

Nematode Infection in Slaughtered Cattle in Manokwari Regency Abattoir, West Papua Province

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ABSTRACT

As part of an ongoing studies to investigate the epidemiology of gastrointestinal helminths especially nematodes infection of cattle in Manokwari Regency, we carried out a purposive sampling of cattle slaughtered in a major abattoir in Manokwari Regency, West Papua Province. This is related to the existence of abattoir. The objective of this study was to determine the prevalence and association between animal sex and nematodes infection in slaughtered cattle in Manokwari Regency abattoir. Fecal samples analyzed from 99 head of Bali cattle using native and floatation methods, during March and May 2018. Eggs worms were identified based on morphology, meanwhile the relationship between animal sex to prevalence of nematodes infection was analyzed by Chi-square Test. Overall, 15 head (15.2%) of the animals had been infected by nematodes. Among the cattle examined, female animals (OR = 0.535; 95% CI: 0.16-1.82) are more likely to be positive to nematodes infection. The result showed that there was no association ($P < 0.05$) between animal sex and the prevalence of nematodes infestation.

Key Words: Slaughtered Cattle, Nematode, Manokwari Regency, Abattoir

INTRODUCTION

Cattle, one of the prominent domesticated livestock in Indonesia, represent a valuable asset in both traditional farming and modern agriculture. They also provide meat, milk, and skin. Livestock systems in developing countries are characterized by rapid change, driven by factors such as population growth, increases in the demand for livestock products as income rise. The growth of livestock products especially meat during the last twenty years was 6.70% in average, inspite of the fact that there may be losses due to various diseases including helminth parasitic infection. The quantity of meat and revenue obtained from domestic livestock is much lower than the national demand. The decreased revenue and quantity of meat was caused by factors such as death and health problem with associated reduced productivity and increased cost of treatment (Ozung *et al.* 2011).

The nematode parasitic infections have harmful effects on grazing livestock (Perry *et al.* 2002), major constraint on ruminants well-being and productive performance (Keyyu *et al.* 2005) with losses due to mainly sub-clinical infections resulting in reduced productivity, instead of mortality (Waller 2005). Mortality of animals caused by parasitic diseases may not be alarming at times but their indirect effects on livestock productivity (Nwosu *et al.* 2007) and their zoonotic effect on human health are considerably greater (Ekong 2012). Indirect losses because of helminth infections are the reduction in productive potential such as decreased growth rate, weight loss, diarrhea, anorexia, and sometimes anaemia (Swai *et al.* 2006). Helminth infections have predisposing factors such as grazing habits, nutritional deficiency, pasture management, climate, vector,

presence of intermediate host, immunological status, and the number of infective larvae and eggs in the environment (Radostits *et al.* 1994).

According to previous study reports, the prevalence of helminth parasites in cattle of many areas in Indonesia was found to be high. Pramasudha *et al.* (2015) reported that the prevalence of gastrointestinal helminth was 9.31% in Bali cattle breeding centre, Sobangan Sub-district, Mengwi District, Bali Province. The prevalence of *Paramphistomum* spp infections of Bali cattle was 10.03% in Prafi District (Purwaningsih *et al.* 2018). In general, the tropical and humid conditions in Indonesia, optimally support the development and spreading of the parasites, so that the prevalence of the infestations are usually high except in the very dry areas.

There is no information of the prevalence of gastrointestinal helminths of slaughtered cattle in abattoir Manokwari Regency. This current study, therefore, aimed to determine the prevalence and association between animal sex and nematodes infection of slaughtered cattle. This is with a view of providing a baseline epidemiological data on this group of parasites.

MATERIAL AND METHODS

Study area and sample

This study was carried out at the Manokwari Abattoir, a major abattoir located in Manokwari Regency, West Papua Province. Cattle slaughtered in this abattoir came mostly from different cattle rearing regions of Manokwari Regency including Satuan Pemukiman (SP) 1, SP 2, SP 3, SP 4, SP 5, SP 6, SP 7, SP 8, SP 9, SP 10, South Manokwari District, Warmare district and Oransbari district. Hence, this abattoir has been serving as a good source of sentinel survey for diseases (including helminthic infections) from different regions of Manokwari regency and beyond. The study was conducted during a period of March to May 2018. A random sampling was used to select animal in Manokwari abattoir. A total of 99 fecal samples of slaughtered cattle were examined during the study period.

Sample collection and identification

Fecal samples were directly collected from rectum of slaughtered cattle. Each sample was put in tube containers with lids and labeled with animal identification and 10 ml of 3% formalin was added into sample container. Then, the samples were kept in refrigerator at 4°C for later examination. The collected fecal sample were processed and examined using qualitative techniques. Nematode eggs were identified by native and floatation technique in saturated NaCl solution (Urquhart *et al.* 1996).

Data analysis

The prevalence of each parasite infection was calculated as the number of animals diagnosed positive for a given parasite divided by the total number of animals examined at the particular time. While Chi-square (χ^2) was carried out to determine the association between animal sex and nematode infection of slaughtered cattle. Confidence level was held at 95% and $P < 0.05$ was set for significance. All statistical analysis was performed using Statistical Package for Social Sciences (SPSS) software package version 16.0.

RESULTS AND DISCUSSION

As many as 15 samples (15.2%) were positive for nematode eggs. Several type of nematodes were successfully identified, namely *Strongyloides* spp., *Oesophagostomum* spp., *Trichuris* spp., and *Haemonchus* spp. Meanwhile, the prevalence of gastrointestinal helminth infection found in this study was higher than the findings of Pramasudha *et al.* (2015) who recorded 9.31% in Sobangan Sub-district, Mengwi District, Badung Regency, Bali Province, and 10.03% prevalence of *Paramphistomum* spp infections of Bali cattle in Prafi District, Manokwari Regency (Purwaningsih *et al.* 2018). This prevalence was much lower than the earlier findings of Handayani *et al.* (2015) in Sukoharjo District, Lampung province who recorded 83.97%. This finding was in agreement with the reports by Rafiullah *et al.* (2011), that the prevalence of these parasites in Khyber Pakhtunkhwa was relatively high, especially for those livestock raised under traditional methods of husbandry. On the other hand, prevalence of gastrointestinal helminth infections in Bali cattle was recorded as 18.52% and 57.45% for sacrificed cattle in some mosques in Manokwari regency and in Prafi District, respectively (Purwaningsih *et al.* 2016a; 2016b).

The disparity in overall and species level prevalence of parasitic infection especially helminth infection on livestock among researchers might be caused by the dissimilarity between the sample size determination and examination method. This study was done by adult parasite recovery through postmortem procedure, unlike most of previous researches conducted via coprological methods, which is reported more sensitive (Niguse & Meaza, 2017). Moreover, various managemental and environmental factors such as management system of examined animals, geographical location of the area. The aim of the project is to control worm were considered all aspect management system, such as deworming strategic, grazing system, nutrition and feeding system, breeding control, housing and confinement system, and effective waste management (Sani *et al.* 2004).

The prevalence of all identified parasitic nematode eggs (*Haemonchus* spp.) showed that had the highest prevalence, and *Strongyloides* spp was the lowest (Table 1). Furthermore, our findings revealed that *Haemonchus* spp. were the most prevalent among the nematode helminths; however, this is at variance with previous reports by Hailu *et al.* (2011) and Mir *et al.* (2013) who reported trematodes as the most prevalent helminths in studies carried out in India, Ethiopia, and eastern Nigeri. This difference could, however, be associated with the differences in geographical and/or climatic conditions and ecology since the presence of trematode infections is dependent on availability of the intermediate hosts.

Table 1. Prevalence of nematode infection obtained from slaughtered cattle in Manokwari abattoir

Species of nematode eggs	Number of positive samples (n)	Prevalence (%)
<i>Strongyloides</i> spp.	1	1.01
<i>Oesophagostomum</i> spp.	4	4.04
<i>Trichuris</i> spp.	4	4.04
<i>Haemonchus</i> spp.	6	6.01
Total	15	15.20

The prevalence of helminths in correlation between sex and infestation rate of nematodes revealed that 18.03% (11/61) of the male and 10.52% (4/38) of the female were infected, respectively (Table 2). The percentage of the male infected was similar to that of the female, with the male (odd ratio (OR) = 0.535; 95% confidence interval (CI): 0.16–1.82) showing slightly higher likelihood of being infected with gastrointestinal helminth when compared to the female.

Table 2. Prevalence of nematode infection obtained from slaughtered cattle in Manokwari abattoir in relation to sex

Variable	Category	Egg nematode		OR	95% CI	P value
		Positive (n) (%)	Negative (n) (%)			
Sex	Male	11 (18.03)	50 (81.97)	0.535	0.16–1.82	1.026
	Female	4 (10.52)	34 (89.48)			
	Total	15	84			

Furthermore, this study revealed that both male and female animals have equal likelihood of being infected with nematode helminths. One major factor that would have accounted for this was the fact that both the male and female cattle under the local setting in Manokwari regency are exposed to poor feeding and veterinary care, factors accountable for equal susceptibility to helminth infections. This is the same with findings by Raza *et al.* (2013) indicated that male cattle were more likely to be infected with helminth than female, because of the male animals were more aggressive when feeding and thus likely to pick up more ova of helminths on the pasture as feed. Furthermore, male domestic ungulates are mentioned to be more susceptible to infections with gastrointestinal tract helminth parasites than females due to hormones debilitating immune functions, which favor the growth and spread of parasites in male guts (Urquhart *et al.* 1996). Despite these, the phenomenon of parasitism during pregnancy caused by a stress and decreased immune competence (Urquhart *et al.* 1996) in female animals may have neutralized the possibility of more male infection in our study. Although there is no record of the exact number of pregnant female animals during this study, some were found pregnant at slaughter. This factor, would also have contributed to the similarity in the prevalence of helminth infection in both the male and female animals sample.

CONCLUSION

The result of this study shows that 15.2% nematode helminth infection was detected in fecal sample examination collected from all slaughtered cattle at a major abattoir, Manokwari Regency, West Papua Province. This study showed that a low prevalence of nematode helminth infection in slaughtered cattle at abattoir may cause economic and zoonotic importance among trade of cattle slaughtered in Manokwari regency West Papua.

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