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Epidemiological studies on bovine brucellosis with special reference on assessment of risk factors and its management in dairy farms in Gharbia Governorate

A thesis presented by

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6-SUMMARY:

Brucellosis is zoonotic infectious disease infect both animal and human and has economic impact on dairy production. Brucellosis is endemic in Egypt especially in Nile delta, so we conducted this study on dairy farms to study the epidemiology of the disease and its risk factors and try to find out the most suitable and reliable program for prevention and control of the disease from dairy farms in Gharbia governorate. Our study conducted a serological survey in dairy farms in Gharbia Governorate to evaluate the endemicity of brucellosis and its risk factors.

Examination of 240 dairy farms revealed that 25 farms (10.4%) were infected with brucellosis and 215 farms (89.6%) were free. Moreover, analysis the distribution of positive cases showed that April, February and January had the highest rate of positive cases as 16, 14, and 13 positive cases were recognized, respectively. However September and November had the lowest rate as 8 and 7 positive cases were found, respectively. As well, our result indicated that the districts of Samnood, Kafr-Elzyat and Basion had the higher prevalence of positive cases, 6.35% , 4.67% and 3.57%, respectively. However districts of El-Santa, Zefta and El-Mahla El-Kobra had the lowest prevalence, 1.49%, 2.3% and 2.89%, respectively.

Tissue samples were collected from positive slaughtered animals for bacteriological examination and typing of *Brucella* species and the results indicated that *Brucella melitensis* biovar 3 is the dominant strain in dairy farms in Gharbia Governorate. Also PCR and electrophoresis was conducted on the isolates for more confirmation of the bacteriological examination and further classification.

Nine samples from farm's dogs and 30 samples from rats were examined serologically for brucellosis and the results revealed no positive cases from dogs and 2 positive cases from rats, which proved the important role of stray animals in the distribution of brucellosis.

One infected farm was selected for application of control program that including test and slaughter of positive cases, vaccination of small heifers and good sanitation of the farm. The result of frequent testing of the farm indicted that, to complete eradication of brucellosis more one time testing is required. Moreover, strain 19 vaccine should be used for immunization of the newly born generation of animals. Following up of antibodies titer in dairy animals, indicated that strain 19 vaccine is a good vaccine for control of brucellosis as it give a long live solid immunity.

Evaluation of the efficacy of disinfectants was conducted as a part of brucellosis control program, so we examined two types of disinfectants, traditional types including; (Virkon®S, Cidex, Sodium hypochlorite, Betadine and Dettol) and new nano types including; (Dettol with Silver-nanoparticles (NPs), Glutaraldehyde with silver-NPs and Calcium oxide - NPs). The results showed that the bactericidal efficacy of the disinfectants were influenced by their concentration, exposure time, especially for Vircon S, however dirty conditions and low temperature decrease the efficacy of disinfectants, especially for Dettol. On the other hand. nano-disinfectants had better efficacy than traditional types, specially Glutaraldehyde with silver NPs. so we suggested that *Brucella melitensis* is sensitive to commonly used disinfectants. However, the bactericidal efficacy was decreased with presence of dirty conditions and low temperatures.

An Epidemiological survey was conducted and data were collected from farm holders and veterinarians, and assessment of risk factors was done. The results of that survey indicated that many factors had significant correlation with the positivity of the farms, such as insertion of newly purchased animals, housing of different species at the same site, sharing the instruments and equipments with other farms, bad sanitation, bad disposal of fetal membranes and normal insemination, While, absence of enough knowledge about brucellosis infection have weak correlation with the positivity of the farms for the disease. On other hand, some factors have not more significant correlation with presence of brucellosis in dairy farms, such as absence of parturition pens, presence of stray animals and no periodical testing of the farm for brucellosis which had equal share of positive and negative cases. In addition, intensive housing system and the age of animals increase the opportunity of infection with brucellosis.

Finally, brucellosis is endemic disease in dairy farms and need more collaboration between farm holders and the veterinary authorities to eradicate it.

7- CONCLUSION:

Brucellosis is endemic in dairy farms in Gharbia governorate with prevalence rate 10.4% and need good control program to decrease its economic loses.

Brucella melitensis biovar 3 (sheep strain) is the dominant isolated strain from the dairy farms in Gharbia Governorate and had an epidemiological importance as indicated from the mixed housing system that represent a risk factor for occurrence of brucellosis.

There are many risk factors correlated with brucellosis with significant effect as absence of quarantine, mixing housing, absence of vaccination program bad sanitation and using of bulls for insemination so, should be in mind during application of control program.

Vaccination and periodical examination of dairy farms is very important to control brucellosis.

Periodical application of disinfectants is a very important procedure to prevent transmission of the disease in dairy farms. The traditional types of disinfectants as Betadine, Vircon S, Dettol and Bleach are very effective against *Brucella* microorganisms> As well, Nano types of disinfectant were very effective against *Brucella* and need more evaluation for its efficacy and toxicity.

Finally brucellosis require good control program including assessment of risk factors and good education of farm holders about the danger of the disease.