Oral Presentation (FA-11)

Seroprevalence and Risk Factors for Bovine Brucellosis in Daerah Khusus Ibukota Jakarta Province, Indonesia

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INTRODUCTION

Brucellosis in dairy cows caused by *Brucella abortus* is detrimental to the dairy business because it adversely affects the production and reproduction potential of dairy cows. In Indonesia, annual economic losses due to reproductive disorders including abortion, infertility, sterility, death early of born weak calves and decreased milk production reached 13.8 million US$ (Noor, 2007).

Subsequent serological studies have indicated the presence of bovine brucellosis in some areas in Indonesia such as South Sulawesi, West Timor and DKI. Jakarta. Although infection of goats and sheep in Indonesia has not been documented, brucellosis is likely to be present in these species as well. However, brucellosis in these species is generally caused by *Brucella melitensis.*

Brucella abortus is endemic in Indonesia. In past three years, the number of brucellosis cases in DKI. Jakarta has increased with more less 501 heads were detected seropositive recently in 91 farms of dairy cattle and 141 out of 899 samples in 2013, 5 out of 178 in 2014 and 58 out of 202 in 2015 samples were positive Brucellosis reported among approximate 2.550 dairy cattle in DKI. Jakarta province respectively. Brucellosis was detected not only in dairy cattle, but also in sheep in DKI. Jakarta Province. Therefore brucellosis still a concern of the Indonesian government.

Population of cattle in Indonesia is more less 16 million. This population comprises of 15.5 million of beef cattle and 0,5 million of dairy cattle distributed in 33 provinces. In Indonesia, eradication activities are accompanied by a vaccination program of infected farms conducted to maintain low level of brucellosis at farm level.

However the implementation of vaccination program is mostly irregular, and therefore the benefits from the vaccination for brucellosis may be hard to assess. In addition, culling accompanied by a compensation scheme has not worked properly, as the amount of compensation disbursed is generally considered insufficient by farmers. This means that not all seroreactors are culled. (Anka *et al*, 2014).

This situation threatens the cattle population in DKI. Jakarta, especially for DKI. Jakarta Province which has become the source of dairy products such as milk and milk-derived products. Therefore, bovine brucellosis is still one of the targeted diseases that the Indonesian government is trying to eradicate in future.

MATERIAL AND METHODS

Data

Secondary data of the disease were gathered during 2013-2015 from Disease Investigation Center (DIC) Subang. Primer data from dairy cattle farmer and Livestock Services Office in DKI. Jakarta, DIC Subang, Directorate General of Livestock and Animal Health Services (DGLAHS) which gathered by active surveillance in August-September 2016. Farms with one and more Complement Fixation Test (CFT) positive cows were detected was seropositives, otherwise seronegatives. At each farm, comprehensive epidemiological information was collected by interview with farmer using a structured questionnaire. Dairy Cattle sera were serologically tested by Rose Bengal Test (RBT) followed by CFT for RBT seropositive in Disease Investigation Center subang.

Data Analysis

Descriptive analyses of explanatory variables

Farm-level information was classified into categorical and numerical data (explanatory variable). Descriptive statistics were calculated using *analyses tool pack* of Excel.

Risk factor analyses

A two-sided Fisher's exact test was used in univariable analysis. Those explanatory variables that showed $p \leq 0.15$ were further evaluated by multivariable logistic regression analysis. All the statistical analyses and Modelling were conducted by Epi-Info software *7.2.0.1 version*. The final model was considered to be the most appropriate model for data.

Study Design

A case-control study was employed and farm was the study unit. Thirty three dairy farms where brucellosis were detected in 2016 by CFT then were defined as the case farms and 58 farms where brucellosis not detected were defined as the control farms in this study.

Blood samples were collected from 2.499 cattle and distributed across in 31 farmers,9 villages, 5 subdistricts and 3 districts (East Jakarta, South Jakarta and West Jakarta) in DKI. Jakarta.

RESULT AND DISCUSSION

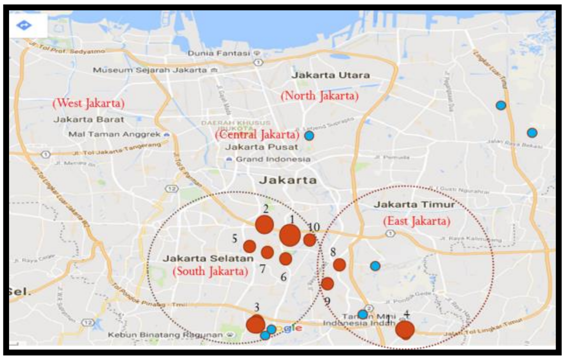
Seroprevalence of bovine brucellosis in DKI. Jakarta in 2016

One hundred and fourty seven (5.9%) out of 2.499 dairy cattle sera were tested positive by both the RBPT and CFT from total 91 farms have been contributed. Total of 91 farms, 31 farms were identified brucellosis seropositif (34.1 %). Forty three out of 91 dairy cattle farms in DKI. Jakarta having abortion history in 2016, and the remain were not having abortion history (57%). Out of total 13 Subdistrict were tested, 5 suddistricts founded brucellosis seropositive from 2 districts, South Jakarta and West Jakarta. These were Mampang Prapatan, Pancoran, Pasar Minggu, Cipayung and Kramat Jati. While in Central Jakarta identified brucellosis seronegative.

At farm level, total prevalence was 34.1% over total 91 farms. Prevalences rate range were 28.6%-50%. The highest prevalence was in Pasar Minggu (50%) followed by Cipayung (44.7%), and the lowest prevalence was in Kramat jati Subdistrict.

Brucellosis distribution in villages level in DKI. Jakarta in 2016

Brucellosis was detected in 2 municipalites, in South Jakarta and East Jakarta, while in North Jakarta was not detected. Brucellosis seropositive were distributed mostly in South Jakarta and 7 out of 9 villages was seropositive. And in Est Jakarta, 3 out of 7 villages were brucellosis seropositive. Map 1 showing geographical distribution of brucellosis in villages level in DKI. Jakarta.



Map 1. Geographic distribution of brucellosis in DKI Jakarta in 2016

- Red point indicated brucellosis seropositive and blue point were seronegative
- The size of point shows the prevalensi rate ' more bigger size more higher prevalence rate'

Analytic Statistic

Risk factors analysis

Total there were 13 explanatory variables examined in univariable analyses (chi-square) and 5 variables showed significant to brucellosis seropositivity with p< 0.05. Univariable analysis of 91 farms results showed some variables indicated as potential significant risk factors. Five variables showed significant associated with brucellosis, these were farm size, purchasing cattle, mating, brucella vaccination and disinfection. Those variables then used in The multivariable logistic regression model to be analysed to get final model.

Table 1. Multivariable logistic regression of farm-level potential risk factors for bovine brucellosis Seropositivity in DKI. Jakarta

Variable	Odds ratio	95% CI	P-value
Farm Size			
Large	4.9	1.5 ; 12.7	0.002
Small			
Mating			
Artificial Insemination	6.4	1.1 ; 17.8	0.005
Natural			
Desinfection			
No	2.8	0.1 :1.0	0.05
Yes			
Constant			0.001

According to the multivariable logistic regression (Table.1), there were 3 variables showed significant associated with brucellosis : Farm size (odd ratio<OR> = 4.9;95% CI: 1.5,12.7), Mating by artificial insemination (odd ratio<OR> = 6.4;95% CI: 1.1,17.8) and Disinfection as protective factor (odd ratio<OR> = 2.8;95% CI: 0.1,1.0).

In the present study, our result found large farmsize and artificial insemination were identified as the risk factors associated with seropositivity to Brucellosis. Large farm size seems 4,9 time more likely to have risk of brucellosis infection than small farmsize. Farmsize is risk factor because in large farms provide more chances for contact between the animals. Large farm size as risk factors associated to brucellosis has been reported by Makita *et al* (2011), the results showed brucellosis seropositive in Kampala, Uganda was significant in large farm size than small farm size (p=0.001). The consistent findings had been showed by Mohammed *et al* (2011), the results showed the prevalence of brucellosis increased in with greater farm size. In the case of brucellosis, the infection agent introduced by new cattle may be easily passed beetwen animals following an abortion episode via pasture or feed contaminated with the organism, inhalation, conjunctiva inoculation, skin contamination, or from contaminated utensils used on infected colostrum for new born calves (Anka *et al*, 2014).

Artificial insemination is identified as risk factor as well. Farms which having artificial insemination 6.4 times more likely to have brucellosis infection compare to farms with natural mating. Brucella antigen could be transmitted via Artificial insemination gun during non aseptic AI procces by inseminator. The use of disinfectant was identified as the factor that protect against brucellosis. Farm which were not having disinfection seems 2.8 times more likely to have brucellosis infection in their farms compare to farms with having disinfection. in other words, disinfection is protective factor to reduce brucellosis infection.

The prevalence of brucellosis in South and East Jakarta were quite high. Since the development program Pondok Rangon in East Jakarta region as the center of the dairy farm, then there was transmission of brucellosis from South Jakarta to East Jakarta. It is very possible because a program to eradicate brucellosis in this area has not been carried out strictly. Meanwhile, the prevalence of brucellosis has existed in a long time period and government funding for compensation as a substitute cost for the reactors are limited causes transmission and spread of the disease were uncontrolled.

CONCLUSION

In conclusion, The results of farm-level risk factors analyses (n=91 farms) showed there were 2 variables as risk factor and 1 variable as protective associated with presence of abortion: Large farm size, artificial insemination and disinfection. More attention should be paid and strengthening proper control program for bovine brucellosis control program such as vaccination for farms with prevalence >2%, Test & Slaughter for farms with prevalence <2%, biosecurity, good management practice (GMP) in farm, Biosecurity and animal movement controlling should be suggested as control measure.

REFERENCE

[1] Aieo SE, Mays A (Eds). 1998. The Merck veterinary Manual, eight edition. Whitehouse station, NJ, USA: Merck & CO, Inc.

[2] Anka MS, Hassan L, Khairani-Bejo S, Zainal MA, Mohamad bin R, Salleh A, Adzhar A. 2014. A case-control study of risk factors for bovine brucellosis seropositivity in Peninsular Malaysia. *J plos one.* 9(9):e108673.

[3] Hovingh E., 2009. Abortions in Dairy Cattle-1. Common cause of abortions. Virginia Cooperative Extension, Virginia State University.

[4] Makitta K, Fèvre EM, Waiswa C, Eisler MC, Thrusfield M, Welburn SC. 2011. Farm prevalence of bovine brucellosis and analysis of risk factors in cattle in urban and peri-urban areas of the Kampala economic zone, Uganda. *BMC Veterinary Research.*20117:60 DOI: 10.1186/1746-6148-7-60

[5] Mohammed FU, Ibrahim S, Ajogi I. Olaniyi BJO. 2011. Prevalence of Bovine Brucellosis and Risk Factors Assessment in Cattle Farms in Jigawa State. International Scholarly Research Network ISRN Veterinary Science Vol: 2011, Article ID 132897, 4 pages doi:10.5402/2011/132897.

[6] Noor SM. 2007. Epidemiologi dan pengendalian brucellosis pada sapi perah di pulau Jawa. Lokakarya Nasional Ketersediaan IPTEK dalam Pengendalian Penyakit Stategis pada Ternak Ruminansia Besar. Balai Penelitian Veteriner. In Indonesia.