, added with a saturated NaCl solution, and then homogenized. Floating impurities were removed, and then saturated NaCl was added again until it was full. Moreover, it was covered with a cover glass and incubated for 45 minutes. The cover glass was removed, placed on an object glass, and then read microscopically using low to medium magnification (14).

Results

Most of the livestock workers, who were all males, had only graduated from elementary school, but their habit of wearing footwear when working was relatively good. Almost all the workers complied with the use of footwear during work, including during break times (Table 1).

Vegetable plants are often found in the yards of houses in rural areas. Usually, these vegetable plants are fertilized using manure, which has the potential to be a source of contamination from various pathogens. On the other hand, vegetables are complementary food sources

for almost every person. Farm workers also really like vegetable food. All the workers stated that the vegetables consumed were always washed first using clean running water. The vegetables, most of which came from the workers’ gardens, were cooked first before consumption. Meanwhile, the distance between the vegetable garden and the livestock pen location was more than 50 meters (Table 2).

In general, the condition of the farms in the study area appeared to give a good impression, even though they were not too far from residential homes. The farm, which contained 52 cows, still had a dirt floor without drainage channels. Beside the cage, about 10 meters away, a soil excavation had been prepared as a place to store the livestock manure, which would then be processed simply into organic fertilizer. Not far from the pen, there was also a well that had been prepared as a source of drinking water for the livestock and for cleaning the pen and livestock. The remaining animal feed from dry grass was collected next to the cage and then burned when a great deal had been collected (Table 3).

The cattle kept on the farms were quite protected from worms. The finding of worm eggs was only obtained

Table 1. Characteristics of the livestock workers (n=20)

Characteristics	Number	%
Workers education		
No school	3	15.0
Elementary school	10	50.0
Junior high School	5	25.0
Senior high School	2	10.0
Gender		
Male	20	100.0
Female	0	0.0
Wear closed footwear when working		
Always	16	80.0
Never	4	20.0
Wash footwear with soap and running water after work		
Yes	10	50.0
Not always	10	50.0
Always wear footwear every time you leave the house		
Yes	18	90.0
No	2	10.0
During work breaks, they often remove their footwear in the livestock area		
Yes	7	35.0
No	13	65.0

Table 2. Vegetable Consumption Behavior Among the Livestock Workers

Vegetable Consumption	Number	%
Frequency of vegetable consumption		
Often	19	95.0
Sometimes	1	5.0
Wash vegetables with clean water and rinse them before eating		
Yes	20	100.0
No	0	0.00
Cook vegetables before eating		
Yes	20	100.0
No	0	0.00
Vegetables come from your garden		
Yes	18	90.0
No	2	10.0
Distance between the vegetable garden and cow pen		
>50 meters	20	100.0

Table 3. Livestock pens condition

Criteria	Condition
Distance from the enclosure to the settlement	<25 meters
Cage drainage	There isn't any
Cage floor	Soil
How to clean livestock manure	Stockpiled to make fertilizer
How to clean leftover livestock feed	Collected and burned
Availability of clean water sources	Yes, well-dug
Availability of trash cans	None (one place to defecate)

from one cow feces specimen, namely hookworm eggs. The finding of worm eggs in the cow feces was not followed by the findings in the livestock farmers; it was proven that none of the livestock workers were infected with worms (Figure 1).

The hookworm eggs found consisted of two stages of development. The first type was worm eggs in the egg cell development stage (Figure 2A), and the second type was eggs containing hatching larvae (Figure 2B).

The hand-washing behavior of the livestock workers was also quite good. Most of them always washed their hands using soap and running water before eating, after finishing work, and especially after defecation activities (Figure 3).

The cattle raised on this farm were never grazed outside the pen. All the livestock manure produced every day was thrown into the earth excavation provided near the pen. Once it was full of livestock manure, the workers would fill it with soil and then make a new excavation next to the old one as a container for the next batch of manure. A small number of livestock workers stated that cleaning the livestock pens was not carried out every day, although the proportion of those who did it every day was much larger. Meanwhile, livestock cleaning was carried out occasionally by more than half of the workers (Figure 4).

Discussion

In general, the condition of the village farms observed was quite good. The stable area had a clean water source

in the form of a dug well, which was used as a water source to provide drinking water for the livestock and clean the stable area. Sufficient clean water is important in maintaining the cleanliness of the cage (15,16). The availability and adequacy of clean water also influence workers' behavior in maintaining personal hygiene while working (17).

The clean living behavior of the livestock workers can be categorized as good considering that they have the habit of washing their hands more than 80% of the time after work, before eating, and after defecation (Figure 3). This, of course, cannot be separated from the availability of clean water in the livestock area. Adequate clean water encourages people to clean themselves (17); conversely, without sufficient clean water, people prioritize using water for primary household needs. Good worker hygiene behavior was proven by the freedom and cleanliness of all the workers from worm infections (Figure 1). Thus, it can be realized that good hand-washing behavior minimizes the potential for worm infections (18). Also, good hand-washing behavior breaks the chain of transmission of worm infections originating from various transmission media (19).

The condition of the livestock on the farm was generally healthy, and only one cow experienced a worm infection. The finding of hookworm eggs in cow feces indicates that adult hookworms live in the cattle's digestive tract (20). The eggs found had a characteristic oval shape, transparent single-layer hyaline egg walls, and contained

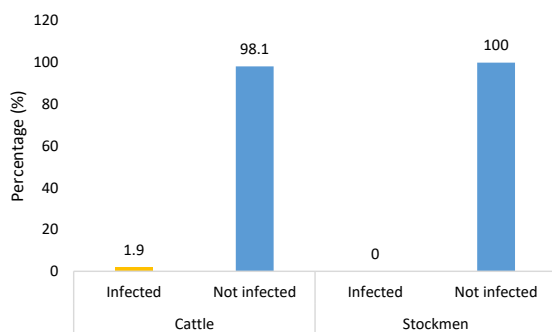


Figure 1. Number of Worm Infections in the Livestock and Stockmen

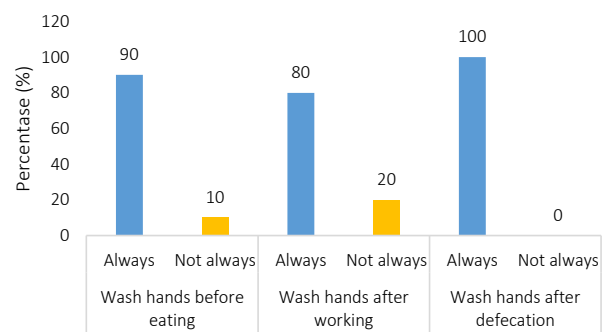


Figure 3. Hand Washing Behavior with Soap of the Livestock Workers

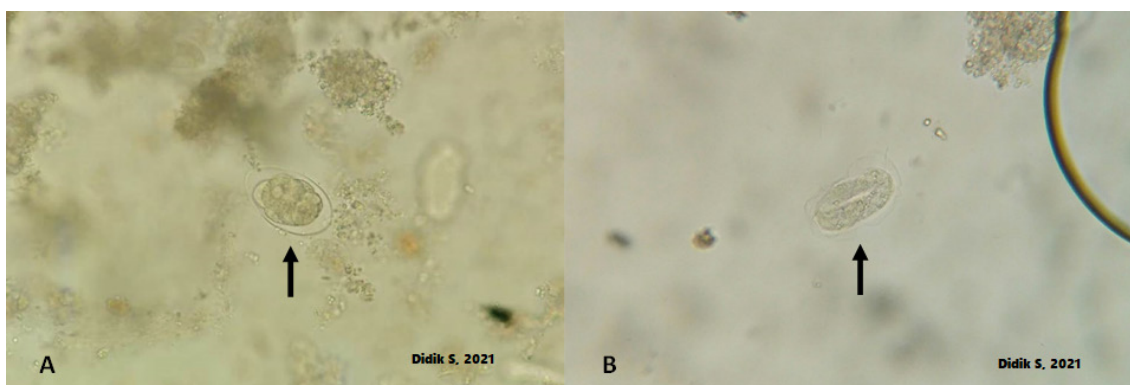


Figure 2. Hookworm Eggs Containing Egg Cells (A) and Hatching Larvae (B)

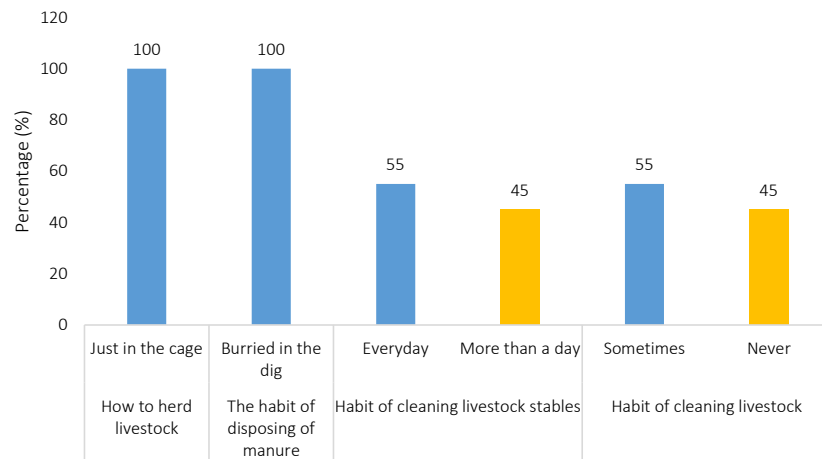


Figure 4. Livestock Grazing and Cage Sanitation

egg cells that were in development (21). This finding is very unique because the cattle were in a drum. All the livestock were in the same pen, but only one animal was infected. These results indicate that the management of cage sanitation is quite good. Animal waste infected with worms does not contaminate livestock food, so it does not transmit parasites to other livestock in the same pen. Sanitation of livestock pens certainly cannot be separated from the availability of clean water and the hygiene behavior of workers in livestock management (17).

Livestock that is always kept in a pen and never grazed is one of the factors that can prevent worm infections (22-24). Animal food that is always maintained and does not come from wild grass outside the cage also greatly influences the quality of animal food. Keeping livestock in cages is a positive decision on this farm because it avoids the potential for infection with various zoonotic pathogens from outside the cage. Throwing away and cleaning livestock manure every day maintains the sanitation of the pen so that pathogens in livestock feces can be immediately removed from around the livestock (25-27).

Conclusion

Worm infections in cows on a farm do not cause infections in other livestock if the sanitation of the pen is maintained through the clean and healthy living behavior of the farm manager. The availability of a clean water source is an absolute necessity to maintain the sanitation of cages on a farm.

Recommendations

It is necessary to examine livestock that are raised traditionally using a grazing system to anticipate the role of livestock as reservoirs and sources of infection for the transmission of worm disease in the community.

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Authors' Contribution

Conceptualization: Meiningtiyas Indriyanti, Didik Sumanto, Sayono Sayono.

Data curation: Wahyu Handoyo, Tri Dewi Kristini.

Formal analysis: Sayono Sayono.

Funding acquisition: Didik Sumanto.

Investigation: Wahyu Handoyo, Tri Dewi Kristini.

Methodology: Didik Sumanto.

Project administration: Meiningtiyas Indriyanti.

Resources: Tri Dewi Kristini.

Software: Sayono Sayono.

Supervision: Didik Sumanto.

Validation: Didik Sumanto.

Visualization: Meiningtiyas Indriyanti.

Writing—original draft: Didik Sumanto.

Writing—review & editing: Didik Sumanto.

Competing Interests

The authors declare that there is no conflict of interest.

Ethical Approval

Ethical acceptance was taken from the Health Research Ethics Commission of the Faculty of Public Health, Universitas Muhammadiyah Semarang, No. 548/KEPK-FKM/UNIMUS/2021.

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